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# Global Perspective – Policy and Regulations

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# Hydrogen policy summary

	EU	USA	Canada	UK	Germany	France	Spain	Portugal	Norway	Netherlands	Belgium	South Korea	Japan	India	China	Australia
<b>2030 Production Target</b>	40 Gwe / 10 Mtpa	10 Mtpa	✗	10GW	5 GWe	6.5 GWe	4 GWe	2 GWe	✗	3 – 4 Gwe	2 – 6 TWh	✓	3 Mtpa	5 Mtpa	0.2 Mtpa by 2025	✗
<b>2030 Demand Target</b>	20 Mtpa	10 Mtpa	✗	✗	✗	✗	25% of current demand	✗	✗	✗	✗	5.3 Mtpa by 2040	0.42 <sup>(2)</sup>	—	✓	✗
<b>Top 3 demand sectors</b>	Industry Ammonia Refining	Other Refining Ammonia	Export Mobility Blending	Power Industry Mobility	Refining Ammonia Steel	Industry Mobility	Refining Ammonia Mobility	Blending Industry Mobility	✗	Industry Mobility	Industry Maritime	Power Mobility	Power Mobility Industry	Refining Fertiliser City Gas	Mobility	✗
<b>Incentives (Tax or CfD)</b>	Hydrogen auctions	Tax: up to \$3/kgH <sub>2</sub>	Tax	CfD	✗	✗	✗	✗	✗	✗	✗	✗	CfD	✓	✗	✗
<b>H<sub>2</sub> project funding (US\$ billions)</b>	~167	8	✗	✓	~9.7	~8.3	~10.6	~8.8	✗	~0.4	~0.19	~3	~53 <sup>(3)</sup>	~2.5	✗	1.6
<b>Net-zero target legislated</b>	✓	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	—	—	—
<b>Emissions (Scope / kgCO<sub>2</sub>/kgH<sub>2</sub>)</b>	Full life-cycle 3.38	well-to-gate 4.0	✗	well-to-gate 2.4					✗			well-to-gate 4.0	well-to-gate 3.4	✗	well-to-gate 14.5 / 4.9 <sup>(1)</sup>	✗

<b>Key</b>	<b>Targets</b>	✓ Legislated	— Strategy or drafted/in progress	✗ Not in place
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(1) China CI definition for Low Carbon Hydrogen is 14.51 kgCO<sub>2</sub>e/kgH<sub>2</sub>; and for Clean/Renewable hydrogen is 4.9 kgCO<sub>2</sub>e/kgH<sub>2</sub>

(2) Wood Mackenzie estimate equivalent to 1% of power generation in Japan in 2030.

(3) Japan plans to invest US\$107 billion from both the private and public sector to develop hydrogen supply chains over 15 years. We've assumed a 50-50 split.



Contents	<i>I Legislative acts</i>	page
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## REGULATIONS

- |   |   |   |
|---|---|---|
| * | Regulation (EU) 2023/1182 of the European Parliament and of the Council of 14 June 2023 on specific rules relating to medicinal products for human use intended to be placed on the market in Northern Ireland and amending Directive 2001/83/EC <sup>(1)</sup> | 1 |
|---|---|---|

*II Non-legislative acts*

## REGULATIONS

- |   |   |   |
|---|---|---|
| * | Council Implementing Regulation (EU) 2023/1183 of 19 June 2023 implementing Regulation (EC) No 1183/2005 concerning restrictive measures in view of the situation in the Democratic Republic of the Congo | 8 |
|---|---|---|

- |   |  |    |
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| * | Commission Delegated Regulation (EU) 2023/1184 of 10 February 2023 supplementing Directive (EU) 2018/2001 of the European Parliament and of the Council by establishing a Union methodology setting out detailed rules for the production of renewable liquid and gaseous transport fuels of non-biological origin | 11 |
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- |   |  |    |
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| * | Commission Delegated Regulation (EU) 2023/1185 of 10 February 2023 supplementing Directive (EU) 2018/2001 of the European Parliament and of the Council by establishing a minimum threshold for greenhouse gas emissions savings of recycled carbon fuels and by specifying a methodology for assessing greenhouse gas emissions savings from renewable liquid and gaseous transport fuels of non-biological origin and from recycled carbon fuels | 20 |
|---|--|----|



# Register of delegated and implementing acts

Logir

Active access

Delegated acts

Implementing acts

Legislative acts

Expert group meetings

Delegated acts > Delegated act details



ADOPTION

SCRUTINY

PUBLICATION



Two Delegated Acts adopted by the European Commission on 10 February 2023 (original deadline 31 December 2021 under the EU Renewable Energy Directive). Entry into force on 10 July 2023.

