Hydrogen Europe

HYDROGEN EUROPE'S

POSITION PAPER ON THE ALTERNATIVE FUELS INFRASTRUCTURE DIRECTIVE

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Hydrogen Europe's main requests:

1. **Hydrogen should be a mandatory fuel** on the list. Furthermore, **the National Policy Frameworks** submitted by the Member States **should be binding, while allowing for flexibility in how to achieve the targets.**

2. **Consider the specificity of infrastructure for heavy-duty vehicles,** supporting hydrogen refuelling stations on the TEN-T Core Network next to those at the logistics centres, depots and urban nodes.

3. **Develop additional technical requirements and CEN/CENELEC standards to enable interoperability** when refuelling hydrogen-powered heavy-duty vehicles.

4. Consider the added value provided by **multi-purpose hydrogen refuelling stations** at strategic locations that could **serve for different transport applications.**

5. **Provide a clear definition of "recharging or refuelling point accessible to the public" and extend the scope** of the definition, while not hampering innovation.

6. **Extend the scope** of the Directive **to rail infrastructure.**

7. **Extend the scope** of the Directive **to airport infrastructure for ground applications.**

8. **Provide hydrogen infrastructure for ships** to cover the needs of the maritime sector.

9. Emphasise the importance of solutions that can **address the entire energy value chain** and are **scalable** such as hydrogen.

10. **Enable synergies between the Trans-European Transport Network (TEN-T) and the Trans-European Energy Network (TEN-E).**

Introduction: The need for a hydrogen refuelling infrastructure

Hydrogen Europe welcomes the upcoming revision of the Directive 2014/94/EU on the Deployment of Alternative Fuel Infrastructure, especially in light of the European Green Deal and the European Union's (EU) aim of becoming carbon neutral by 2050. With 25% of the EU's GHG emissions attributable to transport, and the requirement to reduce them by 90% by 2050, the adoption of hydrogen-powered vehicles in various transport applications is crucial.

This review will represent a concrete action to support the hydrogen industry following the unveiling of the Hydrogen Strategy and the launch of the European Clean Hydrogen Alliance in July 2020. These are essential steps to acknowledge the key role of hydrogen as a pillar of the EU's industrial strategy and its role in ensuring the EU meets its energy and climate objectives.

Renewable electricity is expected to play a vital role in decarbonising the EU's energy consumption. However, it will not do it all through direct electrification, or battery solutions **and hydrogen will be needed.** Overall, hydrogen acts as an enabler of a renewable energy system by allowing the integration, long-term storage and distribution of large-scale renewable energies across different time and places, as well as offering a scalable solution to decarbonise different sectors such as heating, industry, and transport sectors, especially 'hard-to-abate' sectors such as heavy-duty long haul and the maritime sector.

Hydrogen technologies are essential enablers for decarbonising the mobility sector. They maintain the same operational flexibility as conventional engines: long-range, short refuelling time. Hydrogen is particularly well suited for heavy load, high energy use and harsh operational conditions. The vehicles can operate 24/7 in all climate conditions without energy loss. Hydrogen-powered vehicles are available or under development in a wide range of transport applications: light commercial vehicles, passenger cars, buses, coaches, trucks (including mining and garbage trucks), semi-trailers, material handling equipment, reach stacker, unmanned aerial vehicles (UAV), Automated Guided Vehicles (AGV), construction equipment (e.g. excavators), trains (regional passenger trains, shunters, locomotives), bicycles or yard tractors. In the maritime sector, hydrogen-based solutions (such as ammonia, methanol, liquid organic hydrogen carrier (LOHC), and synthetic methane) are currently being considered, along with liquid or compressed hydrogen.

The contribution of hydrogen-powered vehicles to decarbonisation in all modes of transport can only deliver its full potential if an appropriate infrastructure network is established. On the infrastructure side, hydrogen refuelling stations (HRS) can act as a balancer to the energy grids across Europe. HRS have built-in energy storage, can produce hydrogen on-site from the electrical grid or dedicated renewable energy sources, and they can receive hydrogen through pipelines, or in compressed or liquid form.

We call for the establishment of a common regulatory framework to provide for the rapid expansion of hydrogen refuelling stations network across Europe. There is no chicken-and-egg dilemma: the deployment of infrastructure must occur alongside the deployment of vehicles.

