

# Alternative fuels infrastructure as the key to unlock the potential of hydrogen-fuelled mobility

## Recommendations

To improve the efficacy of the new Alternative Fuels Infrastructure Regulation (AFIR)<sup>1</sup>, Hydrogen Europe recommends the following:

1. Ensure that the proposal acts in unison with other proposals of the Green Deal that drive demand for clean solutions in road, waterborne, and aviation sectors.
2. Increase the ambition on hydrogen refuelling infrastructure targets along the TEN-T core and the TEN-T comprehensive network.
3. Establish additional intermediate targets for the TEN-T core network as for instance a 100km limit on the hydrogen refuelling stations network already by 2027.
4. Set out requirements for flexible hydrogen and hydrogen-derived fuel roadmaps for other transport modes, including water transport and aviation.
5. Include deployment of alternative fuels rail infrastructure in the mandatory part of the national policy frameworks.
6. Ensure that the technical specifications for hydrogen supply for road transport are aligned with the standards identified within the Delegated Regulation 2019/1745 on the Alternative Fuels Infrastructure<sup>2</sup>.
7. Use the new targets and roadmaps as starting points for future ambitions to develop an effective hydrogen refuelling infrastructure, ensuring that the potential of this technology is not underestimated, and the objectives are not overlooked.

## Context

The revision of the 2014 Directive on the Alternative Fuels Infrastructure (AFID)<sup>3</sup> is one of the most important proposals of the “Fit for 55” Package, particularly when it comes to promoting alternative modes of transport. The proposal clearly recognises the need for a more defined and coherent set of rules and targets for alternative mobility to ensure the development of an efficient alternative refuelling infrastructure network across the EU.

**Hydrogen Europe welcomes the choice to move from a Directive to a Regulation, since this entails that the targets set within the measure will be binding and directly applicable in all Member States.**

Applying mandatory deployment targets for road transport will be critical to deliver the Green Deal objectives, especially since targets **include both TEN-T core and comprehensive networks to ensure**

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<sup>1</sup> Proposal for a Regulation of the European Parliament and of the Council on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council ([Alternative Fuels Infrastructure Regulation](#))

<sup>2</sup> Commission Delegated Regulation (EU) 2019/1745 of 13 August 2019 supplementing and amending Directive 2014/94/EU of the European Parliament and of the Council as regards recharging points for L-category motor vehicles, shore-side electricity supply for inland waterway vessels, hydrogen supply for road transport and natural gas supply for road and waterborne transport and repealing Commission Delegated Regulation (EU) 2018/674 ([Delegated Regulation on Alternative Fuels Infrastructure](#))

<sup>3</sup> Directive 2014/94/EU of the European parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure ([Alternative Fuels Infrastructure Directive](#))

**geographic availability.** Based on Hydrogen Europe’s calculations, these targets will translate into over 800 hydrogen refuelling stations (HRS) across the EU, a very significant improvement from the current 157<sup>4</sup>.

We underline that **while binding targets are an encouraging step, they only reflect the very minimum level of ambition necessary to deliver on the Green Deal objectives and are not enough to harness the full potential of hydrogen technologies.** To ensure that, it is of key importance to put in place measures that will allow for using all types of clean hydrogen<sup>5</sup> to meet the objectives set out for decarbonization of the transport sector. Therefore, **they must not be watered down or undervalued, but can only be the basis for future developments.** Moreover, the limit of the AFIR scope to targets up until 2030 for hydrogen infrastructure calls for a reassessment of the infrastructural needs in all transport modes.

**The AFIR has to be seen as an essential proposal of the Green Deal that cannot be separated from other proposals relevant for the different transport modes.** For an efficient deployment of zero emissions mobility solutions, it is crucial to jointly develop both demand and supply side. **AFIR can only succeed in unison with the proposals that will drive demand for the uptake of clean solutions** – be it with **EU ETS** (for waterborne and road transport), **CO2 Standards** for road transport (cars and vans and the upcoming proposal for heavy-duty vehicles), **FuelEU Maritime** proposal, the **Energy Taxation Directive**, and the **RefuelEU Aviation** proposal. **Hence, these proposals need to be equally ambitious to match supply and demand across all the transport modes and make the European Green Deal a true success story for clean mobility.**

We support the introduction of a clearer definition of “recharging or refuelling point accessible to the public” so to avoid different interpretations by the Member States which could have resulted in discriminatory access to the stations or funding schemes. The definition should also clarify whether a refuelling station that can only be operated by authorised users (and not by the general public) is classified as public refuelling station.

**Hydrogen technologies offer long-range solutions, short refuelling time, and are very well suited for heavy loads and high energy use.** Hydrogen-powered vehicles can operate 24/7 in all climate conditions and are available in different applications: LCVs and HDVs, passenger cars, buses and coaches, forklifts, excavators, uncrewed aerial vehicles, Automated Guided Vehicles, trains. In both waterborne transport and aviation, clean hydrogen and hydrogen-based solutions are among the most promising technologies to deliver zero emission operations. Commercial-scale flight has already been demonstrated in a six-seat aircraft, while certified technology for 20-seat flight and the launch of commercial routes is expected in the EU in 2024. These characteristics make hydrogen and its many forms an essential tool to achieve the European goal of carbon neutrality.

