Policy Recommendations Report

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HYINHEAT

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List of abbreviations

Abbreviations	Explanation
BAT-AEL	BAT-Associated Emission Level
BREF	Best Available Techniques Reference document
CBAM	Carbon Border Adjustment Mechanism
CCfD	Carbon Contract for Difference
CID	Clean Industrial Deal
CISAF	Clean Industrial Deal State Aid Framework
CO_2	Carbon Dioxide
COM	European Commission document/proposal reference (e.g. COM(2026) 100)
DG ENER	Directorate-General for Energy (European Commission)
DRI	Direct Reduced Iron
EAF	Electric Arc Furnace
ECA	European Court of Auditors
EHB	European Hydrogen Backbone
ETS	Emissions Trading System
EU	European Union
FEED	Front-End Engineering Design
FID	Final Investment Decision
GHG	Greenhouse Gas
GW	Gigawatt
IAA	Industrial Accelerator Act
IDB	Industrial Decarbonisation Bank
IEA	International Energy Agency

IPCEI	Important Projects of Common European Interest
ITRE	Committee on Industry, Research and Energy (European Parliament)
LOHC	Liquid Organic Hydrogen Carriers
NGO	Non-Governmental Organisation
NOx	Nitrogen Oxides
NZIA	Net-Zero Industry Act
OGE	Open Grid Europe (gas pipeline operator)
PCI	Project of Common Interest
PMI	Project of Mutual Interest
RED	Renewable Energy Directive
RFNBO	Renewable Fuels of Non-Biological Origin
ROI	Return on Investment
RTO	Research and Technology Organisation
TKSE	thyssenkrupp Steel Europe
TPA	Third-Party Access
TSO	Transmission System Operator

Introduction

This report, Deliverable 8.9, "Policy Recommendations Report", is the direct follow-up to Deliverable 8.5, the HyInHeat Policy Mapping Document (published 30 June 2025). Where D8.5 mapped the EU regulatory and funding landscape for hydrogen in energy-intensive industry, this report has two purposes: first, to update that landscape with what has changed over the past 16 months; and second, to translate it into concrete recommendations grounded in direct consultation with steel, aluminium, and hydrogen-technology stakeholders.

This report is based on three sources. The first is an update of EU hydrogen policy from July 2025 to October 2026. The second is a questionnaire on the barriers to using hydrogen in industrial processes, answered by 34 organisations from the steel, aluminium and hydrogen-technology sectors. The third is the policy panel that opened the HyInHeat final event on 27 October 2026, during European Hydrogen Week, with speakers from EUROFER, ACER, ENNOH and Hydrogen Europe. A note on terminology used throughout this section: "hydrogen production" refers to instruments acting on the supply side — how hydrogen is made and by whom — while "hydrogen utilisation" refers to instruments acting on the demand side — how much hydrogen industry is required or incentivised to actually use in making steel, aluminium and other products. Several instruments (RED III, NZIA, CBAM, IPCEI) act on both sides simultaneously but through distinct mechanisms; where this matters for interpretation, it is flagged explicitly below and in Table 1.

1.1 Policy instruments at a glance: how each addresses hydrogen

Table 1 below combines the instruments mapped in D8.5 with those introduced or substantially revised since, giving a single reference point for how each piece of the EU framework speaks to hydrogen adoption in steel and aluminium, and its status as of October 2026.

Table 1 EU policy instrument relevant to industrial hydrogen adoption (as of submission date)

Policy instrument	Value-chain stage	Type	How it addresses hydrogen
RED II / RED III	Production & Utilisation	Directive	Defines RFNBOs; RED III sets a binding utilisation mandate of 42% RFNBO in industrial hydrogen by 2030, rising to 60% by 2035. Targets legally unchanged, but the RFNBO delegated act is under review and a leaked September 2026 impact assessment floated making the post-2030 industry target indicative (Section 2.4).
RePowerEU Plan	Production	Strategy / funding	"Hydrogen Accelerator": aims for 10 Mt domestic renewable H2 production + 10 Mt imports by 2030; prioritises pipelines and industrial offtake.
Net-Zero Industry Act (NZIA)	Production & Utilisation	Regulation	Sets a benchmark that EU manufacturing capacity meet at least 40% of annual deployment needs for strategic net-zero technologies (including electrolysers and fuel cells) by 2030; separately fast-tracks permitting for "Net-Zero Strategic Projects", which can include both production facilities and industrial user connections.
Clean Industrial Deal (CID)	Cross-cutting	Strategy	Reframes hydrogen as both a decarbonisation tool and an industrial opportunity; the umbrella strategy

Policy instrument	Value-chain stage	Type	How it addresses hydrogen
			behind CISAF, the IDB, and the low-carbon hydrogen definition.
Clean Industrial Deal State Aid Framework (CISAF)	Production	State aid rules	Allows up to 100% investment aid for RFNBO production via competitive bidding; enables cumulation with Innovation Fund / IPCEI.
Industrial Decarbonisation Bank (IDB)	Utilisation	Funding (proposed)	€100bn instrument to scale clean industrial technologies, phased from an initial ETS-funded "Investment Booster" through to competitive Carbon Contracts for Difference. Trailed in the CID, given legal form in the July 2026 ETS.
Steel and Metals Action Plan	Utilisation	Sector strategy	Names hydrogen-based DRI as "the most promising option" for primary steel decarbonisation within a technology-neutral portfolio; no dedicated new hydrogen funding created. Concrete follow-through has been trade defence
Hydrogen & Decarbonised Gas Markets Package	Infrastructure	Regulation and Directive	Establishes EU-wide hydrogen definitions/certification, third-party network access, and unbundling of hydrogen network operators from producers, governing how hydrogen moves from production to use. The transposition deadline for Directive (EU) 2024/1788 (5 August 2026) was missed by 26 Member States; the Commission opened infringement procedures on 25 September 2026.
Low-carbon hydrogen definition (delegated act under Directive (EU) 2024/1788)	Production	Regulation	Defines "low-carbon hydrogen" (≥70% GHG savings vs. fossil comparator), a production-side classification, extending support beyond strictly renewable (RFNBO) hydrogen to blue/nuclear-based routes.
EU ETS + July 2026 ETS revision	Utilisation	Carbon pricing	Prices CO2 for steel/aluminium producers, indirectly rewarding hydrogen utilisation; auction revenues fund the Innovation Fund and Hydrogen Bank. The July 2026 revision proposes softening the free-allocation phase-out for CBAM sectors. Proposal only, not yet adopted.
Carbon Border Adjustment	Production & Utilisation	Trade / carbon pricing	Two distinct hydrogen links: (i) hydrogen imported as a good is itself a CBAM-covered product, priced on its production emissions; (ii) steel/aluminium imports are priced on their embedded carbon, which indirectly

