

10 Mt Hydrogen Imports by 2030 – Actors, Goals, and Strategic Considerations

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Outline

1. REPowerEU: 10 Mt Green Hydrogen Imports
2. The Geopolitics of Hydrogen Along the Value Chain
3. Strategic considerations & Trade-Offs
4. Policy recommendations – How to prioritize?

The GET-H2 Project

Funding: German Federal Foreign Office

Project duration: June 2021-December 2023

Goals:

- Examining the geopolitics of the global energy transformation with a focus on an emerging hydrogen economy
- Focusing on the role hydrogen will play in re-drawing the geography of energy trade and altering the relations between traditional fossil fuel exporters, new emerging hydrogen producers and continuing import markets like Germany/ EU
- Analyze value chains and perform scenario-based analysis on how to establish a mutually beneficial and smooth energy transition for Germany and the EU as well as selected hydrocarbon exporting countries
- Assisting German and European policymakers in anticipating the geopolitical consequences of a growing hydrogen economy and to present possible pathways for action

New paper

Toward a hydrogen import strategy for Germany and the EU: Priorities, countries, and multilateral frameworks

→ Dieses Working Paper hilft politischen Entscheidungsträgern und Experten bei der strategischen Planung von Wasserstoffimporten, indem es verschiedene Ziele identifiziert und diskutiert, einen Rahmen für die Bewertung von Kompromissen vorschlägt, Regionen und Länder aufzeigt, die sich potenziell am besten als Wasserstoffexporteure in die EU eignen, und die Rolle multilateraler Importrahmen untersucht.



REPowerEU: 10 Mt Green Hydrogen Imports



10 Mt annual own production +
10 Mt annual imports

20 Mt hydrogen by 2030



120 GW of electrolysis capacity

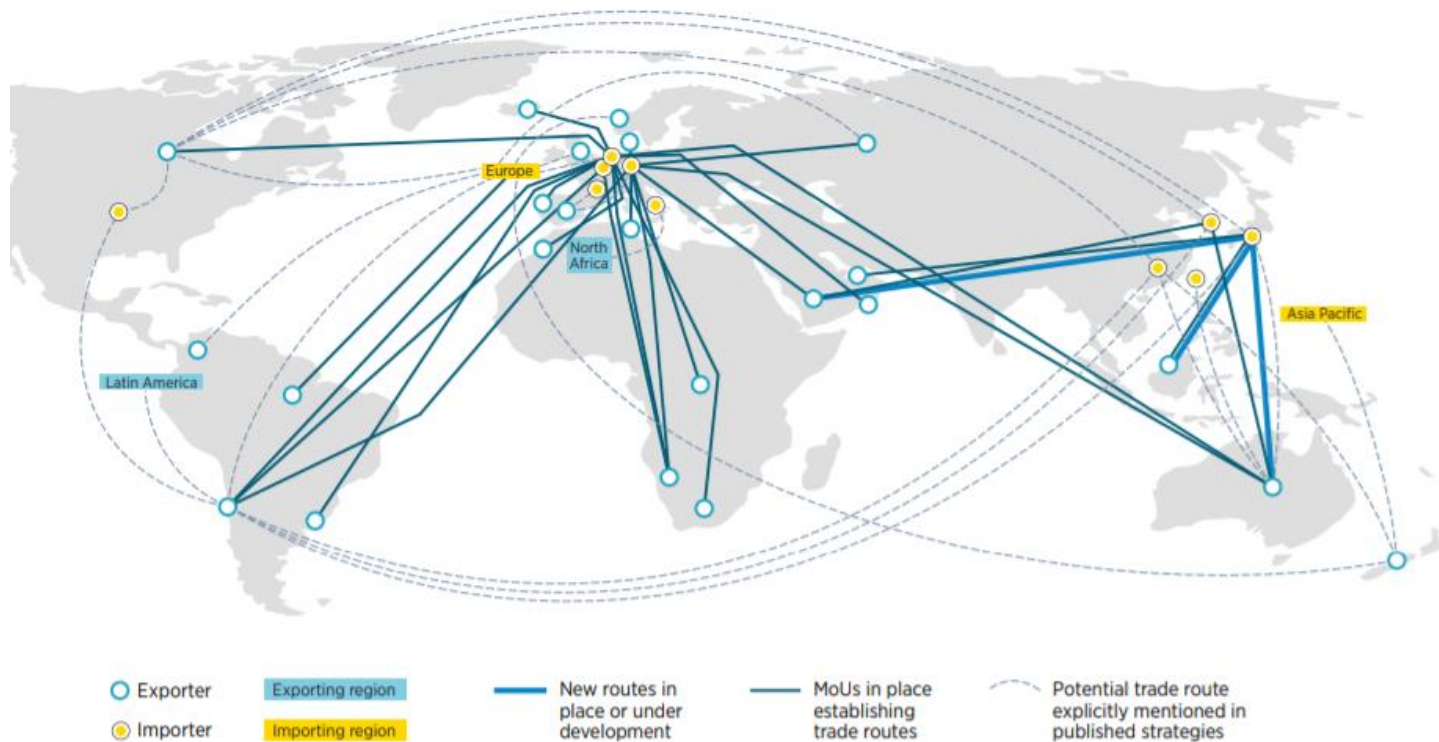
→ electrolysis capacity currently
installed will need to increase
almost **900-fold** within 7 years

