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Hydrogen in Australia's Future and the Implications for our International Relations

AIIA Conference on National Hydrogen Strategies

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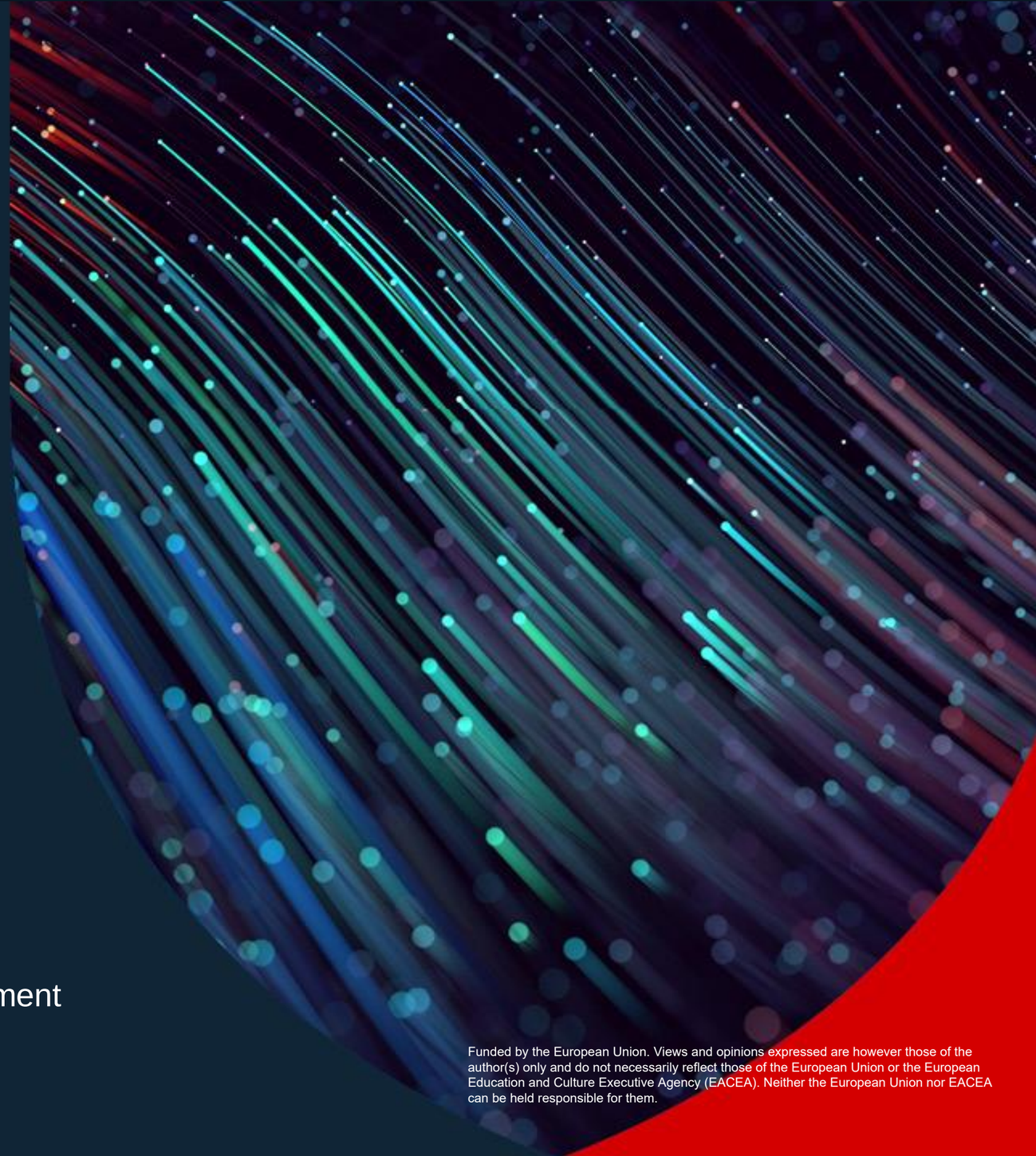

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We acknowledge and pay our respects to the Kaurna people,
the traditional custodians whose ancestral lands we gather on.

We acknowledge the deep feelings of attachment and relationship of the Kaurna people to country and we respect and value their past, present and ongoing connection to the land and cultural beliefs.