Policy instrument	Value-chain stage	Type	How it addresses hydrogen
Mechanism (CBAM)			rewards EU producers who utilise low-carbon hydrogen in making them.
European Hydrogen Bank	Production	Funding (auctions)	Auction-based premium/CCfD-style support paid to hydrogen producers per kilogram produced, narrowing the cost gap between renewable/low-carbon hydrogen and fossil alternatives.
Horizon Europe / Clean Hydrogen Partnership	Cross-cutting	R&I funding	Co-funds (~€1bn EU + ~€1bn industry) research, innovation and demonstration projects spanning production, storage, transport and end-use, incl. HyInHeat.
Innovation Fund	Cross-cutting	Funding (demonstration)	ETS-revenue-financed grants for first-of-a-kind low-carbon industrial projects, spanning both hydrogen production (electrolysers) and utilisation (e.g. DRI); ~30% of 2024 awards were hydrogen-related.
IPCEI Hy2Tech / Hy2Use / Hy2Infra / Hy2Move	Production & Utilisation	State aid (cross-border)	Each wave targets a different stage: Hy2Tech (production technology), Hy2Use (industrial utilisation cases), Hy2Infra (infrastructure connecting the two), Hy2Move (mobility use); >€43bn mobilised across four waves.
Industrial Accelerator Act	Utilisation	Regulation (proposed)	Single-permit systems and "Made in EU"/low-carbon procurement criteria intended to create lead markets for low-carbon industrial products (i.e. demand for goods made using, among other things, hydrogen). Proposed, not yet adopted.
Connecting Europe Facility (CEF) — Energy	Infrastructure	Funding (infrastructure)	Grants for cross-border hydrogen pipelines, storage and terminals (e.g. H2med, SoutH2 Corridor) that physically connect production regions to industrial users, targeting Projects of Common Interest.

Policy Update: What Has Changed Since D8.5 (June 2025- October 2026)

D8.5 described a policy framework in transition, from ambitious decarbonisation targets toward a more pragmatic balance with industrial competitiveness. Sixteen months on that transition has continued, but with a clearer direction than was visible in mid-2025: EU hydrogen policy has moved decisively from ambition-setting toward damage control. The Commission has finalised the low-carbon hydrogen definition, committed to an early review of the RFNBO delegated act (still unpublished at the time of writing), given legal form to a €100bn Industrial Decarbonisation Bank, and softened the ETS trajectory for industry, all against a backdrop of high-profile green-steel and hydrogen project cancellations and a European Hydrogen Bank whose available budget has shrunk rather than grown.

2.1 European Hydrogen Bank: auctions, results, and the fourth-auction budget cut

D8.5 anticipated a third Hydrogen Bank auction in Q3 2025 with a budget of roughly €1 billion. In practice, the auction ("IF25") launched later than planned, in December 2025, with a larger €1.3 billion budget drawn from ETS revenues, and, for the first time, opened to electrolytic low-carbon hydrogen alongside renewable hydrogen (RFNBO), plus a new maritime and aviation offtake topic. Results were published in May 2026: nine projects were selected across three baskets, with €1.09 billion awarded for 1.32 million tonnes of hydrogen over ten years and roughly 9 million tonnes of CO2-equivalent avoided. Winning bid prices ranged from €0.57 to €3.49 per kilogram, and winners included first-time recipient countries Greece and Austria alongside Finland, Denmark, Spain, Germany and Norway [1].

The clearest signal of retrenchment, however, is the fourth auction ("IF26"), whose draft terms were published by the Commission on 9 July 2026: its budget is just €500 million, a 61.5% cut compared with the previous tender [2]. The fourth auction splits €350 million for RFNBO and €150 million for RFNBO-or-low-carbon electrolytic hydrogen, and adds new eligibility conditions on supply-chain resilience [3]. A further note of caution: the second auction (IF24) proved fragile in practice, with winning bidders representing roughly 1.88 GW of the 2.33 GW awarded subsequently withdrawing from grant negotiations after failing to secure offtake agreements at their low bid prices [4]. The written consultation on the draft terms closed on 24 August 2026. The call is planned to open in December 2026 and close in February 2027; the final terms will only be published when it opens [5].

2.2 Low-carbon hydrogen definition and the Clean Industrial Deal architecture

A key regulatory gap flagged in D8.5, the absence of an official EU definition of "low-carbon hydrogen", was closed on 8 July 2025 with the adoption of a delegated act (Regulation (EU) 2025/2359), which requires at least 70% lifecycle greenhouse gas savings against a fossil comparator, aligning the threshold with the existing RFNBO criteria [6].

Of the CID's follow-through instruments (Table 1), the IDB is the most consequential for steel and aluminium: it runs to 2040, with the initial ETS Investment Booster available from 2028 until 2030 [7]. The Booster will reserve 400 million allowances, estimated at around €30 billion at €75/tCO_2, to support industrial decarbonisation projects on a first-come, first-served basis after pre-selection. The second phase runs from 2031 until 2040 (or earlier if Phase 1 is exhausted) will use an additional 400 million allowances and competitive procedures awarding CCfDs carbon premia or other forms of support.

A second instrument followed in March 2026: the Industrial Accelerator Act, submitted to Parliament on 4 March 2026. It aims to speed up permits for decarbonisation projects and boost demand for EU-made, low-carbon products by favouring them in public procurement [8]. Notably, the Commission extended this "Made in EU" preference to electrolysers, alongside solar thermal, heat pumps, wind, and nuclear power, going further than its own impact assessment had recommended [9]. The proposal is still being negotiated. In Parliament, the joint INTA/ITRE/IMCO committee draft report was presented in September 2026 and over 5,000 amendments were tabled, including one calling for the Act to be withdrawn.

2.3 Net-Zero Industry Act implementation

D8.5 already covered what the NZIA does (electrolyser/fuel cell manufacturing targets, fast-track permitting for "Net-Zero Strategic Projects"). What's new is the resilience mechanism taking concrete legal form. On 23 May 2025, the Commission published a Communication mapping trade flows and key strategic dependencies — showing where the EU relies heavily on non-EU suppliers for renewable energy components. This fed into an implementing act that came into force on 18 June 2025, which sets out exactly which components must meet a "resilience" criterion whenever they're used in renewable energy auctions, public procurement, or other support schemes. In practice, authorities must apply this criterion whenever a renewable energy product contains components the EU is highly dependent on for supply [10]. For hydrogen specifically, this means electrolyser and fuel cell manufacturers competing for public funding or contracts may now need to show diversified or EU-based sourcing for high-dependency components, not just meet cost and performance criteria.

