

H2Accelerate

Policy position on heavy-duty hydrogen transport

June 2023

With the EU Green Deal, Europe has set itself the ambitious target to become climate neutral by 2050. This requires an overhaul of all energy and CO₂ related legislation to align with the climate reduction target and comply with the Paris Agreement.

Energy is a pivotal part of the economy; without energy there is no industry. The energy sector will have to reduce greenhouse gas emissions in the coming years, and renewable and low-carbon energy will play a crucial role in the transition towards a low-carbon economy. This will help to diversify Europe's energy supply and reduce dependency on imported fuels.

Reliable and affordable access to energy is key for the EU's industrial competitiveness. Recent geopolitical events have exposed the vulnerability in the EU's energy systems due to dependency on undiversified sources of energy. Furthermore, low-cost energy and subsidies schemes in other regions will challenge Europe's industrial base and technology leadership in zero-emission solutions.

Hydrogen will be essential for the transition and transformation towards climate neutrality and ensuring economic growth in Europe, as a method for storing and delivering clean energy at scale for many sectors, including the transport sector. Other worldwide economies have recognized the importance of hydrogen and are investing substantially into hydrogen as a future low- and zero-carbon fuel, facilitated by subsidy schemes like the Inflation Reduction Act. In order to keep up with other economies, Europe should set the right legal framework today to enable hydrogen in all sectors and avoid future high costs.

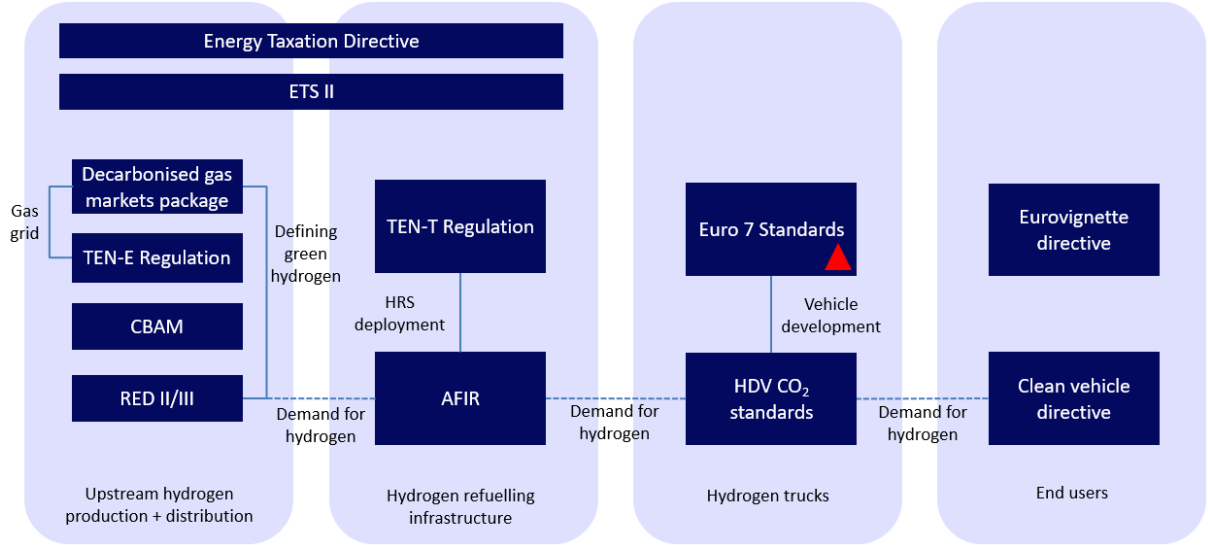
Putting hydrogen as top priority for Europe is not only important to reach EU's climate goal but will also be a strategic choice to ensure energy security and reduce dependency on energy imports. This position paper from the H2Accelerate collaboration sets out a joint position on the current policies being discussed to support the use of hydrogen in transport. The H2Accelerate collaboration was formed in December 2021 between hydrogen infrastructure players Linde, Shell, and TotalEnergies, and truck OEMs Daimler Truck, Iveco Group, and Volvo Group, to accelerate the deployment of hydrogen trucking in Europe.