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# EU Pathways for producing renewable green hydrogen

Renewable fuels of non-biological origin (RFNBOs)



## Direct connection

The electrolyser is directly connected to a renewable asset. The renewable asset must be **no older than 3 years**.

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## Grid connection

Renewable share of electricity in bidding zone where electrolyser is operating > **90%** or consumption occurs during curtailment periods

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## Grid connection

Emissions intensity of electricity in bidding zone is < **18 gCO<sub>2</sub>eq/MJ** (renewable PPA and time and geographical matching still apply)

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## Grid connection

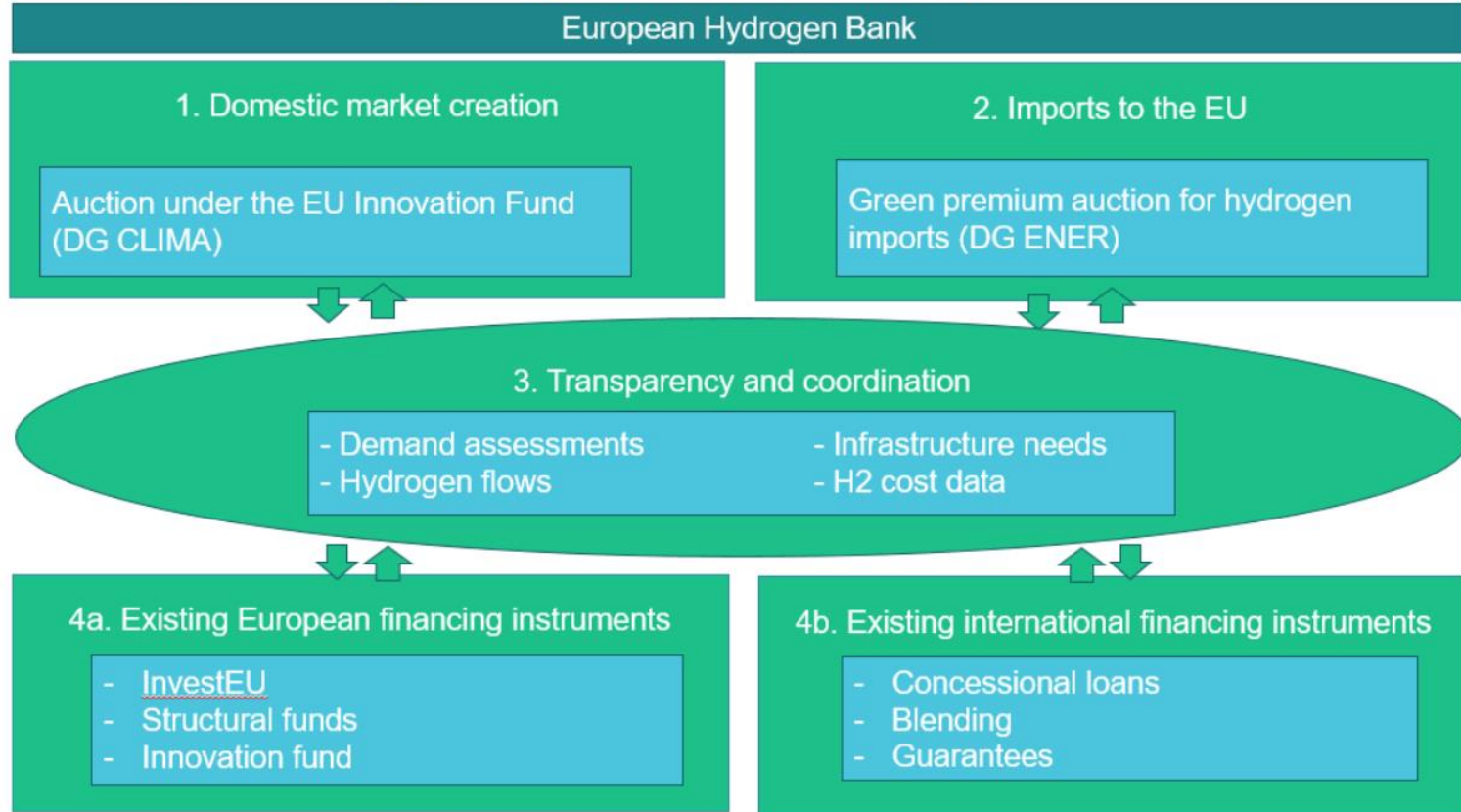
Renewable PPA with contracted asset built within 36 months before the electrolyser