The Industrial Accelerator Act amends the Net-Zero Industry Act by introducing a Union origin requirement for public procurement procedures, auctions and additional Member States' support schemes. However, these requirements cover only part of the net-zero technologies and their main specific components. Electrolysers are included: the stack plus one main specific component must be of Union origin one year after entry into force, and the stack plus two components after three years. Technologies that link directly or indirectly to hydrogen, such as renewable fuels of non-biological origin (RFNBO) technologies, sustainable alternative fuels technologies and transformative industrial technologies for decarbonisation, are excluded in whole or in part. The IAA also creates no Union-origin or lead-market measure for hydrogen or RFNBOs as products [11].

Aluminium and other metals play an important role in hydrogen technologies, particularly in equipment such as electrolysers, piping, and structural components, as well as in enabling energy-efficient systems and supporting transport and storage infrastructure.[1] We therefore call for extending the Union origin requirement for public procurement procedures, auctions and additional Member States' support schemes to all these technologies. This will further increase demand for European-made metals and help secure competitive net-zero value chains in Europe, in line with the competitiveness and technology-neutrality objectives of the Clean Industrial Deal.

2.4 RED III: targets under early review

As Table 1 notes, the targets themselves haven't moved — what has moved is the review timeline.

Following pressure from five Member States (Germany, Spain, the Netherlands, Austria and Poland, in a joint letter of March 2026) and a further push linked to the mid-2026 Strait of Hormuz crisis, the Commission committed in April 2026 to bring forward its review of the RFNBO Delegated Act from its original 2028 review clause to "before the end of June" 2026 a two-year acceleration [12] [13].

That commitment has since slipped. Céline Gauer, DG ENER's Director-General, told the European Parliament's ITRE committee on 14 July 2026 that the Commission had missed its end-June deadline and would now publish the targeted review "very shortly in the autumn", without explaining the delay. The direction of travel remains toward easing the rules: Gauer said the requirement for hourly matching between hydrogen production and renewable electricity consumption, currently due to bind from 2030, could be introduced later than planned given the sector's ramp-up is "far, far away" from expectations, and industry and several Member States are pushing for a deferral to 2035 with quarterly correlation retained in the interim. A separate methodology for recognising nuclear-based low-carbon electricity in hydrogen production is reported to be "nearly done", and a revised EU Hydrogen Strategy is expected before the end of 2026 [14].

The European Commission's proposal for the review of the post-2030 energy framework will amend RED II and RED III and is expected by the end of 2026. A draft leaked in September 2026 would replace the binding RFNBO targets for industry with an indicative EU-level objective after 2030. More than 260 companies, led by Hydrogen Europe, the Hydrogen Council and the Renewable Hydrogen Coalition, have asked the Commission to keep binding targets. Major fertiliser and chemicals producers have instead called for the industry targets to be overhauled.

2.5 CBAM: strengthening, downstream extension, and the ETS revision

CBAM connects to hydrogen in two distinct ways, on opposite sides of the value chain, and it is worth being precise about which is which. On the production side: hydrogen has been one of CBAM's six covered goods since the Regulation was adopted in 2023, alongside cement, iron and steel, aluminium, fertilisers and electricity [15]. Anyone importing hydrogen covered by CBAM into the EU is subject to carbon-cost obligations based on the direct emissions embedded in its production, in accordance with the applicable CBAM rules. On the utilisation side: CBAM's much larger effect on steel and aluminium is indirect, it prices the embedded carbon in imported finished steel and aluminium, which rewards EU producers who utilise low-carbon hydrogen in their own manufacturing process, regardless of where that hydrogen came from.

The main development since D8.5 is a simplification of the production-side rules, plus early moves to widen the utilisation-side scope. An Omnibus regulation (Regulation (EU) 2025/2083, in force 20 October 2025) introduced a new 50-tonne-per-year de minimis threshold letting small importers of steel, aluminium, cement and fertilisers skip CBAM obligations entirely — but hydrogen and electricity were explicitly carved out of that exemption, meaning there is no minimum-volume threshold for hydrogen imports at all: any quantity, however small, remains subject to full CBAM reporting and, from 2027, certificate obligations [16] [17].

A downstream extension of CBAM is also being discussed, but it isn't law yet. In December 2025, the Commission proposed extending CBAM to cover 180 more finished products made from steel and aluminium (like machinery and appliances), starting in 2028 [18] [19].In June 2026, the Council agreed its own position, expanding this list further [20] — industry groups estimate around 200 additional products [21], The Parliament still needs to agree its own position.

Industry reactions have been broadly supportive of extending CBAM downstream, while critical of the proposed scope and implementation. EUROFER supports the extension but says it doesn't go far enough [22].

European Aluminium-similarly argues the product scope expansion remains too limited, but further highlights implementation is foreseen too late. Many important 100% aluminium-based-products like automotive body parts and packaging products should be added.[2] European Aluminium further argues anti-circumvention measures, including the downstream scope extension, must take effect significantly earlier than the currently foreseen 2028 timeline to effectively prevent circumvention, substitution with more-emitting materials, and safeguard the integrity of the CBAM mechanism.

The July 2026 ETS revision proposal carries two implications for hydrogen specifically, pulling in opposite directions. It would slow the pace at which carbon prices rise for industry, weakening one of the main financial pushes toward hydrogen-based steelmaking, a slower-rising carbon price makes it cheaper to keep using coal-based methods for longer. At the same time, it would require Member States to dedicate at least half of their national ETS revenues to decarbonising ETS sectors (current rules already require all revenues to be used for climate and energy purposes, but only a marginal share reaches industrial decarbonisation), which could mean more public money available for hydrogen projects specifically if the proposal is adopted.

2.6 Steel and Metals Action Plan: trade defence in practice

As Table 1 already notes, the Steel and Metals Action Plan is a strategy document, not a piece of legislation, it sets out what the EU intends to do for steel and aluminium, including naming hydrogen-based Direct Reduced Iron as "the most promising option" for primary steel decarbonisation. But of its two main promises, funding hydrogen and defending EU producers from unfair trade, only trade defence has so far turned into law. No major new hydrogen fund has been created; the Plan largely points back to existing pots of money instead.

For hydrogen, this matters because of these two promises are meant to work together. EUROFER has said again and again that carbon-leakage protection — delivered through CBAM ETS benchmarks, and a structural export solution that is still missing, must come first if firms are to invest in hydrogen-based steelmaking [23]. The same logic fits aluminium far less well. For European Aluminium, electrification is the main decarbonisation lever, and hydrogen is seen as a solution where industrial processes cannot be electrified.