The need for policy

For trucking end users, fine margins mean that in order to convert large portions of their fleets to zero emissions options, cost parity with the incumbent diesel vehicles over their lifetime operation is required. Previous H2Accelerate analysis on the 'cost of ownership and policy support required to enable the industrialisation of fuel cell trucks' indicates that due to the relative technological immaturity and low production volumes of hydrogen trucks, policy support will be required to enable cost parity between hydrogen and diesel heavy vehicles until at least the 'sustainable growth' phase (~2030), and possibly until the 'full industrialisation' of the sector (~2035). The whitepaper considered how baskets of different policy measures could be used achieve cost parity, including support for green hydrogen through RED credits, carbon tax through ETS II, and differential road tolls through the Eurovignette directive.

The current European policy landscape

A number of policies to support the deployment of hydrogen trucks and infrastructure, and discourage the use of fossil fuels for transport have been adopted or proposed by the European Commission. The below graphic shows the different policies currently in force or under consideration relating to heavy-duty transport and hydrogen, and the links between them.



H2Accelerate members note that these policies are often developed in isolation from one another, leading to inconsistent measures being taken to achieve the same goal. It is the belief of H2Accelerate members that targets for hydrogen production, refuelling infrastructure, and end use must be equally ambitious in order to secure offtake and supply of hydrogen. Similarly, the timelines for the deployment of upstream hydrogen production, refuelling stations, and hydrogen trucks must also be aligned to ensure a business case for stations and fuel supply for vehicles.

The following sections describe the common position of H2Accelerate members on a number of key proposals for the purpose of supporting the creation of the necessary policy and regulatory pre-conditions for the industrialisation of the hydrogen truck sector.

The Alternative Fuels Infrastructure Regulation (AFIR)

In March 2023, the European Parliament and Council reached an agreement on the Alternative Fuels Infrastructure Regulation (AFIR). The regulation requires that at least one HRS, with the ability to refuel both heavy-duty vehicles and cars and capacity of at least 1 tonne/day, is installed every 200km on the core TEN-T network and in urban nodes by 2030.

H2Accelerate members welcome the implementation of binding and ambitious AFIR targets, however note that the requirements of AFIR in the agreed regulation are only a minimum level of infrastructure, which should be increased in future revisions of the regulation as demand for fuel increases. These targets alone are expected to be insufficient to support heavy-duty sector decarbonisation; according to estimates from Hydrogen Europe, the regulation will result in at least 700 new HRS by 2030¹. This is significantly below the estimated 2,000-2,200 2 tonne/day HRS estimated to be needed to support a 45% reduction in emissions from the heavy-duty transport sector mandated by the Heavy-Duty CO2 standards².

It is expected that the national implementation of AFIR will be supported through funding programmes, such as the Connecting Europe Facility's Alternative Fuels Infrastructure Fund (AFIF) call. H2Accelerate members note the need for hydrogen refuelling infrastructure to be deployed consistently across all European countries, and not just those with dedicated funding programmes such as Germany, to allow end users to travel across the continent. This will be explored in an upcoming H2Accelerate position paper on 'Funding requirements to support pan-European hydrogen refuelling infrastructure'.

H2Accelerate members note that the heavy-duty sector has specific infrastructure requirements which are different to that of passenger vehicles, for example with regards to the need for secure refuelling and overnight parking. The requirement for stations to serve both heavy and light duty vehicles also creates significant additional complexity in the design and safety aspects of HRS, which will need to be supported through both increased funding and regulatory guidance on station design.

The requirements of AFIR only support gaseous refuelling stations, and do not mandate the need for liquid hydrogen refuelling. It is the H2Accelerate position that technology neutrality should be maintained for the near future to enable customers to trial different options. This is explored in the upcoming whitepaper on 'Different refuelling technologies for hydrogen trucks'. Members of the H2Accelerate collaboration are currently trialling liquid hydrogen stations and vehicles, and should these early trials be successful would propose a requirement for liquid stations be added to AFIR through the revision process.

¹ [Hydrogen Europe on LinkedIn](#)

² [ACEA \(2023\) Factsheet: CO2 Standards for Heavy-Duty Vehicles](#)

EURO VII and the HDV CO₂ standards

In order to reduce emissions from heavy-duty vehicles, two proposals for regulations have recently been proposed: EURO VII, which would introduce new pollutant emissions limits on internal combustion engine-powered HDVs, and the Heavy Duty CO₂ emissions standards, which set fleet wide targets for reducing OEMs' HDV CO₂ emissions.