# Conditions for producing renewable green hydrogen

Renewable fuels of non-biological origin

 Principles	 Requirements	 Exemptions/waivers
 <b>Additionality</b>	Renewable asset built no more than 3 years before electrolyser production. No OPEX or CAPEX subsidy received.	Does not apply until 2038 if electrolyser comes into operation before 2028. Some exclusions to subsidy restrictions.
 <b>Time matching</b>	Hourly from 1 January 2030	Monthly until 31 December 2029
 <b>Geographical matching</b>	Same bidding zone or interconnected bidding zone if day-ahead market price is equal or higher.	Equivalent concepts for bidding zones (and curtailment periods) can be used in third countries.
 <b>Carbon intensity</b>	<b>3.38kg CO<sub>2</sub>e/kg H<sub>2</sub></b> 70% greenhouse gas emissions saving compared to fossil fuel comparator. Full life cycle including: upstream emissions, emissions associated with taking electricity from the grid, processing, transport to end-user.	

# European Hydrogen Bank: Proposed activities





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# Hydrogen Bank Financing:

1. Commission likely to use Germany's H2 Global scheme to implement the international part of the European Hydrogen Bank. Proposal is to offer a green premium for green hydrogen imports via a similar auction system as used for the domestic market (EUR 800 million for first domestic auction in the autumn which will award a subsidy to hydrogen producers through a fixed premium per kg of hydrogen produced for a maximum of 10 years of operation).
2. Member States can also use the H2 Global scheme.



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## Demand mandates (EU):

1. Provisional agreement on revised Renewable Energy Directive: will require 42% of hydrogen used in industry to come from renewable green hydrogen and its derivatives by 2030, rising further to 60% by 2035.
2. At least 1% of the renewable energy supplied to the transport sector in 2030 to come from green hydrogen
3. FuelEU Maritime agreement: green hydrogen and its derivatives such as green ammonia or green methanol will need to be used for 2% of shipping fuels in large vessels by 2034.
5. ReFuelEU Aviation agreement: 1.2% synthetic, hydrogen-derived fuel mandate between 2030 and 2031 rising to 2% between 2032 and 2035. Part of a wider mandate which will see all flights departing from the EU by 2050 being powered 70% by sustainable aviation fuels (SAF).

## Strategy

### 1 Target strategic, high-impact end uses



Achieve 5 MMT/year of clean hydrogen by 2030

### 2 Reduce the cost of clean hydrogen



Enable \$2/kg by electrolysis by 2026 and \$1/kg H<sub>2</sub> by 2031

### 3 Focus on regional networks



Deploy regional clean hydrogen hubs and ramp up scale

#### Vision:

*Affordable clean hydrogen for a net-zero carbon future and a sustainable, resilient, and equitable economy*

#### Benefits:

*Emissions reduction; quality job growth; energy security and resilience; positive community impact*

## US Strategy and Regulation

**November 2021: Bipartisan Infrastructure Law (BIL).**  
\$9.5 billion for clean hydrogen:

- Up to \$7 billion for six to 10 regional H2Hubs
- \$1 billion demand-side initiative to support the H2Hubs (announced 5 July 2023)

**August 2022: Inflation Reduction Act (IRA)**

- Clean hydrogen Production Tax Credit offers up to \$3/kg credit for hydrogen with well-to-gate emissions less than 0.45 kg CO<sub>2</sub>e/kg H<sub>2</sub>, conditional on meeting the prevailing wage and apprenticeship requirements.
- Detailed Treasury regulations due August 2023 including how to deal with additionality, time and geographical matching.

### Enablers

Work with other agencies to accelerate market lift off



Good Jobs and Workforce Development



Safety, codes and standards



Policies and incentives



Stimulating private sector investment



Energy and environmental justice

## Green Hydrogen Contracting Guidance

# Financing green hydrogen projects

### Key considerations

- A major consideration for green hydrogen projects will be to structure an acceptable risk profile for financing by allocating risks to those best able to take them, whether this be sponsors, insurers, financiers or governments.
- In this early stage in the development of the green hydrogen sector, public sector grants and other forms of concessionary funding will be a critical source of project financing, with blended financing solutions being key to making green hydrogen projects bankable and commercially viable. As direct financial support and investment from developing host nations is expected to be limited due to national budget constraints, development finance institutions are expected to play a key role in derisking financing in emerging economies.
- Host governments, project developers and sponsors will need to ascertain which combination of financing sources they wish to consider when determining how to structure a green hydrogen project. Each institution will have their own specific considerations as to required elements of the structure of a project, and will need to conduct in-depth due diligence to ensure that the project complies with their applicable credit and policy requirements.
- In developing countries, it will also be important to ensure that there is a robust cost-benefit analysis, socio-economic analysis, consensus building, and balancing of interests to ensure that commitments undertaken by the host state to provide a favourable environment for investment are weighed appropriately with the state's interests and rights to effect changes in policy. This will be critical to ensure the long-term success of the project and avoid disputes between stakeholders.

