IRENA INNOVATION WEEK 2025

Enabling next generation trade in renewable energy value chains

Organised in partnership with

OECD

13 June 2025 | 09:00-10:30

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Scene setting: International trade enabling the energy transition

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The energy transition means new trading patterns

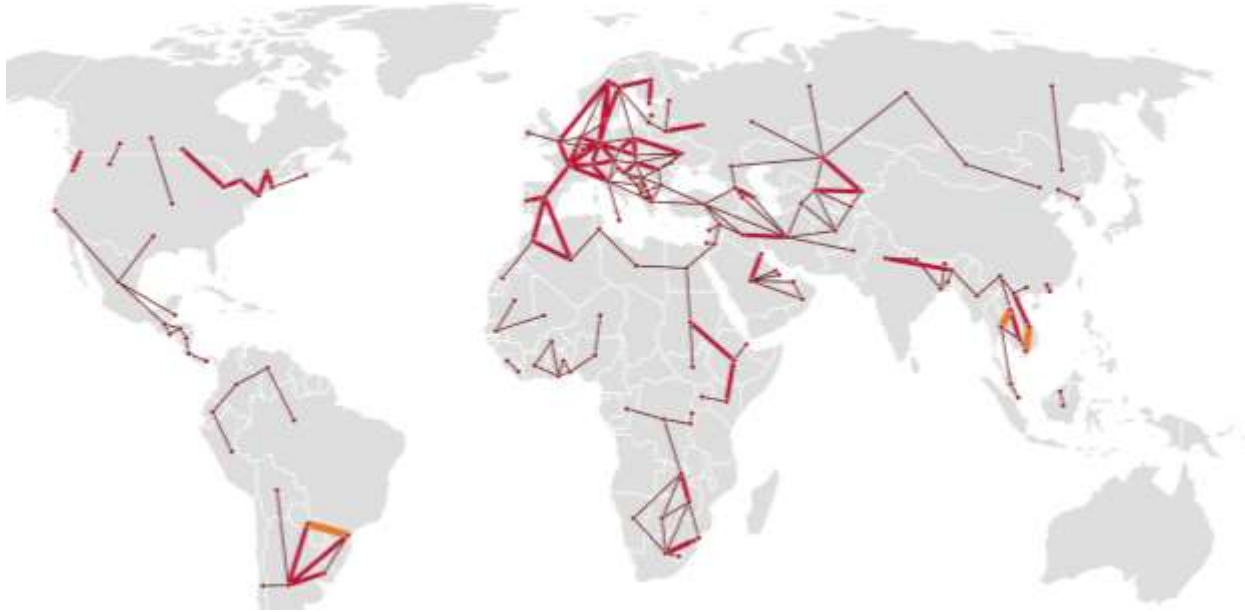
New trade flows in electricity, hydrogen, materials and clean technologies are emerging, in different patterns than traditional fossil fuel markets:

1. **Trade in renewable energy-related goods and technologies:** These include a wide range of goods and technologies, from solar PV panels and blades for wind turbines to smart meters, batteries and electrolysers.

2. **Electricity trade:** Interconnections make grids more stable and resilient. Electricity interconnections can be made between neighbouring countries, at a regional scale and possibly even inter-continentally.

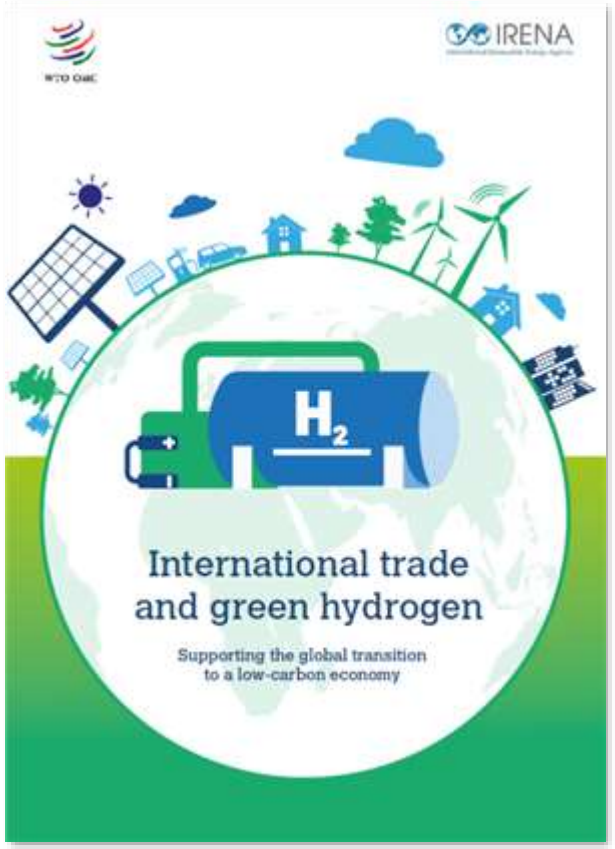
3. **Trade in renewably produced fuels:** Such as green hydrogen, ammonia and methanol.