The clearest example of a SMAP promise becoming hard law is the steel safeguard. On 7 October 2025 the Commission proposed a permanent measure to replace the expiring steel safeguard; it has since been adopted as Regulation (EU) 2026/1384, in force since 25 June 2026 and applying from 1 July 2026 [24]. It cuts tariff-free import volumes to 18.3 million tonnes a year (a 47% reduction versus 2024 quotas), doubles the out-of-quota duty to 50%, and adds a new "Melt and Pour" traceability rule designed to stop steel being re-routed through low-tariff countries to hide its true origin and dodge CBAM — directly reinforcing the carbon-pricing logic set out in Section 2.5. Country-specific quotas have since been allocated by a Commission implementing regulation applying from 1 July 2026, and since 1 October 2026 importers have had to provide evidence of the country where the steel was melted and poured [25]. Aluminium and other base metals sit within the wider Action Plan too, with trade-defence evidence-gathering under way, including a customs system tracking metal-scrap flows, activated in July 2025.

2.7 Infrastructure corridors: progress update

Both flagship southern hydrogen corridors, the H2med corridor (Portugal–Spain–France–Germany) and the SoutH2 Corridor (North Africa–Italy–Austria–Germany), retained Project of Common Interest (PCI) status when the EU updated its PCI/PMI list for the first time since D8.5's publication. The Commission adopted the new list on 1 December 2025, and it entered into force on 29 April 2026, replacing the previous list that had been in force since November 2023. The new list expands hydrogen and electrolyser projects from 65 to 100 [26].

On H2med, the two links, CelZa (Portugal–Spain, ~270 km, 0.75 Mt/year) and BarMar (Barcelona–Marseille, ~400 km subsea, 2 Mt/year), together an estimated €2.5 billion investment, have moved from the planning stage D8.5 described toward execution: in July 2026 the BarMar consortium (Enagás, NaTran, Teréga, formed as a joint venture in July 2025) entered Front-End Engineering Design after confirming a preferred offshore route. Commercial operation for both links is now targeted for 2032, with individual lines allowed to extend to 2037 [27].

On SoutH2 (~3,300 km, over 65% repurposed pipeline, led by Snam, TAG, Gas Connect Austria and bayernets, designed for up to 4 Mt/year from North Africa) [28], the corridor's first section, a ~15 km repurposed pipeline in the Bavarian Chemical Triangle received planning approval in September 2025 and is under construction [29], but bayernets now targets hydrogen-readiness in 2027 [30]. The Italian and Austrian sections are progressing in parallel, with Snam targeting full backbone commissioning by 2030 [31].

Both corridors ultimately feed Germany's Hydrogen Core Network (9,040 km, €18.9 billion, completion extended to 2037), which directly connects thyssenkrupp's Duisburg site and Salzgitter's SALCOS project [32] [33]. However, demand-side risk is significant: thyssenkrupp suspended its hydrogen tender in March 2025 citing prices "significantly higher than assumed," prompting pipeline operator OGE to warn that "a loss of demand from TKSE will have a noticeable impact on the hydrogen core network" [34]. The IEA's 2026 Global Hydrogen Review similarly found only around 4 Mt/year of announced 2030 low-emissions capacity has secured final investment decisions, against nearly 27 Mt/year of announced targets [35]. The thyssenkrupp tender has not been relaunched. In August 2026 the Commission approved an amended aid framework allowing the Duisburg DRI plant, now due to start up in 2027, to operate initially on natural gas. Salzgitter has also pushed the first stage of SALCOS back to 2027 and deferred the investment decision on later stages to 2028/29 [36].

Questionnaire to the stakeholders

D8.5 concluded that closing the gap between policy ambition and industrial reality required direct input from the sectors expected to adopt hydrogen. To that end, a structured questionnaire was developed and distributed to stakeholders across the steel, aluminium, and hydrogen-technology value chains, with the aim of identifying the barriers, policy gaps, and support mechanisms most relevant to their own deployment decisions. The findings presented in this and the following sections directly inform the policy recommendations.

3.1 Questionnaire design and distribution

The questionnaire routed respondents to different question sets depending on how they identified themselves (Table 2). Barrier ratings, drawn from the eight categories in D8.5's PESTLE-SWOT analysis, were asked only of industry and association respondents, since they are the ones directly exposed to these operational and investment decisions; technology providers and university/research respondents were not asked to rate barriers, but answered questions specific to their own role instead. One question, on how hydrogen policy should address NOx emissions, was common to all three tracks.

The questionnaire was distributed to stakeholders across the steel, aluminium, and hydrogen-technology value chains between November 2025 and April 2026, primarily through HyInHeat project partners and their industry networks.

Table 2 Questionnaire structure by respondent type

Respondent type	Rated the 8 barriers (1–5 scale)?	Also asked about...
Industry & Associations	Yes	Pilot/demo projects, balancing competitiveness with decarbonisation, carbon pricing (ETS/CBAM) effectiveness, deployment barriers, green hydrogen benefits
Technology Providers	No	The technology they offer, their role in EU collaborative projects, maintenance/scalability challenges, EU manufacturing capacity
University / Research	No	How academia can partner with industry, why hydrogen costs haven't fallen, how universities can help close the skills gap

3.2 Respondent profile

34 valid responses were retained for analysis.

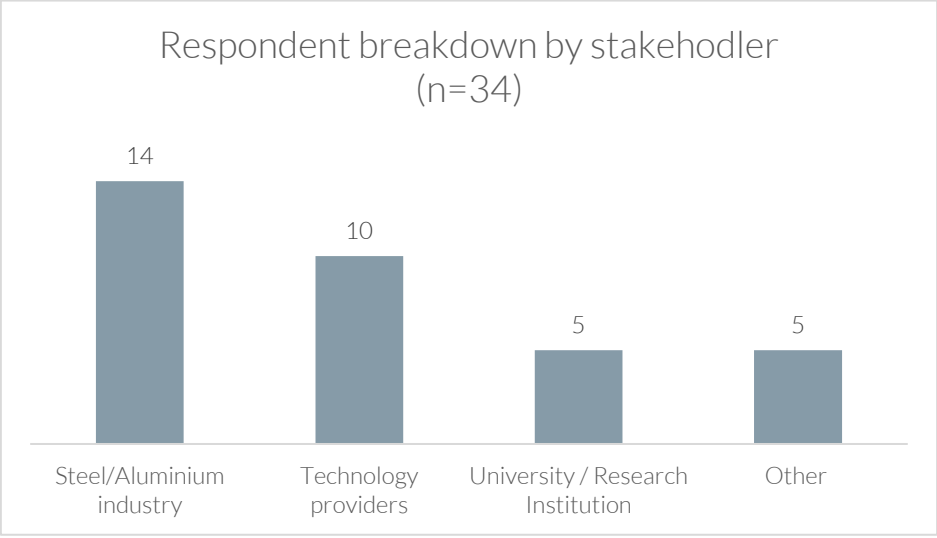


Figure 1 Distribution of the 34 valid responses across four stakeholder categories.