## 2. Relevant practices and international trends

It is premature to discuss international trends in the financing of green hydrogen projects. This paper therefore assesses a number of important considerations that are expected to influence the future development of financing activity in the sector. These are:

<b>Finance sources</b>	<ul style="list-style-type: none"> <li>• Governments and other international organisations</li> <li>• Multilateral and development financial institutions</li> <li>• Export Credit Agencies (ECAs)</li> <li>• Commercial bank term debt providers</li> <li>• Others</li> </ul>
<b>Risk allocation: due diligence</b>	<ul style="list-style-type: none"> <li>• Offtake / market risk</li> <li>• Renewable power and water supply risk</li> <li>• Technology Risk</li> <li>• Construction Risk</li> <li>• Access to market, transport and infrastructure risks</li> <li>• Regulatory risks</li> <li>• Environmental and social issues</li> </ul>
<b>Risk allocation: sponsor support</b>	<ul style="list-style-type: none"> <li>• Sponsor completion guarantee</li> <li>• Debt Service Undertaking ("DSU") / Sponsor Financial Guarantee</li> <li>• Contingent Stand-by Equity</li> </ul>
<b>Government / public sector finance and regulatory landscape</b>	<ul style="list-style-type: none"> <li>• Regulatory developments</li> <li>• Public - Private Partnerships</li> <li>• Cap &amp; Trade Systems / Carbon Tax</li> </ul>

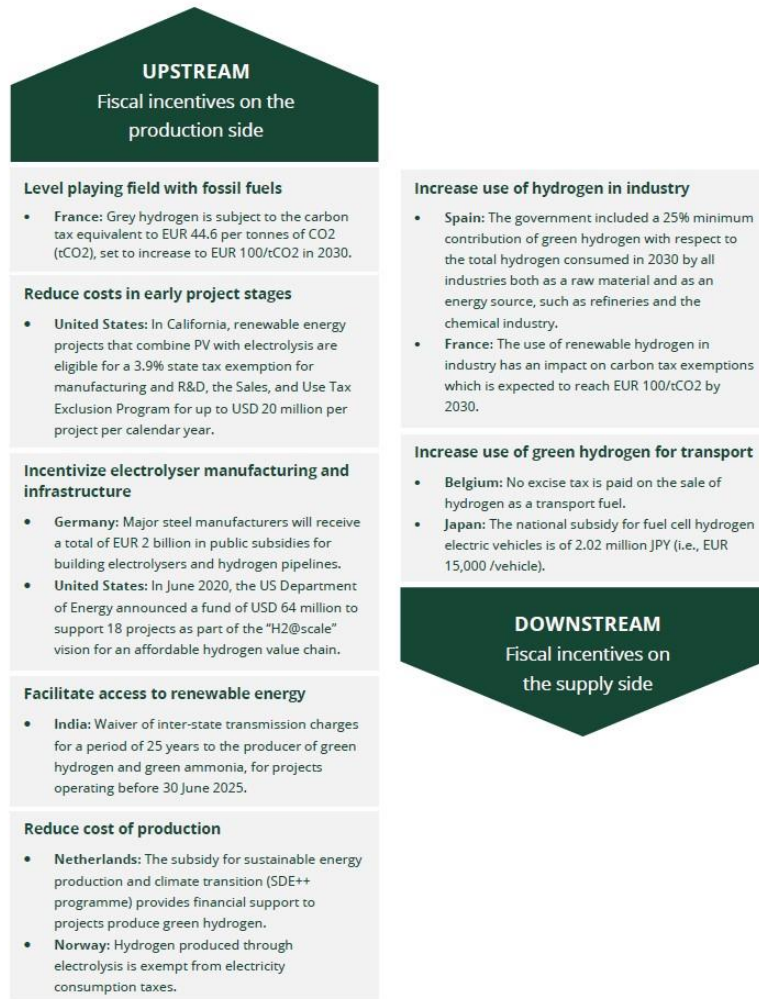
Figure: Examples of fiscal incentives across the value chain<sup>2</sup>