The Geopolitics of Hydrogen Along the Value Chain

Regarding pre-chain products and the upstream flow, these factors decide about the geopolitical implications

- Availability of raw materials
- Concentration of electrolyser (component) manufacturing
- Technology leadership
- For blue hydrogen:
 - concentration of gas, availability of CCS technology
- For green hydrogen:
 - renewable energy capacity, financial and infrastructural readiness

Figure S.2 An expanding network of hydrogen trade routes, plans and agreements

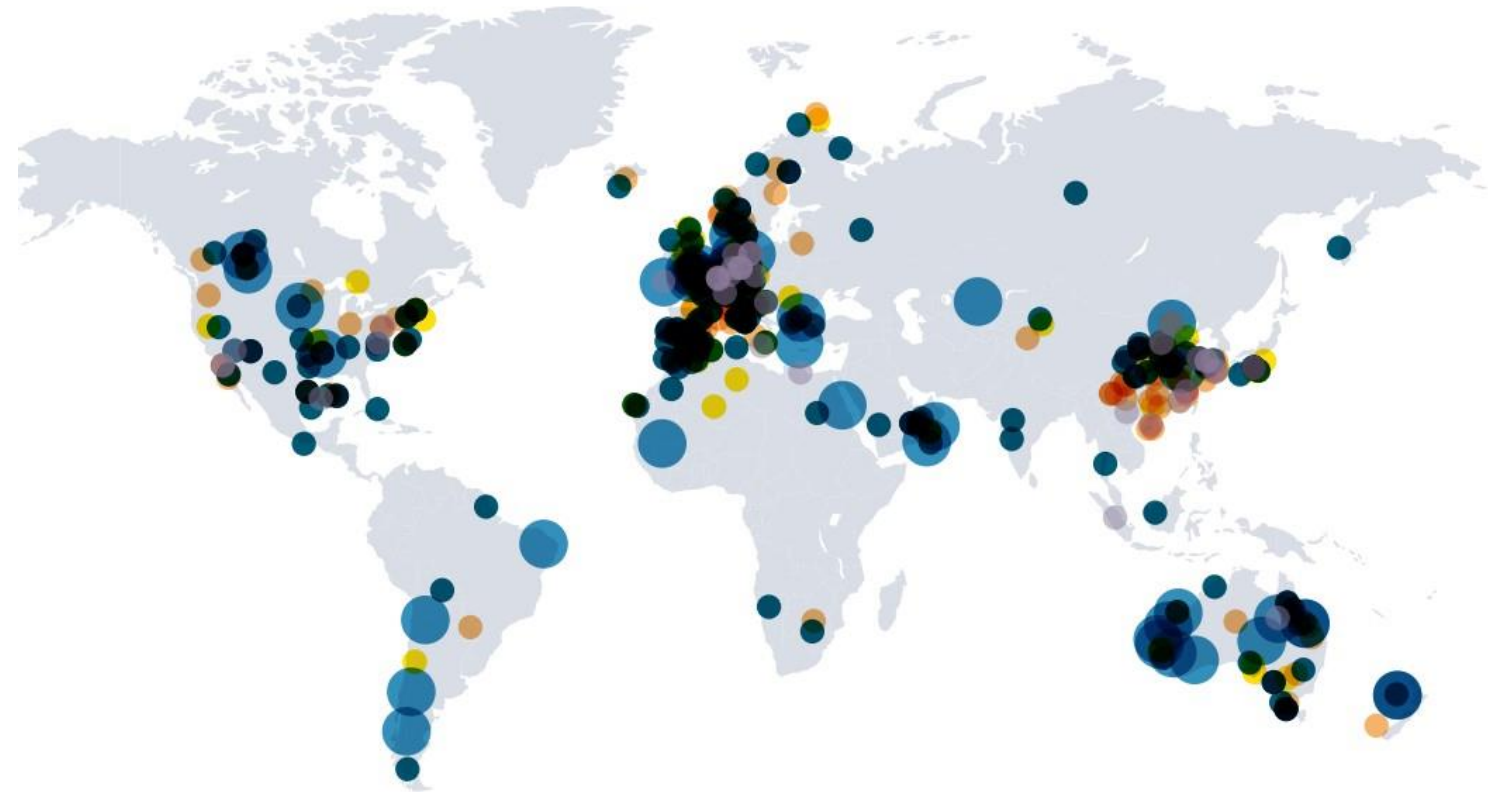


Map source: Natural Earth, 2021

Notes: Information on this figure is based on the information contained in government documents at the time of writing.