As shown in Figure 1, the sample is dominated by steel and aluminium producers themselves, split roughly two-to-one in favour of aluminium. Technology providers — companies supplying equipment, industrial gases, or other services into the value chain rather than producing steel or aluminium themselves — make up the second-largest group, followed by university and research institutions and by industry associations and think tanks whose remit spans the broader hydrogen and decarbonisation landscape.

Respondents span 12 countries, with Germany and Belgium the best represented (six each), followed by Italy (five) and Spain (four). The remaining respondents come from eight other countries. Most of the sample is concentrated in Northern and Western Europe, with little representation from Southern or Eastern Europe.

3.3 Industry & Association

Industry and association respondents were the only group asked to rate barrier severity, and the only group asked the six open-ended questions on pilots, competitiveness, carbon pricing, deployment, and green hydrogen's benefits.

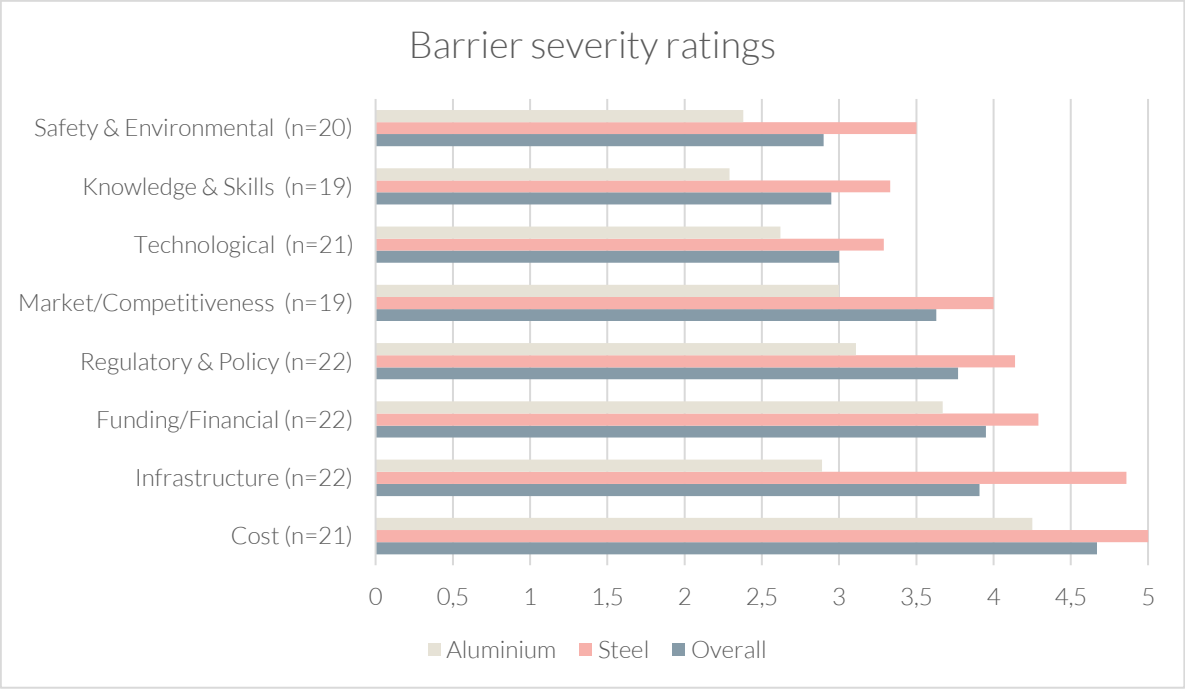


Figure 2 Mean perceived barrier severity (1–5 scale) by category, split by sector.

As Figure 2 shows, cost is the largest barrier for both sectors, and infrastructure shows the widest steel/aluminium gap, reflecting steel's dependence on continuous pipeline-scale supply versus aluminium's ability to rely on smaller, local volumes. Financial/funding and regulatory barriers follow a similar pattern, both rated meaningfully higher by steel than by aluminium, consistent with the larger project scale and more complex regulatory exposure steel-based hydrogen projects face. Market/competitiveness concerns center on the risk of carbon leakage from non-EU competitors. Technological, knowledge/skills, and safety barriers are rated lowest by both sectors, though steel still rates them somewhat higher than aluminium throughout.

For the open-ended questions for the industry, on what would most effectively accelerate the transition, respondents mostly pointed to instruments already in use rather than calling for new ones — pilot and demonstration funding, project-level co-funding, and OPEX-focused support rather than capital grants alone. Several described real projects already under way, suggesting the barrier is less about instrument design than about scale and continuity of support.

Asked how to balance economic competitiveness with the EU's decarbonisation agenda, opinion was split. Some respondents saw the balance as achievable given the right safeguards, describing flexibility and phased implementation as essential if the transition is to hold together economically. Others were considerably more

pessimistic, describing customer interest in hydrogen as having already declined as businesses focus on survival rather than sustainability spending.

On whether current carbon pricing mechanisms — the EU ETS and CBAM — are effective in promoting hydrogen adoption, almost no respondent said the current system is already working well. The split was instead between those who see the mechanisms as fundamentally right but underpowered, needing to be strengthened or made stricter, and those who consider it too early to judge CBAM's effect on hydrogen uptake specifically, or who pointed to loopholes that let competition be distorted rather than corrected.

Deployment barriers — covering permitting and supply chain coordination — circled back to cost as the dominant theme, but several respondents separated out infrastructure and regulatory delay as distinct, compounding problems in their own right, not simply downstream effects of price.

3.4 Technology Providers

Technology providers did not rate barrier severity. They answered five role-specific questions instead — the technology they offer, the role of EU collaborative projects, long-term maintenance and scalability risks, whether Europe has sufficient manufacturing capacity, and NOx (covered in 5.4).

Describing the technology they offer, respondents split into two broad types: suppliers of combustion and furnace equipment adapted for hydrogen use — reheating and treatment furnaces, burner and injection systems, direct-reduction shaft furnace technology — and suppliers of monitoring and measurement equipment for flow and emissions.

Views on the role of EU collaborative projects were consistently positive. Respondents described these projects as valuable for spreading process knowledge that is otherwise scarce, for testing system integration at pilot and demonstration scale, and for building contact with potential industrial customers — though none suggested these projects solve the underlying cost and infrastructure barriers on their own.

Asked about long-term maintenance, efficiency, or scalability challenges, this group gave the most technically detailed answers in the entire survey. Two concerns recurred across multiple respondents independently: hydrogen embrittlement and material compatibility issues in pipelines and storage systems, and the need to build in safety analysis and protective design from the start of a project rather than retrofit it later.