# Green Hydrogen Contracting Guidance

## Fiscal Terms and Incentives

### Key considerations

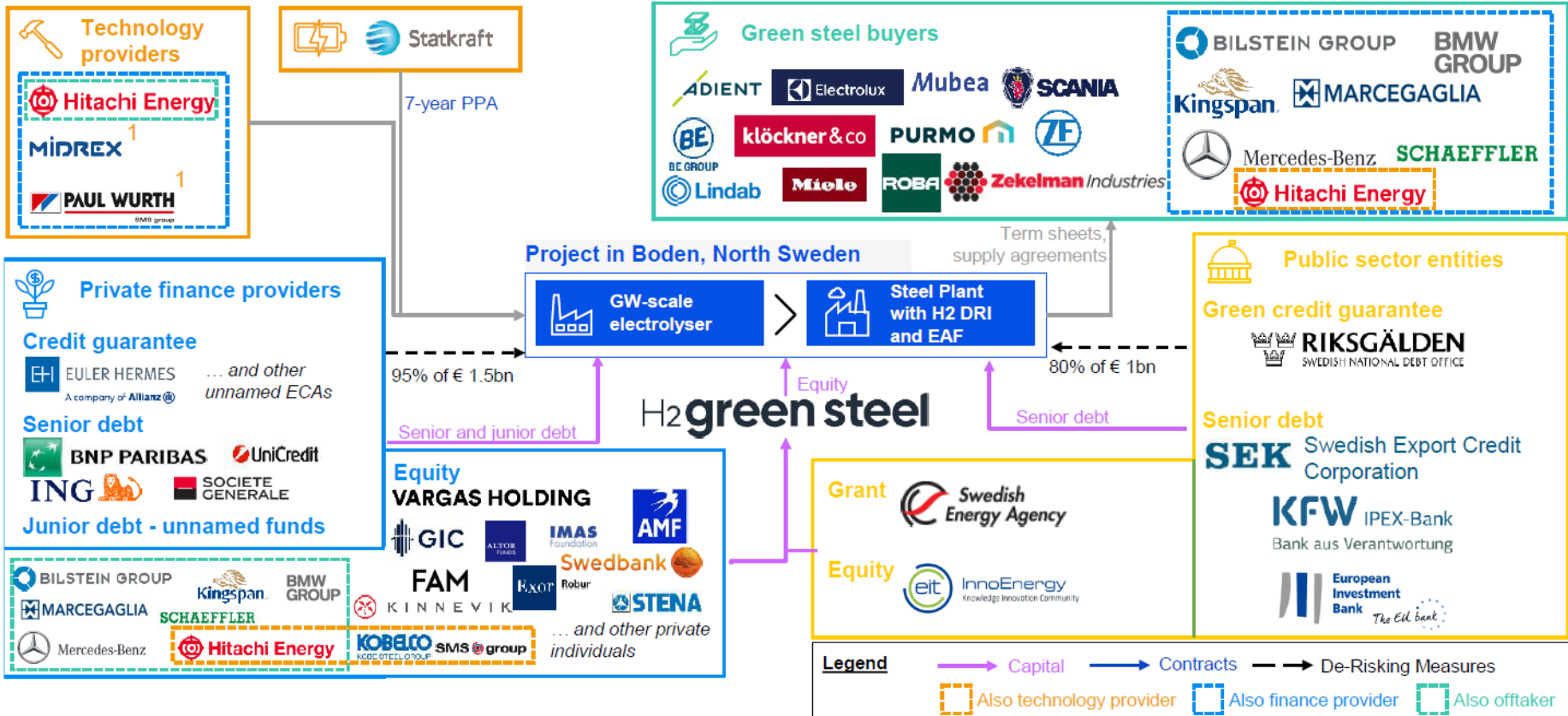
- In the early stages of green hydrogen development, it is likely that the industry will rely on fiscal incentives as new technologies are rolled out and scaled up. Fiscal incentives to reduce the costs and tax payments by project developers, as well as subsidies for individual projects or through public schemes, may be provided by governments to raise investments. However, as green hydrogen becomes increasingly competitive, taxes will become of greater importance as a source of revenue.
- Host governments will need to analyse and model how fiscal decisions made today impact investments and government revenues from green hydrogen in the future. The overlay of taxes and incentives will form the shape of the framework and implementation agreements between host governments and project developers.
- Each host government will need to identify the optimal mix of fiscal instruments and terms to meet its objectives. Contracts will therefore need to include responsive terms which allow for the adjustment and allocation of overall financial benefits between host governments and investors in response to variables that affect project profitability.
- A fiscal regime that is clear and transparent for the government, companies and citizens and sufficiently simple to monitor and apply for taxpayers and tax administrations will be critical, in particular in emerging and developing economies.





# H2 Green Steel - financing

## Industry / Corporates



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# Thank you