Along with the revision of the AFID, upcoming key initiatives should support the use of hydrogen in the transport sector, specifically the Sustainable and Smart Mobility Strategy and the revision of the Trans-European Transport Network (TEN-T).

The crucial role of the AFID to support the uptake of hydrogen infrastructure

To ensure a level playing field with other alternative fuels, and to allow the hydrogen market to reach capacity, the AFID needs to be revised and must include a set of actions described below:

1. **Hydrogen** (in compressed or liquid form) must be a **mandatory fuel** on the list. It must be noted that several Member States included hydrogen in their National Policy Frameworks (NPFs) while hydrogen was not mandatory. Furthermore, the Directive should require the **binding implementation** of the NPFs submitted by the Member States while allowing for flexibility in how to achieve the targets. The NPFs should also be in line with Member States' vehicle deployment plans, considering the level of maturity of the sector in each Member State, and combined with appropriate incentives to support the demand side. Proportionate sanctions should apply in case of non-compliance with these targets. Besides, the **European Commission should develop a common methodology** that the Member States would use to develop their deployment targets. This would ensure the coherence of the alternative fuels' infrastructure roll-out at European level (no infrastructure gaps).

2. Hydrogen is particularly suitable for heavy-duty applications, such as buses and long-haul trucks. For long-distance, hydrogen is expected to represent the most promising carbon-neutral solution. Long-haul applications may require higher refuelling flow and footprint. Therefore, the **specificity of infrastructure for heavy-duty vehicles (HDVs) must be considered.** It is necessary to support hydrogen refuelling stations **on the TEN-T Core Network (typically motorways) next to those at the logistics centres, at depots and urban nodes.** The heavy-duty market is moving fast and will require a proper infrastructure: A joint letter, entitled 'Joint call for the deployment of hydrogen fuel cell trucks - A needed shift towards a carbon-neutral society', signed by 44 industries covering the entire supply chain, committed to deploying **5,000-10,000 trucks by 2025 and up to 95,000 trucks by 2030[1].**

[1] https://hydrogeneurope.eu/sites/default/files/2020.02.12%20Joint%20call%20for%20deployment%20of%20FC%20trucks_final%20version%20with%20logos.pdf

3. **In order to enable interoperability when refuelling hydrogen-fuelled heavy-duty vehicles, additional technical requirements within the AFID and CEN/CENELEC standards will be needed.** Some of the existing standards referenced in the Commission Delegated Regulation (EU) 2019/1745 supplementing Directive 2014/94/EU will be applicable to refuelling points in their current form. For gaseous hydrogen vehicle refuelling, these additional requirements include the areas of refuelling protocols, refuelling nozzles to cover the needs for heavy-duty vehicles. For refuelling vehicles operating on other forms of hydrogen (e.g. liquid), new or improved standards will need to be written. Additionally, the Directive's technical requirements (Article 5 and point 2 of Annex II) will need to be expanded beyond gaseous hydrogen. A mandate should be given to CEN/CENELEC to address these gaps, and we look forward to providing the sectoral expertise needed.

4. The Directive should reflect the multi-faceted solutions that hydrogen technologies can bring to the transport sector's decarbonisation such as **multi-purpose hydrogen refuelling stations** at strategic locations **that could serve for different transport applications**, e.g. on-road and off-road vehicles at airports logistics and ports.

5. The current **definition of "recharging or refuelling point accessible to the public"** [2] (article 2.7) **may have led to different interpretations** by the Member States, potentially which may result in discriminatory access to the stations or funding schemes. To ensure legal certainty and market confidence, **we invite the Commission to provide a clear definition. We support the inclusion of private stations that allow access to other private users:** these stations may not be within the scope of the AFID depending on the interpretation of what a 'publicly accessible' station is in different Member States (and they could potentially be defined as a 'semi-public' station). However, that expansion of the scope of refuelling points covered by the AFID to non-publicly accessible refuelling points should not lead to restrictions in innovation by imposing standards for connectors, fuel quality and refuelling protocols that are not appropriate for the application in question. The technical requirements of Annex II point 2 should be directed at publicly accessible refuelling points only.