On whether Europe currently has sufficient manufacturing capacity to meet demand, the group was close to unanimous: most respondents said capacity is insufficient, citing bottlenecks across hydrogen availability, supply chains, and energy systems more broadly. One respondent went further, pointing to a recent shift in EU funding priorities away from green economy measures and toward defence spending as a compounding risk on top of the existing capacity gap.

3.5 RTOs

University and research respondents did not rate barrier severity. They answered four questions of their own — how academia can best partner with industry and government, the root causes of hydrogen's persistently high cost, universities' role in closing the skills gap, and NOx (covered in 5.4). All five respondents completed all four questions.

On partnering with industry and government, answers converged fairly closely: respondents pointed to EU-funded consortium and demonstration-project structures as the model academia already relies on and wants to see more of, framed around building projects that solve problems industry itself cannot.

There was no equivalent consensus on why hydrogen's cost has stayed persistently high despite years of policy and funding support. Answers ranged from geopolitical uncertainty depressing investor confidence, to a structural mismatch between lab-scale research and genuine industrial-scale demonstration, to the suggestion that policy attention has been too narrowly focused on green hydrogen specifically rather than a broader set of viable low-carbon routes.

On universities' role in closing the workforce skills gap, most respondents named a concrete contribution they see academia making or able to make — postgraduate-level courses, semi-industrial-scale testing capability, or infrastructure-specific expertise. One respondent broke from this pattern entirely, questioning whether a meaningful skills gap exists at all.

3.6 NOx: A Cross-Track Consensus

NOx policy is the only question every respondent group answered, and it produced the same core position across all three tracks, raised independently rather than in coordination. Respondents across industry, technology providers, and academia said NOx should be measured on a basis that reflects hydrogen's actual combustion chemistry — on a wet-gas basis, or in units such as mass per unit of energy or per unit of product — rather than the units currently used, which several respondents said were inherited from fossil fuel regulation and unfairly penalize hydrogen combustion, since it produces mostly water rather than the exhaust volumes those units assume.

> *"Emissions cannot be reported as currently done — dry basis of exhaust gas." — Technology provider*
>
> *"Change to mg/kWh units." — University/research*
>
> *"The NOx measurement method should be changed and adapted to products of combustion containing mainly water." — Aluminium producer*

This is the one point of genuine, technically specific agreement across an otherwise divided survey — a strong, low-controversy candidate for a concrete policy recommendation later in this report.

The link between the policy landscape and the questionnaire

Read together, the policy update and the questionnaire tell the same story from two independent angles.

4.1 The Hydrogen Bank is moving the wrong way relative to what industry actually asked for

Industry and association respondents, asked what would most effectively accelerate the transition, mostly did not call for new instruments — they asked for continuity and scale of what already exists: pilot/demo funding, project-level co-funding, and OPEX-focused support rather than one-off capital grants (Section 3.2). That is close to the opposite of what actually happened: the fourth Hydrogen Bank auction's budget was cut 61.5% (Section 2.1), and the second auction (IF24) already showed what happens when support is thin and short-term — winning bidders representing 1.88 of 2.33 GW walked away when they couldn't secure offtake at the low prices they'd bid. The questionnaire's ask (durable, OPEX-oriented support) is a fairly direct diagnosis of why IF24 failed.

4.2 Steel's infrastructure dependency is playing out in real time – and the demand side is the weak link

Figure 2 shows infrastructure as the barrier with the widest steel/aluminium gap, attributed to steel's need for continuous, pipeline-scale supply versus aluminium's ability to run on smaller volumes. Section 2.10 gives this a concrete face: the German Hydrogen Core Network is built to connect exactly the two flagship steel projects (thyssenkrupp Duisburg, Salzgitter SALCOS) that would justify it — but thyssenkrupp put on hold its own hydrogen tender in March 2025 over cost, prompting pipeline operator OGE to warn that losing TKSE demand would have a "noticeable impact" on the network. This is the cost barrier and the infrastructure barrier reinforcing each other in a single, named example, not two separate problems.

4.3 Carbon pricing: industry's ambivalence matches the policy's actual state of limbo

Almost no industry/association respondent said ETS/CBAM are already working; the split was between "right but underpowered" and "too early to judge / undermined by loopholes" (Section 3.2). That ambivalence is a reasonable reaction to where the policy genuinely stands: CBAM's downstream extension is still only a Commission proposal plus a Council position, with Parliament yet to weigh in (Section 2.5), and the ETS revision pulls in two directions at once — a slower carbon-price rise weakens the financial case for hydrogen-based steel, while the proposed 10x increase in mandatory decarbonisation spending (from ~5% to ≥50% of ETS revenue) could work the other way. Respondents aren't being indecisive; the instrument itself hasn't decided yet.

4.4 Manufacturing capacity is short, right as a new EU-content requirement lands on it

Technology providers were close to unanimous that Europe doesn't currently have sufficient manufacturing capacity to meet hydrogen demand (Section 3.3). That finding lands awkwardly next to two 2025-2026 developments: the NZIA's new resilience mechanism (Section 2.3), which requires diversified/EU-based sourcing for high-dependency components whenever electrolysers or fuel cells compete for public funding, and the Industrial Accelerator Act's "Union-origin requirements for electrolysers, extended further than the Commission's own impact assessment recommended (Section 2.2). Building EU capacity is the right long-term goal, but both instruments risk tightening supply further in the near term if they land before the capacity gap tech providers describe is closed.

4.5 Steel and aluminium are on genuinely different paths

On the policy side, the Steel and Metals Action Plan names hydrogen-DRI as "the most promising option" for steel, while European Aluminium's own position (Section 2.6) treats electrification as the primary lever and hydrogen as a fallback only where processes cannot be electrified. On the questionnaire side, steel respondents rated every single barrier category higher than aluminium respondents did (Section 3.2),

independently reproducing the same divergence. Any recommendation that treats "hydrogen adoption in heavy industry" as one undifferentiated problem is already contradicted by both of this report's evidence sources.

4.6 NOx is the one unambiguous, ready-to-use recommendation in the whole report

Every other theme above involves genuine disagreement or unresolved policy. NOx doesn't: all three respondent tracks — industry, technology providers, and academia — independently converged on the same specific ask, unprompted (Section 3.4/3.5): measure NOx on a basis that reflects hydrogen's actual combustion chemistry (wet-gas basis, or mass per unit of energy/product) rather than units inherited from fossil-fuel regulation that structurally penalise hydrogen's mostly-water exhaust. This is low-cost, technically narrow, and has zero identified opposition — a rare thing in this report, and worth flagging as such rather than burying it alongside more contested recommendations.