Members of H2Accelerate consider that the Euro VII regulation will not promote efficient CO₂ emissions reductions and gives the wrong signal to the market. The current Euro VII regulation will require significant investment to produce the next generation of ICE-powered vehicles to meet the standards; investment which could be more efficiently used to directly develop new zero emissions solutions. Further, the current uncertainty on the legislative framework with many delegated acts still to be developed on key technical issues will mean that any measurable impact of investment in Euro VII will only be seen when numbers of diesel vehicles are decreasing and OEMs are in full electrification to meet the CO₂ fleet targets and hereby also tackling air pollution. It should also be noted, that the impact in improving air quality is only minor with EURO VII: complete fleet renewal with EURO VI vehicles would reduce NOx by 40%, whereas EURO VII would only add another 2% reduction³. Members encourage the regulation to be made as realistic as possible both on a content and application timeline basis, in line with the heavy-duty CO₂ regulation, to enable investment to be directed towards genuinely zero emission solutions.

The proposal for the revision of the HDV CO₂ standards gives companies a strong signal to invest at scale in truly zero emission solutions. Given the diminishing returns of investing in increasingly efficient diesel vehicles, it is the expectation of H2Accelerate members that the use of zero emission vehicles (i.e. battery and hydrogen vehicles) will largely contribute to meet the majority of the tailpipe emissions reductions targets. Both of these solutions will be needed to meet the needs of end users and allow suitable refuelling/recharging infrastructure to be provided, and different solutions will be suited to different use cases. Hydrogen trucks will be essential to meet the needs of long-haul, heavy-duty applications, as well as in other scenarios where access to fast charging for battery electric vehicles is limited or vehicles are double shifted.

The proposed revision to the HDV CO₂ targets, recently presented by the European Commission on 14th February 2023, sets a 45% fleet-wide emissions reduction target by 2030, 65% by 2035, and 90% by 2040, compared to a mid-2019 to mid-2020 baseline. H2Accelerate members support these values being set as ambitious and binding targets alongside a newly introduced assessment obligation for the Commission, published prior to the HDV CO₂ target review in 2028, assessing the effective roll-out of hydrogen refuelling and EV charging stations in all member states and proving its consistency with the HDV CO₂ reduction targets, which should be otherwise reviewed. In addition, strong enabling economic incentives for customers to purchase zero emission trucks must be in place to support deployment. There should be a clear link between the relevant EU legislations, and a system of conditionality taken into consideration that provides a safeguard clause for OEMs in the

³ ACEA (2023) [Proposal for a Euro 7 regulation](#)

case that the infrastructure roll-out is not materialized in a matching timeline. H2Accelerate serves to bring infrastructure players and OEMs together to kick-off the roll-out of HRS and hydrogen-fuelled vehicles with the support of relevant EU legislation.

It will be necessary to create demand for the vehicles and to prevent a step change in the cost of freight services. As demonstrated in the H2Accelerate whitepaper on the 'cost of ownership and policy support required to enable the industrialisation of fuel cell trucks', these incentives will be required until at least 2030 (and should be grandfathered over the lifetime of the vehicles), and could include differential road tolls for zero emission vehicles through the Eurovignette Directive and a carbon tax to disincentivise the use of diesel in transport, even though ETS II for transport has not delivered the expected results. These measures would need to be implemented in all member states in a timely fashion, in order to create the volumes of demand required to meet the updated targets.

In the early stages of zero emission vehicle deployment, H2Accelerate members consider that it is important to keep the current tank to wheel methodology and definition of zero emission vehicles currently in use. This allows hydrogen internal combustion engine vehicles, as well as hydrogen fuel cell vehicles, to meet the definition of 'zero emissions vehicles'.

Members of the H2Accelerate collaboration consider it vital that this regulation is finalised with the Fit for 55 Package during the mandate of this Parliament.

RED

Members of the H2Accelerate collaboration believe that the most important priority for RED II should be the adoption of the delegated acts, published 13th February 2023. This will provide the certainty to infrastructure companies on business case, thereby preventing any further delays to final investment decisions. This is particularly important as the development of green hydrogen production capacity has the longest lead time of any element of the hydrogen trucking system.