[2] "recharging or refuelling point accessible to the public" means a recharging or a refuelling point to upply an alternative fuel which provides Union-wide non-discriminatory access to users. Non-discriminatory ccess may include different terms of authentication, use and payment

6. In line with the objective of the AFID to establish a common framework for the deployment of alternative fuels infrastructure in the European Union and to mitigate the environmental impact of transport, the **scope of the Directive should be extended to rail.** Several Member States included rail in their NPFs. Regional rails should be considered as one of the sectors, in which hydrogen plays an essential role for achieving decarbonisation at an affordable cost and replace diesel trains on non-electrified tracks. The EU's ambition to shift freight transport from road to rail will open opportunities for more significant deployment of hydrogen in freight transport.

7. **Extending the scope of the Directive to airport infrastructure** for ground movements would provide a concrete pathway to carbon-free airports. The versatility of hydrogen solutions and its scalability is particularly well suited for energy-intense applications used in airports: the technology can be deployed in airport logistics, in harsh climate conditions without energy/performance losses. It can also be used for other purposes such as heating the airport or as back-up power, ensuring energy resilience. **Airports represent a natural location for the emplacement of a hydrogen ecosystem.** In the longer term (post-2030), the infrastructure could serve hydrogen-powered aircraft, especially short and medium-range aircraft along with long-range aircraft running on hydrogen-based fuels. In addition, funding hydrogen refuelling stations and infrastructure for different transport applications will provide a strong market signal to investors resulting in upscaling of renewable hydrogen demand and leading to a more robust supply chain.

8. **To cover the need for maritime application, ports should provide hydrogen infra structure for ships as a first step.** As we speak, large bunkering ports in the ARA (Antwerp-Rotterdam-Amsterdam) region are building hydrogen-fuelled tugboats. These projects will trigger the design, deployment, and operation of a hydrogen supply chain and the decarbonisation of ports. Hydrogen will be produced from low-carbon sources, whether in ports or elsewhere (e.g. offshore wind) and then delivered to ports via pipelines and/or ships. Hydrogen can then be used as a shipping fuel (but also as a fuel for the other mobility usages within the port) and to decarbonise the ports industrial areas - either as a source of clean energy or as a feedstock for industry (e.g. for ammonia production or refining).

9. Dedicated attention should be provided to **solutions that can address the entire energy value chain and are scalable** such as hydrogen. Hydrogen offers ways to integrate and transport large quantities of energy over long distance and provide cost-effective seasonal storage (e.g. in salt caverns). The costs of producing and transporting hydrogen via pipelines are 10 to 20 times cheaper than the cost of transporting electricity via cable, with transporting large energy capacity (1 to 2 GW for an electricity cable vs 15 to 30 GW for a pipeline)[3]. Direct electrification alone is not sufficient for large volumes and is not suitable for specific transport applications. The business case for hydrogen production and distribution is at its best with large volumes. Hydrogen is, therefore, needed as a scalable tool to decarbonise maritime and land transport and hard to abate sectors such as heavy industry/heating.

10. The **synergies between the Trans-European Transport Networks (TEN-T) and the Trans-European Networks for Energy (TEN-E) should be explored further** to make a direct link between the fuel source, the optimisation of the production, use and transport of large quantities of hydrogen and the increase of hydrogen demand for the transport sector through the development of hydrogen infrastructure network. When TEN-T and TEN-E corridors are aligned geographically, the HRS network should be strengthened. This is especially valid for HRS on the TEN-T corridors to be used by long haul trucks. Cross-references to TEN-T and TEN-E interlinks should be added to the revised TEN-T and TEN-E guidelines. In addition, according to the EU Hydrogen Strategy [4], the repurposing of existing natural gas pipelines or new dedicated infrastructure may provide an opportunity for cost-effective hydrogen supply to HRS.

The current requirements to implement hydrogen refuelling stations need to be amended to reflect the maturity and needs of the sector:

- **The distance between hydrogen refuelling stations should be** reduced from 300 to **150 kilometres considering population density and traffic level for stations developed for passenger cars/light commercial vehicles.** This would improve the customer experience and acceptance, with the increase of the reliability of the network. Achieving a high network density will be key to foster broad vehicle deployment.