Insights from the HyInHeat final event: policy panel

The HyInHeat final event, held on 27 October 2026 during European Hydrogen Week, opened with the policy panel "Policy First: Building the Foundation for Hydrogen Investment". It was moderated by European Aluminium, with speakers from EUROFER, ACER, ENNOH and Hydrogen Europe. The panel provided a third, independent check on this report's findings. Speakers from different parts of the value chain (industrial users, regulators, network operators and hydrogen producers) raised the same themes as the policy update (Section 2) and the questionnaire (Section 3).

Cost and the need for public support. Hydrogen Europe named regulatory complexity as a key challenge. It said electrolytic hydrogen is being deployed but the deployment is stalling. Capacity has grown from almost nothing a few years ago, and several projects are expected to start commercial operation between end-2026 and mid-2027. Even so, the market remains stuck and far from the 2030 ambition. Hydrogen Europe noted that practically every electrolytic project so far has relied on some form of public support, and that most investement decisions in electrolytic hydrogen focus on sectors that already use hydrogen, such as refining, chemicals and steel. Lead markets are one of the most effective ways to stimulate use of electrolytic hydrogen in Europe, where demand is currently lagging. It also saw the implementation of the RED targets for industrial users as an important opportunity right now. EUROFER stressed that international competition requires steel to be both very low-carbon and low-cost, and that the cost of hydrogen remains far above what steelmakers need.

Demand uncertainty and infrastructure risk. ACER identified demand uncertainty as a key challenge. ENNOH described the infrastructure challenge as a question of risk. Who pays for pipelines that may be under-used at first? How can a network with few initial users stay viable while it attracts new ones? ENNOH argued that the most competitive hydrogen in Europe is often produced far from demand centres. Large-scale transport through coordinated trans-European corridors is therefore more efficient than producing locally. These corridors are not free of risk, but a clear allocation of that risk could create an investment case and give certainty to both supply and demand. ENNOH noted that more than ten corridors are currently being planned to bring competitive hydrogen to demand centres. It also stressed the role of large-scale storage, and the need for more electricity infrastructure as energy systems become more integrated.

From production subsidies to an ecosystem approach. ACER highlighted the need for an ecosystem approach that brings production, infrastructure and demand together to lower the final cost of hydrogen. It pointed to electricity price formation and the production rules for renewable hydrogen as factors that raise production costs across Europe. It also noted that the hydrogen market has developed more slowly than originally assumed. The call for evidence on the new EU Hydrogen Strategy opened the day before the event. In that context, ACER observed that the strategy could look across all uses, such as refining, fertilisers and maritime fuels, and start from an industrial-policy choice about retaining these value chains in Europe given their often struggling global competitiveness. It framed that choice as a trade-off between decarbonisation, competitiveness and resilience. EUROFER, for its part, called for a holistic approach in which hydrogen use is prioritised in hard-to-abate sectors.

Fragmented rules and slow transposition. A question from the audience raised how fragmented national rules are on hydrogen production and safety, and asked how Member States could be pushed towards a common approach. ENNOH replied that standardised rules, for example on hydrogen purity, are being developed but take time. Two things slow progress: the length of regulatory processes, and incomplete transposition of existing EU legislation into national law. The policy record confirms this. By the time the Commission opened infringement procedures in September 2026, only one Member State (Italy) had notified full transposition of the Hydrogen and Decarbonised Gas Markets Directive. As one speaker put it, “no rules means no investment”.

Closing priorities.

ENNOH called for the existing legislation to be transposed into national law quickly, because network operators cannot plan or invest without stable rules. It also asked for de-risking of infrastructure investment, so that pipelines can be built before demand is fully in place.

Hydrogen Europe's message was to keep the course on existing targets, since they are the main signal investors rely on.

ACER stressed the need for a clear choice on which hydrogen-consuming industrial value chains Europe wants to retain as this choice determines where hydrogen is needed and at what cost. It also named the cost of hydrogen as the deciding factor for uptake.

EUROFER called for a structural reduction in energy prices and regulatory costs, since these drive the final cost of hydrogen for steelmakers. It also asked to keep the technology basket open, so that companies can choose the decarbonisation route that fits their process.

Policy recommendations

The following recommendations follow directly from the evidence in this report, the policy landscape mapped in Section 2 and the stakeholder findings in Section 3, and the discussion at the final event policy panel.

> *Make Hydrogen Bank support predictable across auction rounds, and prioritise duration and OPEX support for projects with credible offtake.*

Cost was the single most severe barrier identified in the questionnaire, and when asked what would most effectively accelerate the transition, industry respondents mostly pointed to continuity and scale of existing support, pilot/demo funding, project-level co-funding, OPEX-focused mechanisms, rather than new instruments. The Hydrogen Bank's track record so far points the same way. Its budget has swung from €1.3 billion in the third auction (IF25) to €500 million in the fourth (IF26), and its scope and eligibility rules have changed from one round to the next (Section 2.1), which makes it hard for developers and industrial offtakers to plan beyond a single round. The second auction (IF24) also demonstrated the risk of supporting projects whose offtake is not yet secured: winning bidders representing 1.88 of 2.33 GW withdrew after failing to secure offtake at their bid prices. We recommend that the Hydrogen Bank: (i) set out a multi-year schedule of auction rounds with greater consistency in budget, scope and design; (ii) direct support toward sufficiently mature projects that can demonstrate credible, well-developed hydrogen offtake arrangements; and (iii) shift toward multi-year, OPEX-oriented support rather than short-term capital bidding rounds. Policymakers could also consider whether elements of a Contract for Difference-like approach, where support adjusts to the gap between the cost of hydrogen and a reference price, could complement the current fixed-premium model and reduce the risk that winning projects later find their bid price unviable. The final event panel made the same point from the market side. Hydrogen Europe noted that practically every electrolytic project so far has relied on public support, and that lead markets are among the most effective ways to stimulate demand, which is currently lagging. Supply-side auctions should therefore be paired with demand-side measures, such as lead markets for low-carbon steel and aluminium, so that supported projects can find offtakers at a viable price. Stable targets matter too: as Hydrogen Europe put it, they are the main signal investors rely on.