Overview

Hydrogen in the global energy transition

Trade-related implications

Australia’s hydrogen trade future

Broader implications for our international (trade) relations

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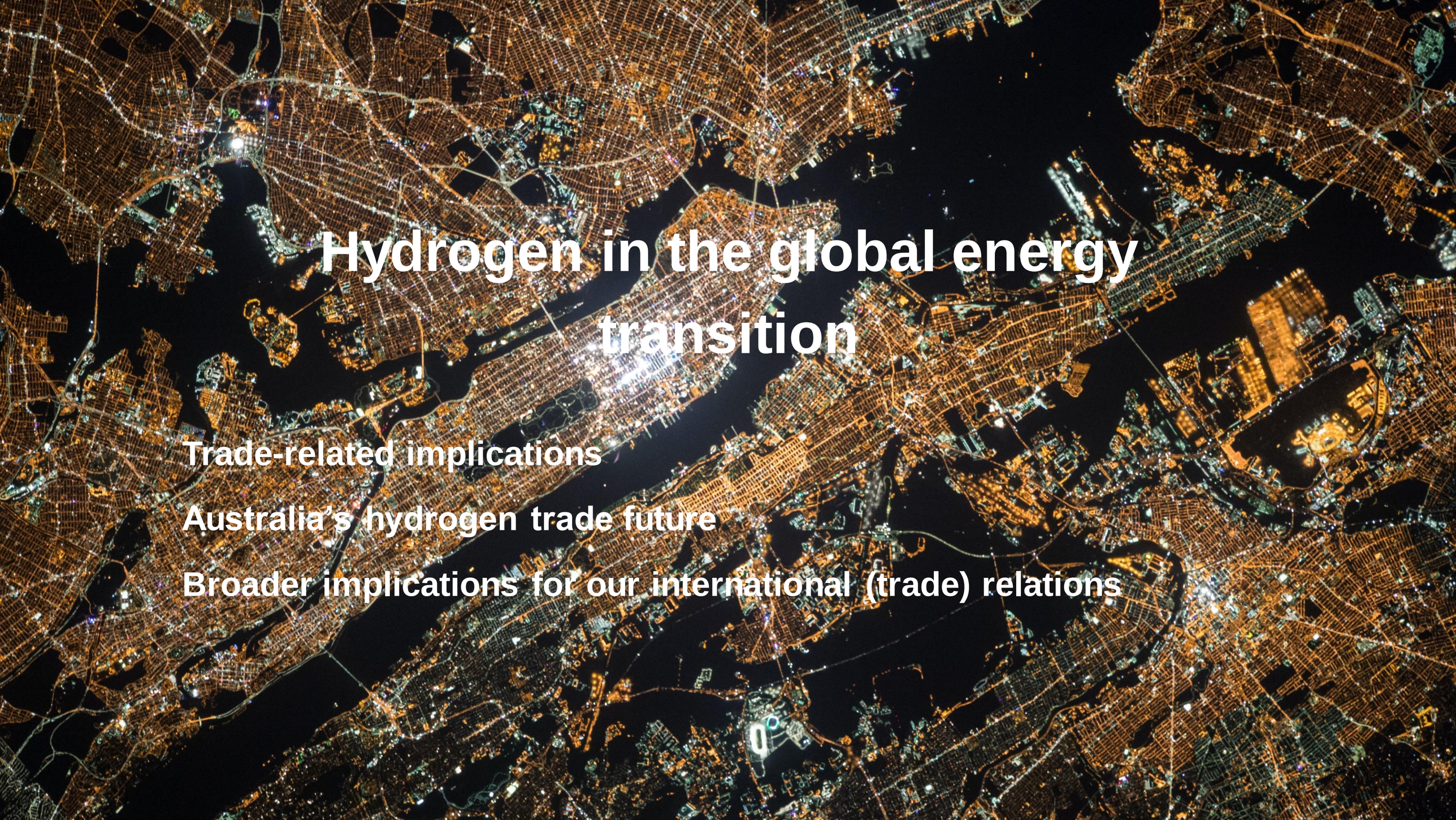