- **In addition, the following elements should be considered** when deciding about the HRS location: **the presence of renewable electricity/hydrogen or distribution networks (TEN-E), presence of ports, airports, logistics hubs.**

[3]Source: Green Hydrogen for a European Green Deal A 2x40 GW Initiative
[4]COM (2020) 301 final

- Hydrogen refuelling infrastructure location should not be limited to the TEN-T Core networks to reflect the different transport needs. **The geographical scope should be extended to the whole transport network, including the comprehensive network and urban nodes.** The TEN-T guidelines [5] should also be amended to strengthen the sustainability goals in their requirements for both the Core and the Comprehensive networks.

- The standards of individual Member States for the construction of HRS (e.g. safety distances) are not always aligned. Harmonisation of European legislation would be required to achieve the HRS development in all Member States.

Additionally, the European Commission should consider adding a well-to-tank perspective when analysing infrastructure. Choices on the production and distribution of hydrogen will influence refuelling infrastructure when minimising costs and efficiency losses. The review of the Alternative Fuel Infrastructure Directive in the context of the Green Deal offers an excellent opportunity to analyse this interdependence between hydrogen production, distribution, and infrastructure, and to strengthen a broader industry discussion.

On the reporting, to ensure an appropriate level of monitoring, especially valid for alternative fuels technologies evolving quickly, Member States should report annually to the European Commission on the implementation of the Directive instead of every three years. This would be in line with the report of the Parliament's on the Deployment Alternative Fuels Infrastructure Directive (2018/2023(INI)).

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

Hydrogen infrastructure forecasts

Hydrogen-powered heavy-duty vehicles are considered as one of the key solutions to decarbonise the heavy-duty sector. As for hydrogen refuelling stations **for trucks**, especially for regional distribution and long-haul trucks, the sector forecasts that approximately **1,500 HRS** will be needed in the EU by 2030, each with a capacity of 2 tonnes of hydrogen per day [6].

Regarding rail, hydrogen-powered trains have significant market potential. FCH trains are expected to take a combined market share of 20 % from diesel-powered trains in all the considered areas of rail application in 2030. In other words, **one in five of the currently diesel-powered train vehicles could be powered by hydrogen [7]**.

Collaboration: a critical success factor

To achieve European climate and energy goals, the swift decarbonisation of the transport sector is necessary. A coordinated approach at national and EU level to ensure that the various plans are consistent among all stakeholders such as OEMs, utilities, regional authorities is essential. **Public and private partnerships, such as joint ventures, should be further encouraged** to share risks and deploy the infrastructure rapidly. **Public authorities will also play a crucial role in facilitating permitting procedures.** Nowadays, permitting procedures can be a lengthy process. Securing sufficient hydrogen demand, with the use of **captive fleets** is another crucial element to secure a valid business model for the station owner/operator.

[6] The number of stations depends on various parameters, including fuel consumption. Note that Stations will higher capacities/day will be needed as well to cover substantial trucks fleets.
[7] Roland Berger Study on the Use of fuel cells and hydrogen in the railway environment, April 2019 (https://www.fch.europa.eu/sites/default/files/Study%20on%20the%20use%20of%20fuel%20cells%20and%20hydrogen%20in%20the%20railway%20environment_final.pdf)

Stimulating the demand side

Besides supply-side measures to support the infrastructure uptake, **the need to stimulate the demand for zero-emission vehicles is vital, e.g. with financial and non-financial incentives.** Actions include **push and pull measures**, such as direct incentives for the purchase of alternative fuels/zero-emissions vehicles (as in Germany, Spain, United Kingdom), scrapping schemes, tax incentives, road toll exemption or reduction (e.g. in Germany, Switzerland), urban vehicle access restrictions, access to restricted areas or to specific times (e.g. at night for urban deliveries) and the use of dedicated lanes or free or reduced parking fees. The coordination between the main actors along this value chain, together with public authorities, will allow more rapid uptake of these vehicles.

In the maritime sector, tightening the regulations on ship emissions (e.g. following the Norwegian example in Fjords) would be an approach **to stimulate the demand side.** Extension of emissions controls areas (ECAs) would be another way to drive the demand for zero-emission ships forward.

A broad and rapid shift to zero-emission vehicles will only happen if they are **competitive in terms of customers Total Cost of Ownership** (TCO's) and will lead to significantly better business-cases for the vehicle operators: for these reasons, **a fully supportive fuel taxation framework** - which guarantees at least medium-term predictability and stability and which sets the right price signals - **is necessary.** In addition, it is essential to **consider the internalisation of external transport costs,** i.e. the 'user pays' and 'polluter pays' principles. This shall provide incentives for operators to include environmentally friendly solutions to achieve cost parity with traditional fuels.