### **Higher ambitions for a more comprehensive and efficient hydrogen road mobility sector**

While we greatly appreciate the clear and binding targets for HRS set by the new instrument, **Hydrogen Europe believes that these targets should be seen as the minimum starting point for the roll out of HRS in road transport.** The proposal should also consider specificities of heavy-duty refuelling, with a binding requirement of 2 tonnes per day to be available at site.

More specifically, the **distance between HRS deployed along the TEN-T core and the TEN-T comprehensive network should be reduced from 150km to 100km** to guarantee an adequate

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<sup>4</sup> Fuel Cells and Hydrogen Observatory

<sup>5</sup> Hydrogen Europe defines this as either hydrogen with 90% GHG reductions or renewable hydrogen. *Hydrogen Act* [https://www.hydrogeneurope.eu/wp-content/uploads/2021/04/2021.04\\_HE\\_Hydrogen-Act\\_Final.pdf](https://www.hydrogeneurope.eu/wp-content/uploads/2021/04/2021.04_HE_Hydrogen-Act_Final.pdf)

coverage for hydrogen vehicles. Furthermore, specific and more ambitious target should be set for the TEN-T core network, **including a 100km limit between HRS along the core network to be reached already by 2027** as well as a significant increase of the daily output capacity for hydrogen refuelling stations. Moreover, the AFIR should set ambitious standards as to the accessibility and usability of hydrogen refuelling stations to guarantee easy access and short refuelling times. All of this together would give confidence to both OEMs and customers.

According to Hydrogen Europe's calculations, for a total H2 fleet of more than 2 million Fuel Cell Electric Vehicles, it would be recommended to have around 5000 hydrogen pumps. **Based on an average three pumps per station, approximately 1700 HRS in 2030 would be needed to satisfy the corresponding 2030 fleet mix.** This assessment shows that the current targets are just a minimum policy signal that can be treated as a basis for making the necessary investments and to satisfy the shortfall between the HRS mandated by the targets and the actual demand for HRS across Europe.

**Additionally, Hydrogen Europe supports the proposal's target of mandating liquid hydrogen refuelling station every 450km.** Liquid and gaseous hydrogen have their specific characteristics and offer different advantages, hereby widening the scope of the usage of hydrogen. Therefore, refuelling stations should be equipped with gaseous as well as liquid hydrogen, ensuring a customer friendly infrastructure that will facilitate the market uptake of both technologies.

Lastly, **hydrogen refuelling stations at each urban node should be at least two**, in order to ensure an increase in use and reliability.

### Setting tailored targets and approaches for other modes of transport

Hydrogen Europe also deems it fundamental to stress that decarbonisation efforts concern all transport modes including rail, water transport and aviation, which will also require the development of alternative fuels trajectories. The text of the proposal primarily tackles these under the national policy frameworks, which for some modes would not be sufficient to provide enough clarity to all parties and the needs and availability of various types of infrastructure.

#### *Waterborne transport*

**Pure hydrogen and hydrogen-based e-fuels (e.g. e-methanol, e-ammonia, e-LNG) offer a great potential for the development of a sustainable waterborne transport sector.** Together with the new FuelEU Maritime instrument, the proposal could have the potential to make ports become **hydrogen hubs, where hydrogen can be produced or imported, stored and distributed to be used in different applications** (such as inland waterways, onshore power, trucks and rails, industrial hinterland and others).

Ports will also need to consider the triple-S criteria (sustainability, scalability and storability) when developing hydrogen infrastructure. Ports are also bound by local legislation and lack of space which can hamper the storage of fuels that are more hazardous such as ammonia. The storability of alternative fuels or the lack thereof could also hamper the development of the said supply chain.

To provide a clearer picture to both operators and first movers in the waterborne sector, Hydrogen Europe stresses that a roadmap approach should be adopted, notably to match the ambitions set out in the future FuelEU Maritime Regulation. **Hydrogen Europe calls for a separate requirement for all waterborne port operators to prepare roadmaps for the rollout of appropriate refuelling infrastructure for hydrogen and hydrogen-based fuels, both for shipping and port operation's needs.** To face the uncertainty on what type of fuel is best suited for use, **ports will need to develop these roadmaps in synergy with actors like end users and fuel suppliers to design an appropriate timeline with related conditions for use and quantities of use.**

Additionally, the roadmaps should be prepared two years in advance of GHG targets and potential RFNBO sub-targets for FuelEU Maritime, thus the first roadmap would have to be finalized by 2023 and its update would have to be finalized in 2028. **The update of roadmaps ahead of FuelEU Maritime targets will provide greater predictability to the end users, port authorities, and fuel suppliers alike.**

### *Rail transport*

In line with the objective of the AFIR to establish a common framework for the deployment of alternative fuels infrastructure in the European Union, **Hydrogen Europe welcomes the inclusion of rail in the scope of the new Regulation in Article 13 on national policy frameworks (NPFs)**. Provisions for the deployment of alternative fuels rail infrastructure should be included in the **mandatory part** of the national policy frameworks to strengthen the ambition to decarbonise rail, as hydrogen powered trains can provide an excellent **opportunity to replace diesel units on non-electrified lines**.