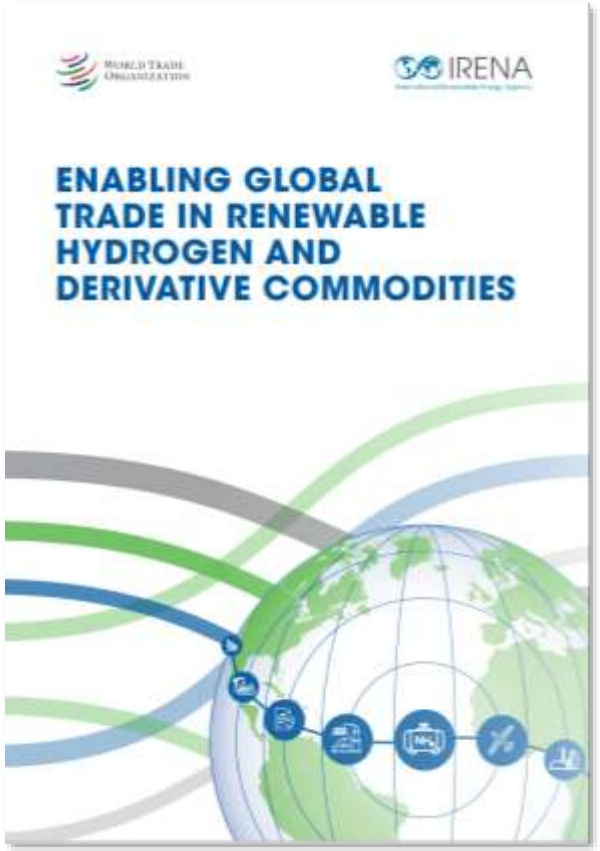
Existing electricity interconnectors (as at February 2024)



This map is provided for illustration purposes only. Boundaries and names shown on this map do not imply any endorsement or acceptance by IRENA.

IRENA and WTO teamed up to provide in depth insights on green hydrogen and commodity trade





- Many member countries seek to establish trade and international markets for hydrogen and its derivatives.
- The 2023 report reviewed the **current state of these markets** and offered recommendations for policymakers to use trade in advancing hydrogen deployment during the energy transition.
- The 2024 report focused on the **key physical, institutional, and social enablers** needed for hydrogen-derived commodity trade.