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

Source: IRENA



221 large-scale industrial usage

Refinery, ammonia, methanol, steel and industry feedstock

133 transport

Trains, ships, trucks, cars and other hydrogen mobility applications

74 integrated H₂ economy

Cross-industry and projects with different types of end uses

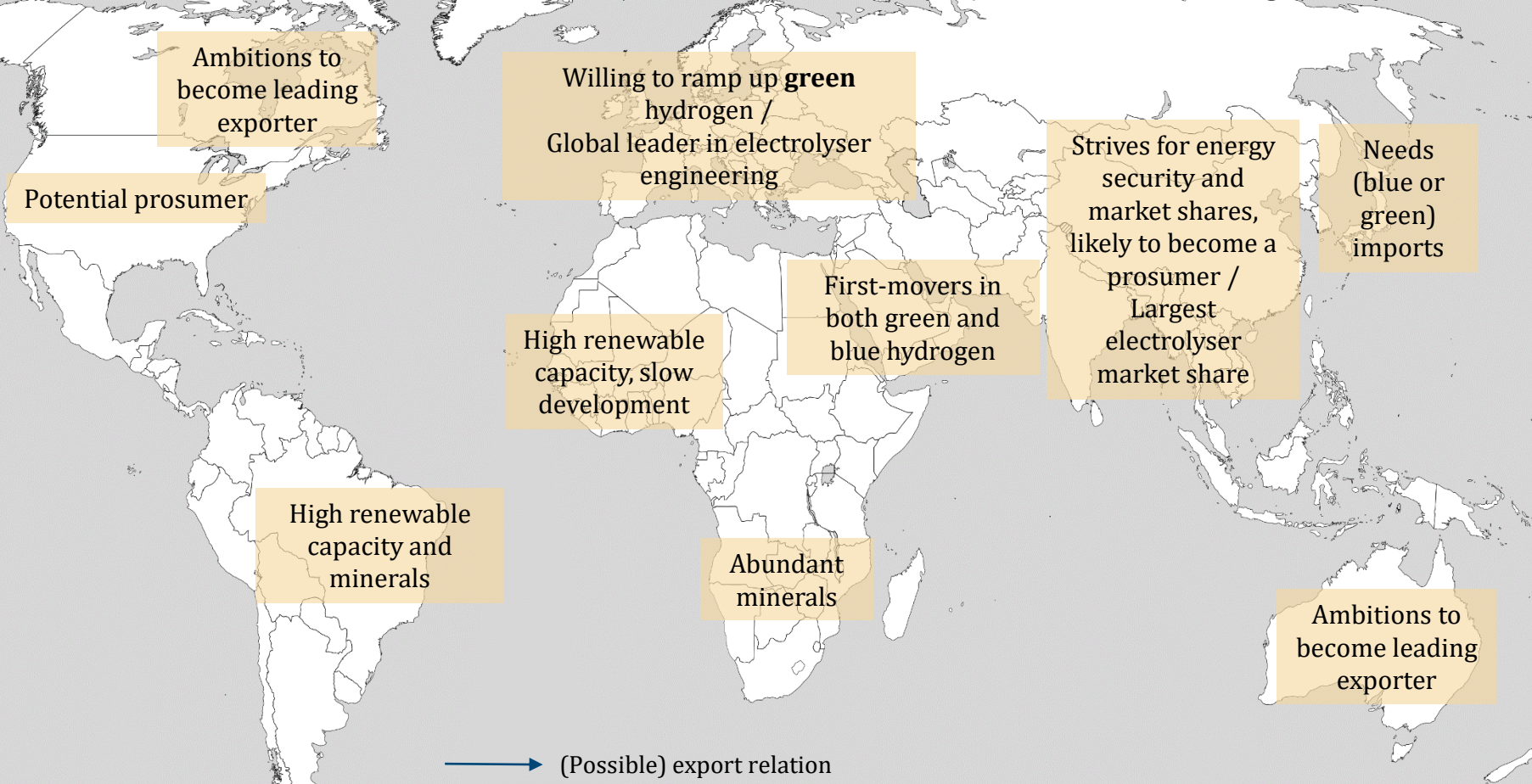
51 infrastructure projects

H₂ distribution, transportation, conversion and storage

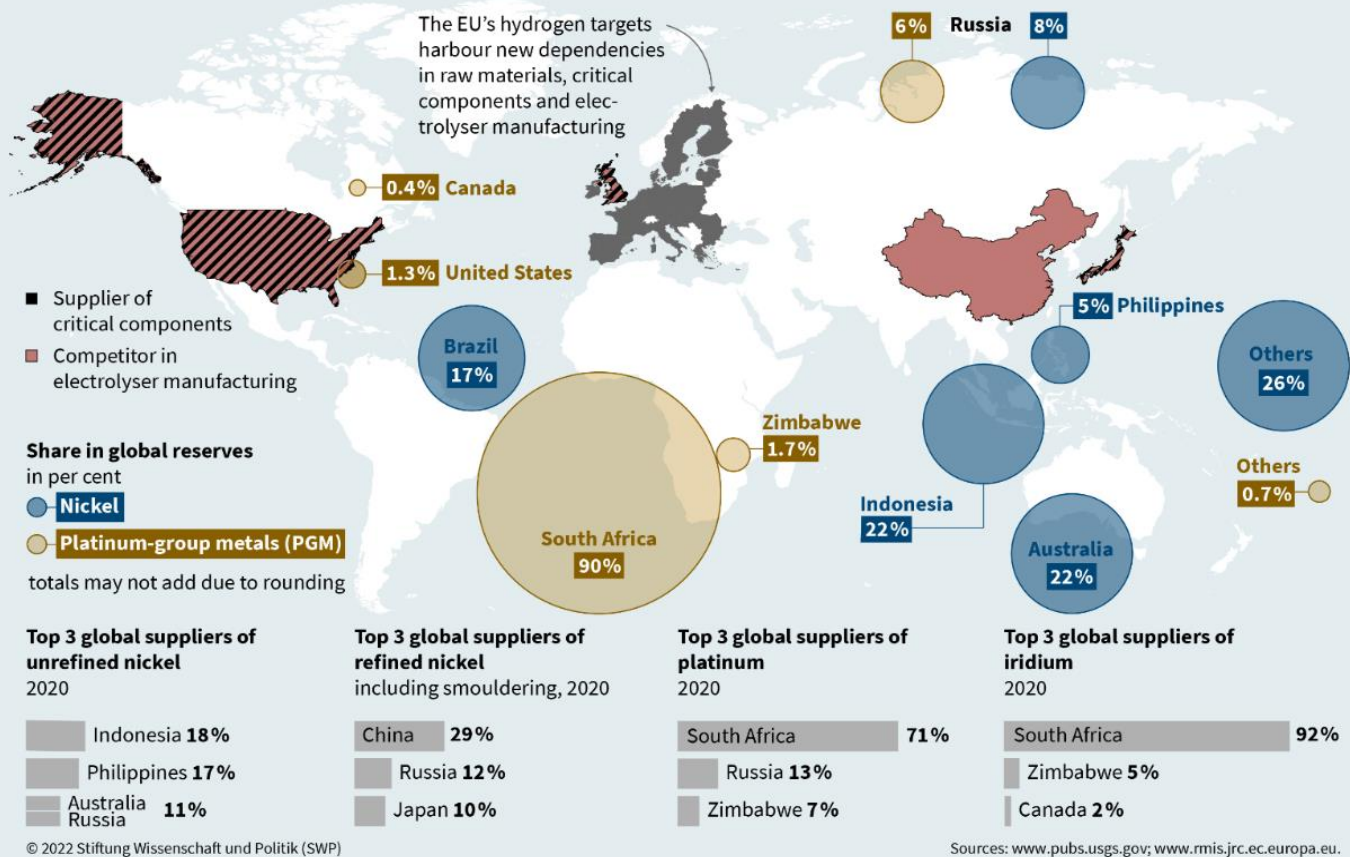
43 giga-scale production

Renewable H₂ projects > 1 GW and low-carbon H₂ projects > 200 ktpa

Source: IRENA



Green hydrogen for the EU: Competitors in electrolysis manufacturing and raw materials suppliers



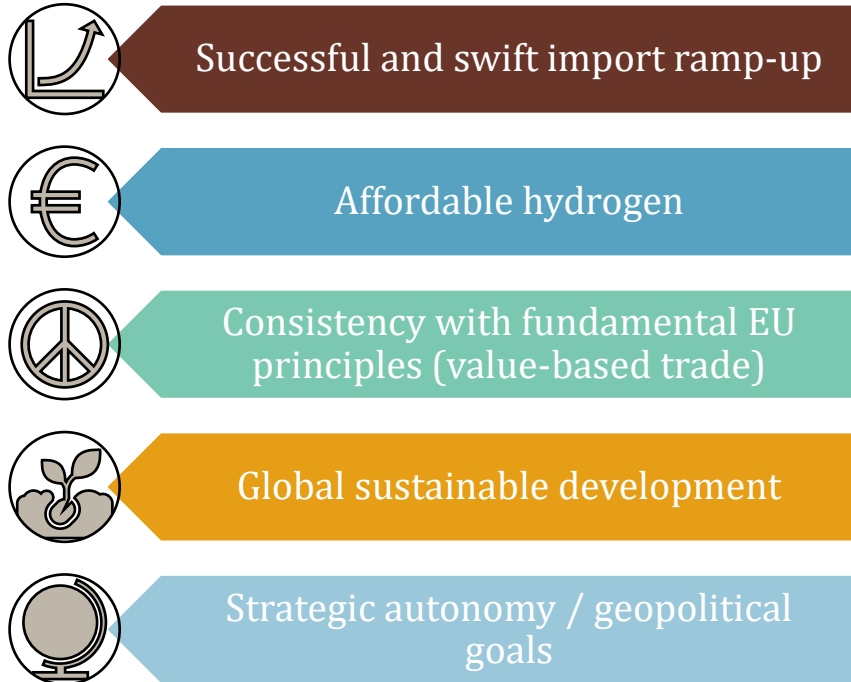
Sources: U. S. Geological Survey, Mineral Commodity Summaries 2022 (Reston, VA, 2022); Gian Andrea Blengini et al., Study on the EU's List of Critical Raw Materials (2020). Final Report (Luxembourg: Publications Office of the European Union, 2020)

The geopolitics of hydrogen

- The H2 world will be technology intensive and characterised by geo-economic competition between EU, US, China, Japan over technological leadership, norms and standards and location of energy-intensive industry
- Decoupling from Russia will shift the EU focus and make diversification an even bigger challenge
- Green hydrogen has not less dependencies and confrontational potential than blue hydrogen, just different ones

Strategic considerations & Trade-Offs

Stylised goals from the policy debate:



Numerous trade-offs, e.g.:

- Targeting development in low-income countries collides with swift ramp-up
- Aligning imports with EU principles tends to have a negative role vis-à-vis the other goals (including geopolitics)
- Ambiguous relationship between geopolitical goals and the swift and successful ramp-up

Policy recommendations – How to prioritize?

- A swift and successful ramp-up of imports should be the sole primary goal: Otherwise, the market won't develop and climate targets won't be met
 - Strategic autonomy rather a condition for overall planning than a progressable objective attached to individual suppliers
 - Affordability of imports as a secondary goal
 - Value-based criteria can be included but only as a tertiary goal
 - Sustainable development criteria can be assessed for each individual project but are not a sound basis for selecting partners
- > What does this mean for the choice of partners?

Thank you!

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Global Issues / Geopolitics of the Energy Transition – Hydrogen

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