Hydrogen in the global energy transition

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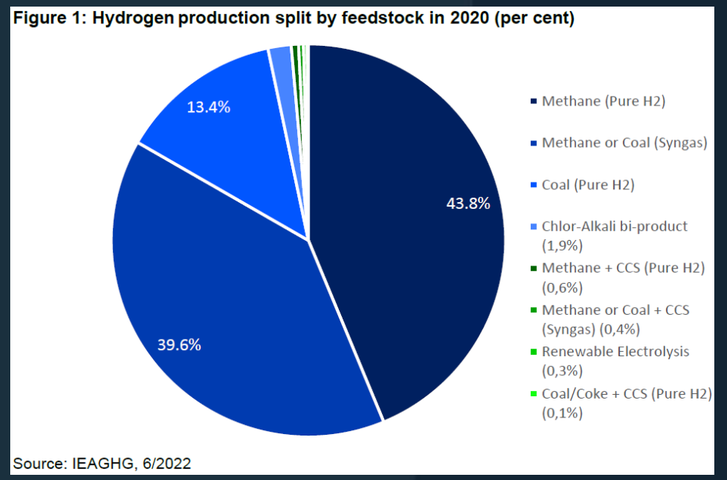
Global demand is growing but supply is met by unabated fossil fuels

Global demand is mostly in industrial and refining applications

New growth in direct iron reduction, shipping, and power (off a small base)	This will be substantially short of 2030 requirements to meet 2050 net zero targets

Low emissions production pipeline (electrolysis; CCUS) increasing rapidly off very low base

Still far short of path consistent with 2050 net zero targets	Currently competitive with unabated fossil fuels production in many regions	Particularly in countries/regions with good renewable resources (e.g., Australia)	If electrolyser production scales up and costs are driven down – a virtuous cycle could be established



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Which means trade opportunities will grow

- The major potential demandeurs are heavy industry, heavy duty road transport, and shipping
- Securing customers is a key challenge for suppliers
- Trade impediments also block progress (more on this below)
- To remove them requires international cooperation

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Geopolitics are providing significant tailwinds

- Russia’s invasion of Ukraine and impacts on European energy supplies
- China’s western search for energy security (Central Asia and the Middle East)
- Japan’s dependence on Russian gas and search for energy guarantees
- U.S. desire to re-industrialise to compete with China, and derivative subsidies
- European responses to US subsidies, and rush to diversify from Russian gas

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Trade-related implications

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Plans for low emissions hydrogen are ambitious, but demand is lagging

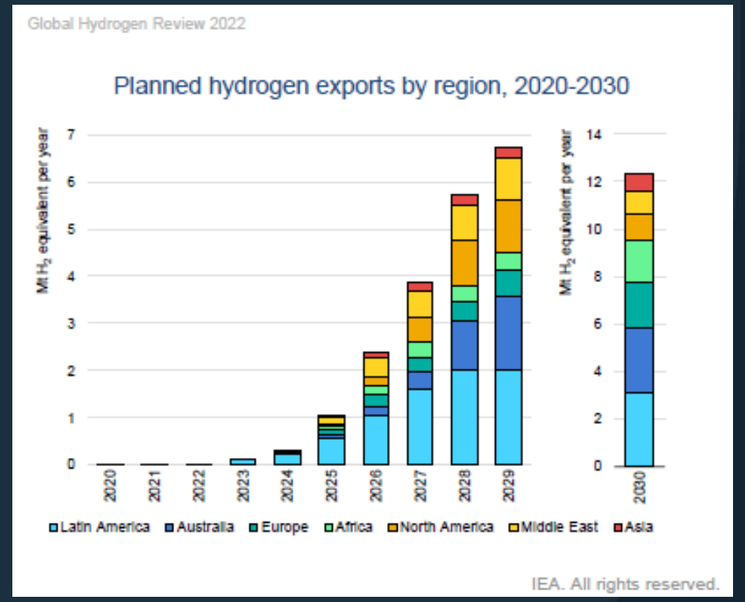
A “nascent, but rapidly growing landscape for hydrogen trade” (IEA, 2022, 162)

Derived from electrolytic production and carried in ammonia

Planned supply currently substantially exceeds confirmed import agreements

But Asian, and especially European, governments are developing import plans

Target-setting beyond 2030 remains a constraint on projects needing longer time-horizons