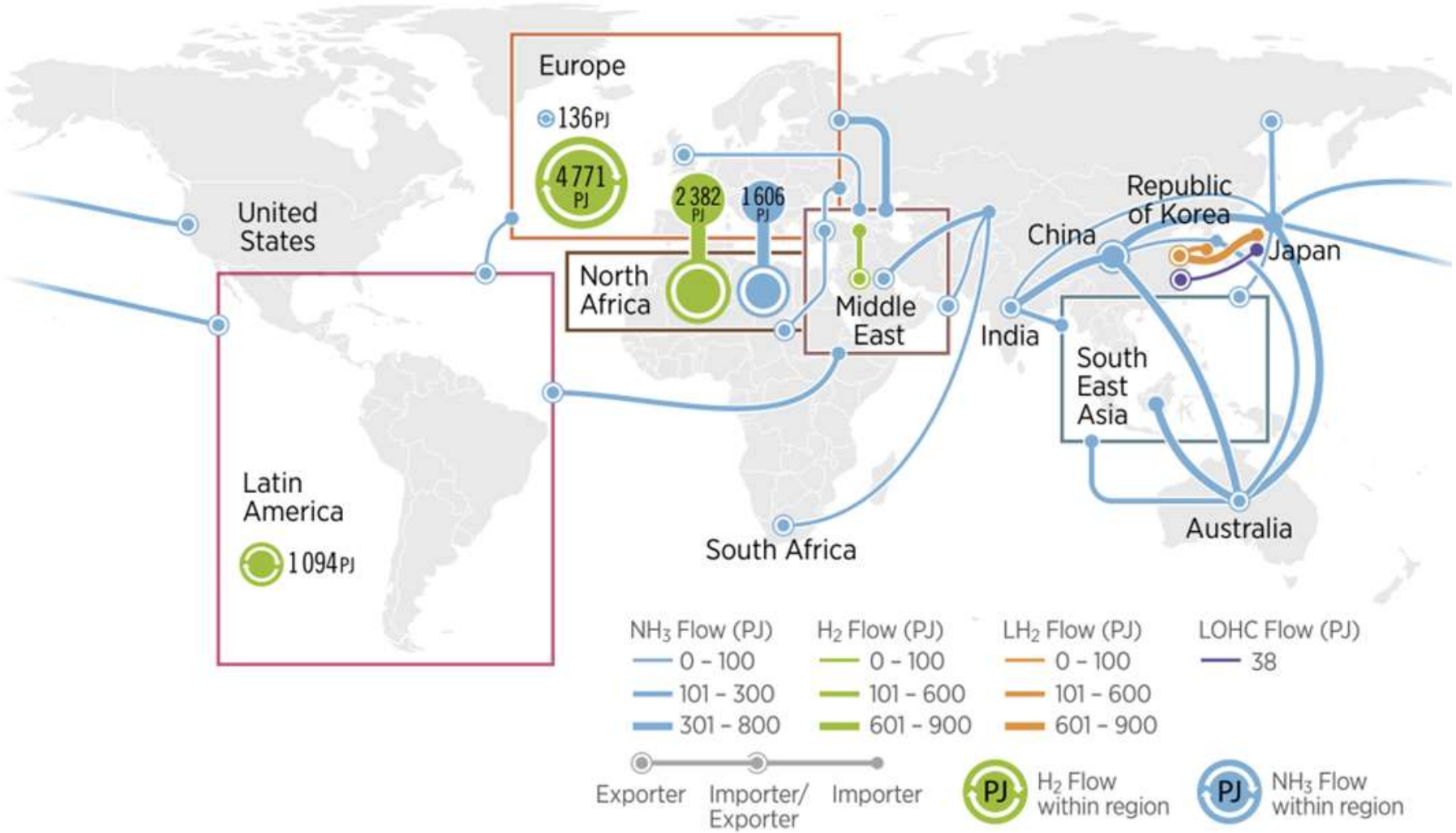
Source: WTO and IRENA (2023) International trade and green hydrogen: Supporting the global transition to a low-carbon economy
IRENA and WTO (2024), Enabling global trade in renewable hydrogen and derivative commodities, International Renewable Energy Agency and World Trade Organization, Abu Dhabi and Geneva.

About a quarter of the global hydrogen demand could be internationally traded, with derivatives playing a vital role in these international value chains

By 2050, international trade could satisfy about ¼ of the total global hydrogen demand in IRENA's 1.5°C scenario.

55% of this hydrogen would be traded via pipelines.

45% of this hydrogen would be shipped, predominantly as ammonia.



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Source: IRENA, 2022. Global hydrogen trade to meet the 1.5C goal. Part I: Trade outlook for 2050 and way forward.

When discussing trade in these sectors, it is key to recognise that trade in goods and services will also be vital to driving development and deployment

	Renewable energy production	Hydrogen & hydrogen derivatives production	Transport, storage and reconversion	Use
EQUIPMENT	• Renewable energy generation equipment, e.g., solar panels, wind turbines, etc. • Electric equipment.	• Electrolysers • Compressors, valves, flow control, metering and related equipment • Ammonia, methanol, direct reduced iron production plants.	• Piping and storage systems. • Compressors, valves, flow control, metering and related equipment. • Hydrogen, ammonia, methanol, hot briquetted iron transport vessels.	• Ammonia, methanol, production plants. • Direct reduction furnaces for iron production. • Fuel cell systems. • Hydrogen-ready (industrial) boilers • Hydrogen-ready gas turbines for power generation. • Fuel cell electric vehicles. • Ammonia, methanol and hydrogen storage equipment.
SERVICES	• Design • Engineering • Related construction • Operation and management		• Transportation and storage services • Related construction (e.g., port terminals)	• Wholesale and retail (e.g., hydrogen stations) • Marketing
	R&D, technical testing and analysis, consulting and training, various professional and business services			