The collaboration also supports strong, binding, and separate targets for the use of renewable fuels of non-biological origin (RFNBOs) in transport under RED III. The provisional agreement text on RED III set out at the end of March sets a binding target of 5.5% for advanced biofuels and RFNBOs in the share of renewable energies supplied to the transport sector by 2030⁴. While H2Accelerate members consider that this target should be more ambitious, they prefer that the current target should be implemented as quickly as possible, and can be revised upwards in future.

Consistency in the volume of hydrogen implied by different policies

⁴ Council of the EU (2023) [Council and Parliament reach provisional deal on renewable energy directive](#)

With different policies being put in place to stimulate demand for hydrogen fuel and trucks, it is important that the volumes of hydrogen supply and demand are matched in order to secure sufficient supply for end users, and a business case for infrastructure. Further, additional policy mandating the use of hydrogen in different sectors without increasing upstream production risk insufficient hydrogen being available for end users in the heavy-duty road transport sector. This uncertainty creates a challenging investment case for truck manufacturers, whose customers will only purchase vehicles if high reliability and low cost hydrogen fuel is available across Europe. H2Accelerate members consider that proportional additionality rules for the production of green hydrogen should be implemented for every policy that increases the demand for it.

H2Accelerate members note that today the only policy incentive for the purchase of hydrogen trucks is the Clean Vehicle Directive, which only mandates the purchase of zero emissions vehicles under public procurements. This is not expected to lead to sufficient demand for hydrogen. Other purchases of hydrogen vehicles will therefore only occur if the cost and performance of vehicles is able to match or improve upon the incumbent solutions. H2Accelerate members therefore consider that further end user incentives to promote the purchase of hydrogen trucks in Europe would help to secure investment in upstream elements of the value chain.

Prerequisites for the development of a hydrogen trucking system

In addition to promoting the sale of hydrogen fuel and trucks, H2Accelerate members recognise there are practical barriers to the deployment of a hydrogen trucking system that must be resolved prior to full industrialisation. The implementation of a functional guarantee of origin scheme for green and low carbon hydrogen is a prerequisite for the practical application of the proposed policy measures. Similarly, a universal definition for not only green hydrogen, but other forms of hydrogen (such as low carbon hydrogen) will need to be in place before the policy proposals can be applied. Finally, pan-European standards for the fast and safe refuelling of trucks with hydrogen at 350 and 700 bar, and with liquid hydrogen are required in order to enable vehicles to meet the operational needs of end users.

Conclusions

A lack of cohesive policy in Europe to support the deployment of hydrogen trucking leads to a significant risk of uncoordinated and delayed transition to zero emissions solutions. This system relies on many actors taking action at the same time and massive scale to achieve the change needed. In order to achieve a 30-50% fleet-wide CO₂ reduction target scenario, ACEA estimates that 1,500-2,200 2 tonne/day hydrogen refuelling stations will need to be deployed across Europe, supporting 50,000 to 85,000 heavy-duty hydrogen vehicles⁵. The H2Accelerate

⁵ ACEA (2023) [Factsheet: CO₂ Standards for Heavy-Duty Vehicles](#)

collaboration supports the implementation of ambitious and binding policy measures that ensure, by 2030:

- At least 1.0 Mtonne per annum⁶ of green hydrogen could be available for the transport sector at a cost that allows competitiveness with diesel.
- Infrastructure players develop a pan-European network of at least 1,500 2+ tonne/day, high reliability hydrogen refuelling stations that are able to meet the specific needs of trucking end users, with a fuel cost that is competitive with diesel alternatives.
- Vehicle OEMs manufacture at least 50,000 heavy-duty hydrogen vehicles, which meet the performance requirements of end users, to create a business case for hydrogen production and refuelling infrastructure, on timescales that are aligned with the deployment of this infrastructure.
- End users are financially incentivised to purchase the vehicles through policy which creates cost of ownership parity (as a minimum) with diesel vehicles.

These measures, implemented together, will allow Europe's climate target to be met on time and in a way that minimises the financial impacts of the energy transition on end users of freight services.

⁶ Based on 2 tonne/day x 1,500 stations x 365 day/year x 95% capacity factor