Source: IRENA Global Hydrogen Trade Report, 2022

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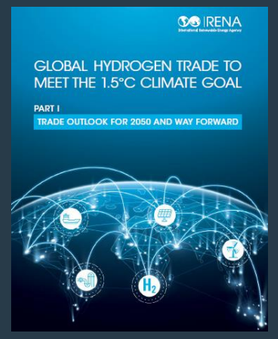
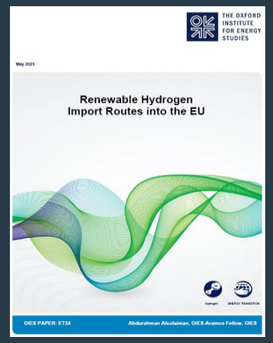
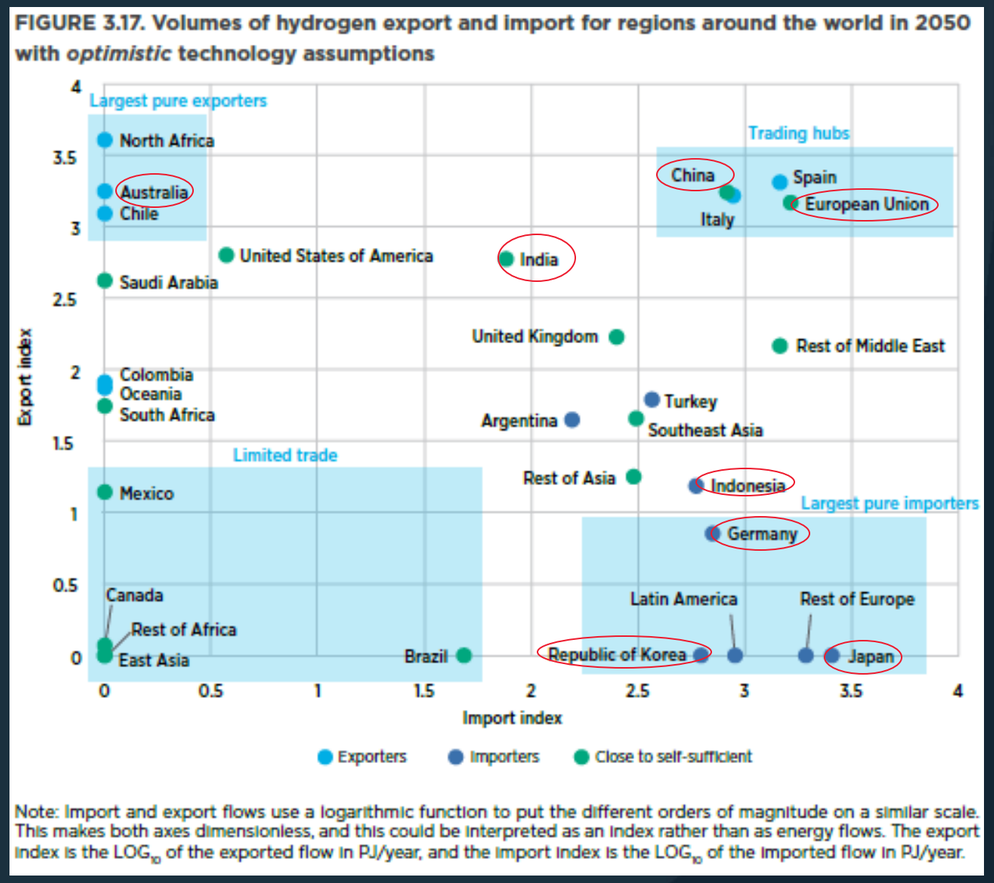
Major industrial relocations could be in the cards

- Some countries will be large net importers
- Particularly Europe - the largest hydrogen import target driving investment decisions
- Some current fossil-fuel exporters could benefit, including Australia
- Competition is escalating rapidly
- Each country and firm faces trade-offs between domestic production and imports







Source: IRENA Global Hydrogen Trade Report, 2022

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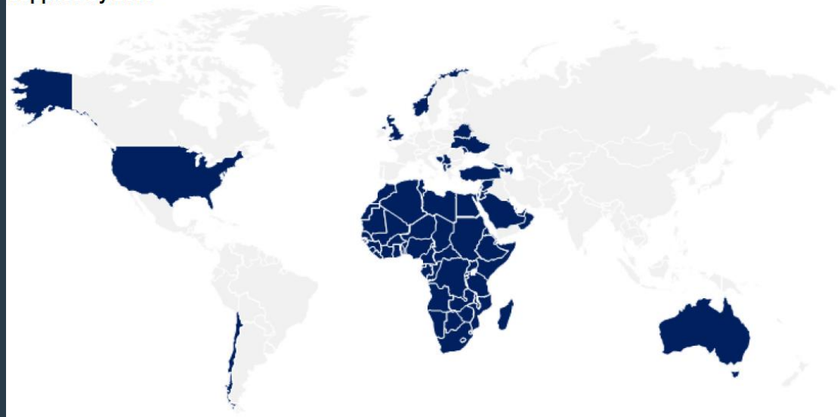
Consider the EU market opportunity for Australia