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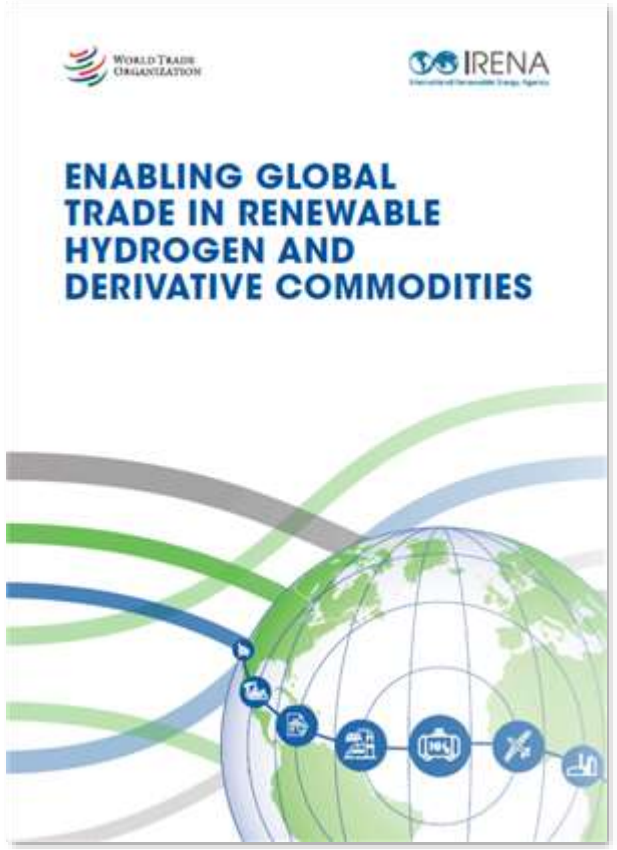
Source: WTO and IRENA (2023) International trade and green hydrogen: Supporting the global transition to a low-carbon economy

Our 2024 report focuses on enabling measures for scaling international markets in the green derivative sectors (ammonia, methanol, and e-kerosene)



Eleven enabling measures are considered across three pillars. Highlighted enablers include:

1) Infrastructure:

Holistically consider resource availabilities and requirements when planning infrastructure development, and ensure adequate supply of renewable electricity, water and carbon.

2) Institutional:

Align standards and reduce divergences in certification to ensure credible global markets and foster consumer confidence across international borders.

3) Social:

Embed job creation in national action planning for hydrogen and the derivative sectors, and understand the opportunities available to use industrial development to achieve socioeconomic progress.

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Source: IRENA and WTO (2024), Enabling global trade in renewable hydrogen and derivative commodities

The path to 2050 is paved with innovative solutions

IRENA's work focuses on the measures required to **enable** emerging renewable energy trade.

Can we learn from exemplar projects already implementing these principles today?

Novel market end state, 2050+

New ways of doing things today

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Scene setting: Financing hydrogen & derivatives projects: international market dimensions