On the fuel side, **hydrogen quotas/targets for renewable and low carbon hydrogen on the demand side would be a useful addition**. They are needed to drive decarbonisation and boost the uptake of hydrogen, sending a clear signal to end-users and triggering investment on the production side to meet the demand. On the transport side, a quota/target (a percentage of total volume) for carbon-free kerosene, shipping bunkering fuels, hydrogen-powered trains and for hydrogen in transport fuels could be set.

Financing

Despite the unprecedented crisis currently unfolding, the long-term climate and environmental challenges remain the main threat to our planet. **The clean hydrogen sector is ready to play its essential role in the Green recovery plan and support the decarbonisation of our economies.** It is even more imperative to advance the development of hydrogen infrastructure. The infrastructure needs to be set up rapidly while vehicles are becoming commercially available. Several instruments are expected to play a key role: the upcoming **Green Deal calls**, especially the mobility topic (area 5) should enable the implementation of hydrogen ecosystems at ports and airports including the necessary hydrogen distribution networks and refuelling stations. **The European Clean Hydrogen Alliance** will bring all stakeholders in the value chain to develop an investment agenda to stimulate the deployment of hydrogen production and use and build a pipeline of concrete projects (by the end of 2020). **The Important Projects of Common European Interests** (IPCEI) are also expected to be part of the process. It is essential to encompass the use of hydrogen for mobility purpose, with ambitious infrastructure networks and vehicles deployments.

Moreover, **CEF Transport and Energy are an essential complementary scheme** for the massive deployment of hydrogen technologies for transport, energy, and industry. Close **coordination** between these funding sources, the **Innovation Fund, Clean Hydrogen for Europe partnership** under Horizon Europe and the new measures proposed under the Next Generation EU programme such as **the Strengthened InvestEU programme, the proposed Strategic Investment Facility as well as the Recovery and Resilience Facility** is vital. It should be planned from the launch of the new Multiannual Financial Framework (MFF), especially given the central role that hydrogen is should play in green recovery plans. Recovery and resilience plans should be used to deliver a green transition, in particular, to boost investment in hydrogen infrastructure.

Specifically, **the future Clean Hydrogen for Europe partnership** and successor to the Fuel Cells and Hydrogen Joint Undertaking (FCH JU) should be built on three, equally important pillars: (1) production of hydrogen, (2) distribution of hydrogen and (3) end uses applications including transport. Restricting or even focusing the partnership on pillar 1 and 2 without the end-uses would separate the supply from the demand of hydrogen and would ignore the fact that transport applications are those that require the most R&I.

The future partnership should include flagship projects which develop an application up to commercial readiness and catalyse the massive investments anticipated by the IPCEI, Clean Hydrogen Alliance and EU policies. Similarly, the future partnership should support Hydrogen Valleys (e.g. port, airport), combining in a single location production and distribution of hydrogen and several end-uses applications and demonstrating the full potential of hydrogen as an enabler for sector integration. This would be very complementary to the Green Deal call transport topics. To consolidate this sector, a continuation is urgently needed. Given the growing importance of hydrogen technologies; this should be reflected in a **doubling of the relevant budget.** Moreover, it would be in line with the commitment taken in Mission Innovation to double the budget of public funding R&I for clean energy, including hydrogen.

The already existing co-funding and financing schemes should be further strengthened. We welcome **the CEF Transport Blending Facility** and the opportunity that it will leverage. However, the current funding for the additional costs on the vehicle side and infrastructure sides **should be supported with higher rates**. Furthermore, the CEF mechanism must ensure that hydrogen refuelling infrastructure roll-out happens in both TEN-T Core and Comprehensive networks. **Regional funds** should help to fill the gaps in EU regions, as well as in remote areas, mainly due to the significant role played by the regions in the creation of a hydrogen ecosystem.

To ensure infrastructure is developed quickly and at scale, in parallel to technology costs coming down and the first hydrogen-powered heavy-duty vehicles hitting the roads, **subsidies and incentive schemes should be directed at projects that can deliver multiple hydrogen stations along key transport routes.**

Finally, future national and reform plans will also be an opportunity to support investments in infrastructure through the **new Recovery and Resilience Facility.**

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