Figure 14: Countries within the regions indicated by the EU for potential future Hydrogen supplies by 2030[16]



Source: Author's analysis of the EU technical documents

Table 2: Approximate estimated 2030 LCOH to the Port of Rotterdam[23,24]

Country	Export port	Route	Estimated LCOH by 2030 (USD/kgH2)	Proportion of shipping cost to total LCOH)
Australia (West)	Perth	Via Suez Canal	2.49	24%
Australia (East)	Gladstone	Via Suez Canal	2.69	30%
Chile (Panama/South)	Valparaiso	Via Panama Canal	2.06	23%
Morocco	Casablanca	-	2.19	6%
Oman	Mina Al-Fahel	Via Suez Canal	2.28	17%
Saudi Arabia (West/East)	Jeddah	Via Suez Canal	2.32	14%
UAE	Sharjah	Via Suez Canal	2.39	16%

Source: Author's analysis of the different studies identified for hydrogen production in the specified geography and through the use of the HySupply Shipping Analysis Tool.

Geopolitics and the need for the EU to secure trusted import partners are driving import demands

North African and Gulf States constitute 4 of the 6 import partners (currently announced export intentions)

The Middle East's geopolitical future is in flux as the US retrenches from the region and China moves in

This mean that Australia has a real opportunity as a trusted supplier

But the economics of transportation are challenging

Also, the infrastructure conversion and/or establishment requirements

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Australia’s hydrogen trade future

Broader implications for our international (trade) relations

How is Australia's production capacity positioned?

According to the State of Hydrogen Report (2022, xiii), not well – it is no longer a global leader

This partly explains the latest budget's $2 billion hydrogen fund

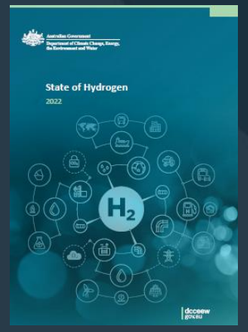
But this is small change compared to US, EU, and Chinese subsidies

Moreover, supply chain bottlenecks could emerge as international demand and competition heat up

Table 2: Comparison between Global Leader and Australian Progress – by Industry Development Signal

Industry Development Signal	2022 International Comparison
Investment	Follower → Leader
Project Scale	Follower → Leader
Cost-competitiveness	Follower → Leader
Australia's exports	Follower → Leader
Chemical feedstock	Follower → Leader
Electricity grid support	Follower → Leader
Mining and off-grid	Follower → Leader
Heavy transport	Follower → Leader
Light transport	Follower → Leader
Gas networks	Follower → Leader
Electricity generation	Follower → Leader
Steel and iron making	Follower → Leader
Industrial heat	Follower → Leader

(Source: Deloitte, 2022[22])



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Broader implications for our international (trade) relations

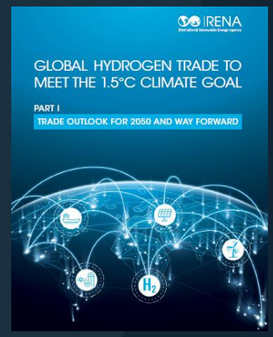
At the global level there is much to do

Develop common global standards, regulations, and certifications

- International methodology for PPM metrics (notably emissions-intensities)
- National standards to translate these into practice
- Mutual recognition of those national standards
- Certifications processes and verification procedures

Develop market models to smooth investment and trade flows

- Contract templates
- Auction procedures
- Spot markets
- Commodity pricing benchmarks linked to emissions-intensities
- In short, there are a variety of “institutional voids” (Khanna and Palepu, 2010)



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How is Australia positioning in this landscape?

Domestic – National Hydrogen Strategy

- Embedded emissions accounting framework
- Hydrogen Guarantee of Origin
- Federal subsidies (etc.)
- States' initiatives
- But: infrastructure and institutional bottlenecks are emerging for renewable energies rollout

Bilateral accords

- Australia-Singapore Green Economy Agreement (GEA)
- Access to US IRA subsidies
- Australia-EU FTA, and bilateral arrangements with Germany
- Sustainability chapters in FTAs

Indo-Pacific Economic Framework

- Pillar 2 (Supply Chain Resilience): Hydrogen roadmap
- Pillar 3 (Clean economy): Details to be seen but likely to build on GEA

Multilateral

- The World Trade Organization's Trade and Environment Structured Discussions
- Interrnational Partnership for Hydrogen and Fuel Cells in the Economy
- IEA, etc.

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