Deger Saygin
Industry Programme Lead
OECD

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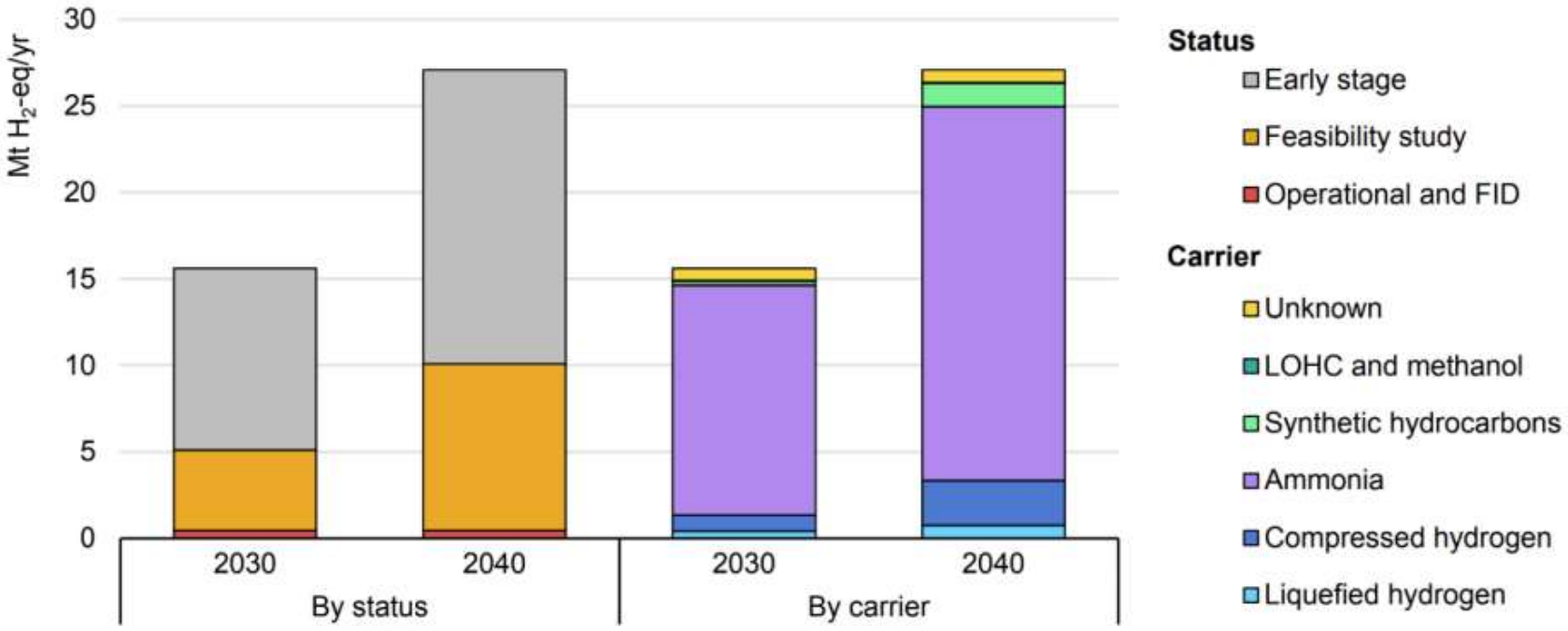
A lion's share of clean hydrogen trade is expected in the form of clean ammonia
Today about 80% of potential projects prioritise ammonia for transport often without reconversion