> *Plan hydrogen infrastructure around confirmed industrial demand, and account for when it will actually be available.*

Infrastructure showed the widest steel/aluminium gap of any barrier category, reflecting genuinely different supply needs across use cases and regions rather than a difference in ambition: steel's hydrogen-DRI route needs continuous, pipeline-scale supply, while aluminium can run on smaller volumes (Section 4.2). The timing of infrastructure is also a barrier in its own, Germany's Hydrogen Core Network has a completition target of 2032, with individual lines allow to slip to 2037, and the H2med links target 2032 (Section 2.7), and an industrial user cannot commit to switching to hydrogen before it knows when hydrogen will reach its site. At the same time, hydrogen demand for steel is highly uncertain. Beyond technology choices, it depends strongly on the future trade of steel and steel products and on circularity measures, especially retaining scrap within the EU (deliverable D7.5). The policy ask is therefore threefold. First, we recommend that infrastructure planning, including TSO network development plans and the selection of PCI/PMI projects, be based on confirmed demand by region and application (for example, signed offtake agreements or connection requests from industrial users), and that it recognise that different applications need different supply solutions, such as pipelines for large continuous users and trucked delivery or on-site production for smaller or dispersed ones, rather than defaulting to one infrastructure model applied uniformly across sectors. Second, we recommend that infrastructure delivery milestones be tracked and published, and that support schemes for industrial users take the realistic date of hydrogen availability at their site into account, so that delays in deployment do not hold back industrial hydrogen uptake. Third, as ENNOH stressed at the final event, early networks with few users need risk-sharing mechanisms, for example intertemporal cost allocation or public guarantees for capacity that is under-used at first. These mechanisms would allow pipelines to be built ahead of full demand without placing the whole cost on the first industrial users.

Refine CBAM to reflect each sector's distinct cost structure, with sector-specific changes for steel and aluminium.

Industry's mixed response to current carbon pricing mechanisms (Section 3.2) reflects real differences in how CBAM affects steel and aluminium. For steel, the main concern is the completeness of coverage: EUROFER supports the downstream extension but warns that loopholes on circumvention, downstream products and exports remain (Section 2.5). For aluminium, primary production is highly electricity-intensive, so the treatment of indirect (electricity-related) carbon costs and of exports weighs more heavily on whether CBAM protects EU producers who invest in decarbonisation. We therefore ask policymakers, in the ongoing CBAM review and the parallel ETS revision, to: (i) assess the impact of each proposed change separately for steel and for aluminium, rather than for metals as a whole; (ii) for steel, close the remaining circumvention and downstream gaps before the downstream extension takes effect; and (iii) for aluminium, address how indirect carbon costs and exports are treated, so that EU producers are not left exposed to costs that CBAM does not currently capture. The aim is a mechanism that rewards low-carbon production, including hydrogen-based processes, in both sectors. At the final event, EUROFER added that structural energy prices and regulatory costs ultimately decide the cost of hydrogen for steelmakers, so the cost side of the framework matters as much as protection from carbon leakage.

Adjust NOx measurement to fit industries different from natural gas.

NOx should be measured on a basis that reflects hydrogen's actual combustion chemistry not on units inherited from fossil-fuel regulation. This matters beyond measurement accuracy: the NOx limits that actually govern a facility's permit come from the BAT-Associated Emission Levels in the relevant BREF documents, calculated on today's concentration-based, dry-gas basis. A BREF methodology that properly accounts for hydrogen's combustion profile is a precondition for hydrogen conversions to be evaluated, and permitted, on their real merits.

Confirm permitting fast-tracks help industrial users, not just producers.

Respondents identified permitting delay as a real barrier in its own right, separate from cost. The NZIA and Industrial Accelerator Act both promise faster permitting, but both were designed with hydrogen *producers* in mind — it is not yet clear whether industrial *users* (e.g. a plant converting a furnace to hydrogen) see the same speed-up. Since both instruments are new and untested, we recommend permitting timelines be tracked and published so this can be verified in practice rather than assumed.

Speed up transposition of the Hydrogen and Decarbonization Gas Markets Package and harmonise technical rules across the Member States.

At the final event, panellists identified incomplete transposition and fragmented national rules on hydrogen quality, safety and network access as a direct brake on investment: without stable rules, network operators cannot plan and industrial users cannot commit. Twenty-six Member States missed the 5 August 2026 deadline for transposing Directive (EU) 2024/1788. We recommend that the Commission promptly follow up on the infringement procedures it opened in September 2026. We also recommend that ENNOH, ACER and the Commission accelerate common network codes and standards on hydrogen quality and safety, so that a furnace converted to hydrogen in one Member State faces the same requirements as in another. This links directly to the NOx recommendation above: both call for technical rules that are designed for hydrogen and applied consistently across the EU.

> *Use the new EU Hydrogen Strategy to give a clear, long-term signal on where hydrogen will be used.*

Speakers at the final event agreed that the hydrogen market has developed more slowly than expected, and that investors and industrial users need a clearer signal. ACER pointed to the need for a clear industrial-policy choice on which hydrogen-consuming value chains Europe wants to retain. EUROFER called for hydrogen to be prioritised in hard-to-abate sectors while keeping the technology basket open. Hydrogen Europe stressed that stable targets are the main signal investors rely on. The review of the RFNBO rules, the new Hydrogen Strategy and the post-2030 renewable energy framework are all being prepared at the same time (Section 2.4). We recommend that the Commission use them together to set out, up to 2040, which industrial uses hydrogen is expected to serve and how demand in those uses will be supported. Any change to existing targets or production rules should protect projects that have already invested under the current rules. For steel and aluminium, the strategy should recognise that the two sectors are on different paths (Section 4.5): hydrogen-based DRI for primary steel, and hydrogen as one option among others, alongside electrification, for aluminium process heat.

Conclusion

This report set out to update D8.5's policy mapping with what has changed since, and to ground it in real industry experience. Both parts point the same way: EU hydrogen policy has become more detailed since mid-2025 — a finalised low-carbon hydrogen definition, a firmer (though still proposed) Industrial Decarbonisation Bank, an accelerated RED III review — but more detail hasn't yet meant more hydrogen actually being used. The Hydrogen Bank's budget is shrinking, CBAM's downstream scope is still unresolved, and infrastructure is being built faster than confirmed demand for it. The questionnaire shows the same gap from the industry side: cost is still the biggest barrier for both sectors, and steel and aluminium are clearly on different paths that policy needs to keep treating separately, not as one hydrogen story.

These findings were discussed at HyInHeat's final event on 27 October 2026, during European Hydrogen Week. The opening policy panel, with EUROFER, ACER, ENNOH and Hydrogen Europe, confirmed the report's main messages. Cost and demand uncertainty remain the central barriers, infrastructure needs a clearer allocation of risk, and incomplete transposition of existing rules is itself holding back investment. The panel's input led to two additional recommendations, on transposition and on the new Hydrogen Strategy. The closing panel focused on the NOx measurement problem that this report's respondents raised independently, across every group we surveyed (Section 3.6), and brought the technical experts who identified it together with DG Environment. The event also featured a real example of the aluminium pathway this report describes, with Novelis presenting the UK's first industrial-scale hydrogen fuel switch at its Latchford site.

The recommendations in this report are a starting point, not a final word. Several — especially on CBAM and infrastructure — deliberately stop short of telling regulators what to do, since that needs more input from the sectors involved first. NOx is the exception: it's the one finding in this report that no respondent, in any group, pushed back on.

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