Regional rail should be considered as one of the sectors in which hydrogen could play an essential role to achieve decarbonisation at an affordable cost. **The EU's ambition to shift freight transport from road to rail will open opportunities for more significant deployment of hydrogen:** hydrogen-powered trains are in operation or about to be tested in different Member States (e.g. Germany, Netherlands, France, Italy, Austria) and are expected to take a combined market share of 20 % from diesel-powered trains by 2030.

### *Aviation*

In the aviation sector, pure hydrogen-powered aircrafts are expected to be in commercial operation by 2024 and will reduce the sector's emissions substantially, particularly where hydrogen fuel cell technology is deployed. **The versatility of hydrogen solutions and its scalability is particularly well suited for energy-intense applications such as airports:** alongside aircraft propulsion, 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 or as backup power supply, ensuring energy resilience in such strategic locations. It can also be used as a transport hub to provide clean fuel for the extensive network of transport links including buses and trains. Airports (along with ports) represent a natural location for the placement of a hydrogen ecosystem. 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.

**In this sector, the easiest and most immediate use of pure hydrogen is to decarbonize ground operations.** EU airports like Rotterdam the Hague, Milan Malpensa, Liege and Lyon are kickstarting projects and developing plans to equip themselves with zero emission machinery to serve aircrafts. Such ramp-up of hydrogen in airport facilities and early adoption of sub-regional routes powered by hydrogen pave the way for fully fledged hydrogen-powered commercial aviation. Therefore, it is of key importance that the final text of AFIR considers the growing share, and related needs, of hydrogen into the sector: hydrogen-powered ground operations need dedicated infrastructure. Thus, **Hydrogen Europe supports the current framing of the National Policy Frameworks to require that Member States include the deployment of hydrogen infrastructure in airports.** These national frameworks should also **consider the possibility of proposing voluntary targets for aircraft refuelling and ground operations at TEN-T airports.**

Lastly, an ambitious and coherent proposal on refuelling infrastructure **should be in line with the new RefuelEU Aviation instrument**, especially on the long-term perspective. **Future revisions of AFIR will have to set out mandatory targets for the storage, use and, possibly, on-site production of pure**

**hydrogen required by zero emission aircrafts, to reflect the developments in this sector.** We expect technological developments in the next 10 to 20 years to overcome existing barriers and drive costs down sufficiently to enable hydrogen to be a key pillar of zero emission aviation, and we call for such disruptive innovation to be adequately reflected into the AFIR in the future.

### Operation of HRS: Standards, accessibility, and reporting

#### *Interoperability*

**Importantly, the technical specifications for hydrogen supply for road transport, identified in Annex II.3, should be aligned with the standards defined within the Delegated Regulation 2019/1745 on the Alternative Fuel Infrastructure.** More specifically, the new Alternative Fuels Infrastructure Regulation should not include definitions such as ISO/TS 20100 nor ISO 19880-1, but instead refer to the standards mandated by the Delegated Regulation. These standards include: EN 17127 ‘Outdoor hydrogen refuelling points dispensing gaseous hydrogen and refuelling protocols’; and EN 17124, defining the quality characteristics of hydrogen dispensed by hydrogen refuelling points. Also, the standard EN ISO 17268 should be referenced in place of ISO 17268, for the purpose of consistency.

For what concerns the railway sectors, attention should be given to standards currently being developed for fuel cells, refuelling systems and refuelling stations; there is a direct synergy between the rail and the truck sector thanks to the almost identical size of tanks and the related refuelling processes.<sup>6</sup>

#### *Monitoring and Reporting*

Hydrogen Europe supports the use of National Policy Frameworks as an instrument to define national plans for the deployment of the adequate infrastructure, considering the different levels of maturity of the sector in each Member States.

Taking into consideration all the alternative fuels infrastructures included in the scope of the AFIR would ensure the right level of monitoring and a consistent progress among EU Members. We call for the inclusion of the hydrogen refuelling infrastructure within the scope of the planned yearly reporting, which, for the moment as defined within the existing Directive, only considers the battery electric infrastructure and the battery electric and plug-in hybrid vehicles.

**Finally, we welcome the shortened gap between the submission of the final National Policy Framework and the first progress report (and following ones) to two years instead of three.** Notably, reporting on deployment and use of hydrogen refuelling infrastructure within TEN-T airports should be considered.

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<sup>6</sup> Phryde project