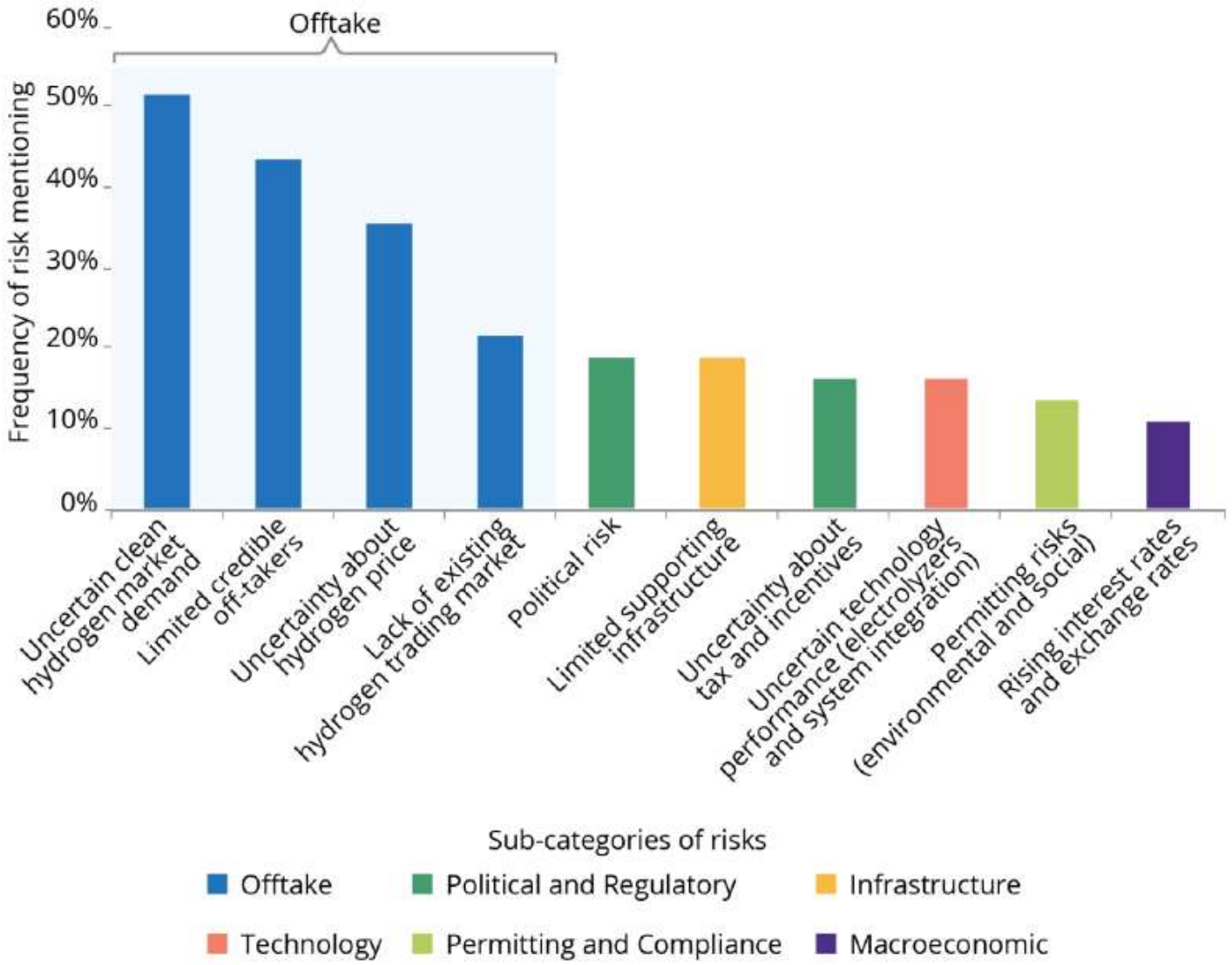


Considerations for increased hydrogen trade

- Standards and certification
- Energy security
- Health and safety
- Sustainable development impacts (e.g. water, labour, just transition)
- Critical raw materials use

Source: IEA (2024); OECD (*forthcoming)*

Identified key risks based on OECD/World Bank investor survey (2023)



Source: WB/ESMAP, OECD, GIF, Hydrogen Council (2023)

Mapping of de-risking instruments

← *Highest risk for investors*

	Uncertain clean hydrogen demand	Uncertainty about hydrogen price	Country risk	Uncertainty about tech. performance	Licensing, permitting, completion risks	Interest and exchange rates
Buyer credit guarantees						
Contractors-all-risk insurance						
Contracts for Difference						
Credit default swaps						
Foreign currency guarantee						
Interest rate swaps						
Liquidated damages						
Loan loss reserve						
Offtake guarantee						
Partial credit guarantee						
Performance guarantees						
Political risk investment/foreign investment insurance						
Syndicated loan						

Not relevant — **Very relevant**

- Offtake guarantees and Contracts for Difference are well-placed to address offtake risk (both market demand and clean hydrogen price).
- Political risk investment insurance is key to address country risk
- Several instruments exist to address interest and exchange rates

Source: OECD & WB/ESMAP (2024)

Leveraging derisking instruments and international co-ordination to catalyse investment in clean hydrogen

- Effective de-risking strategies require a **combination of instruments** to:
  1. Balance the project's risk-return profile
  2. Avoid overlaps between redundant instruments
- **Enabling conditions** to create a conducive environment for investors are key (e.g. access to infrastructure, demand creation mechanism)
- **Public-private partnerships** can optimise risk allocation
- **International partnerships** and **co-ordination mechanisms** are essential to scale clean hydrogen financing

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Panel discussion

Moderator

Deger Saygin
OECD

Panelists:

Eleanor Webster
Mission Innovation

Frank Wouters
MED-GEM Network

Dolf Gielen
World Bank

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Audience Q&A

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Fireside chat

Moderator

James Walker
IRENA

Luca Corradi
Net Zero Technology Centre

Ryan (Chenjiang) Xiao
China Hydrogen Alliance

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Closing remarks

James Walker
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Deger Saygin
OECD

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Renewables and Digitalisation for a Sustainable Energy Future

Thank you!

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