Green Hydrogen in the Energy Transition; prospects and opportunities

Dialogue with GESEL, Brazil

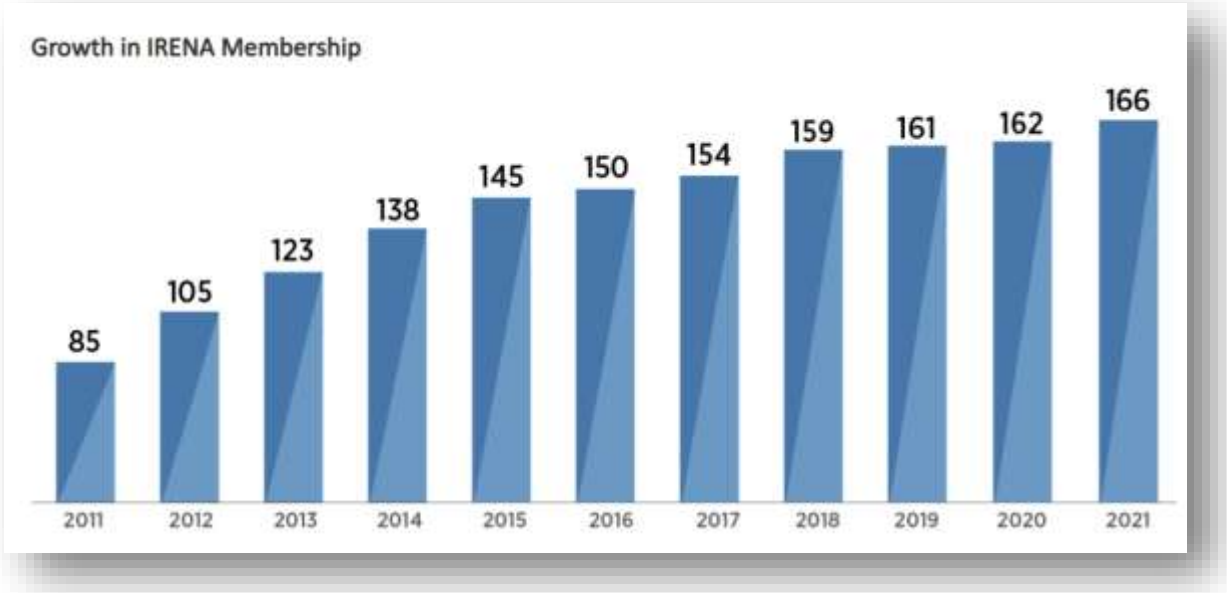
Barbara Jinks – Programme Officer, green gas delivery and use
Pablo Ralon – Programme Officer, renewable energy cost status and outlook

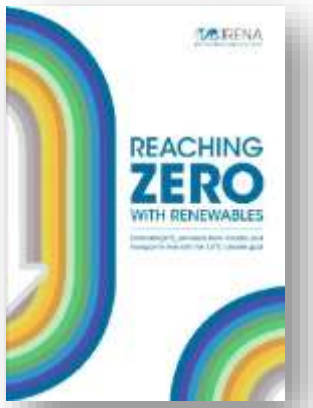
Webinar, 16 December 2021

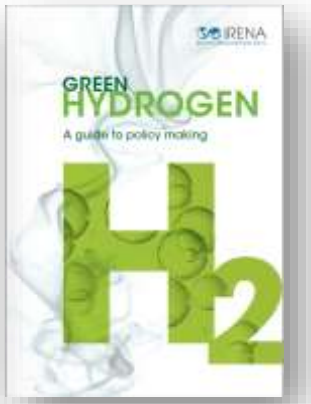
Today's agenda

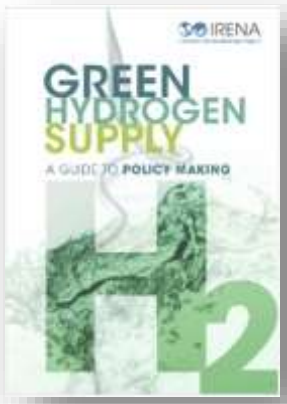
1. Overview of IRENA activities
2. Role of hydrogen in the energy transition
3. Electrolysis cost reduction
4. Enabling Measures Roadmaps
5. Conclusions

IRENA – global coverage









Promote renewable energy (including gases).

Policy advice through scientific analysis, collaboration and dialogue.

Green gas team aims to increase awareness and dialogue on green gases (H2, biomethane, synthetic methane)

- Molecules essential for successful energy transition
- Gas business and infrastructure have key role in energy transition

IRENA's work on green hydrogen since 2018

Analysis/Reports

2018	Hydrogen from Renewable Power – technical outlook
2019	Hydrogen: A renewable energy perspective
2020	Reaching Zero with Renewables (Sep)
	Green hydrogen: a guide to policy making (Oct)
	Green hydrogen: electrolyser for cost reduction (Dec)
2021	Innovation Outlook: renewable methanol (Jan)
	Green hydrogen supply: a guide to policy making (May)
	Reaching Zero with renewables: Biojet Fuels (Jul)

Outreach

2019	Ministerial Roundtable on Green Hydrogen at 10th Assembly (Jan)
2020	**Collaborative Framework on Green Hydrogen launch, meetings Jun & Sep**
	Biennial IRENA Innovation Week: green hydrogen session (Oct)
	Policy Talk - policies for green hydrogen (Nov)
2021	Policy Talk - Green Hydrogen Supply: policies & practical insights (May)
	Collaborative Framework on Green Hydrogen, meetings May, Oct
	Launch Enabling measures Roadmap at COP 26 (Nov)

Collaborative Framework on Green Hydrogen

Established June 2020 to **foster dialogue between governments and private sector and consolidate voice of private industry to present to Members.**

Co-facilitators are EC and Morocco

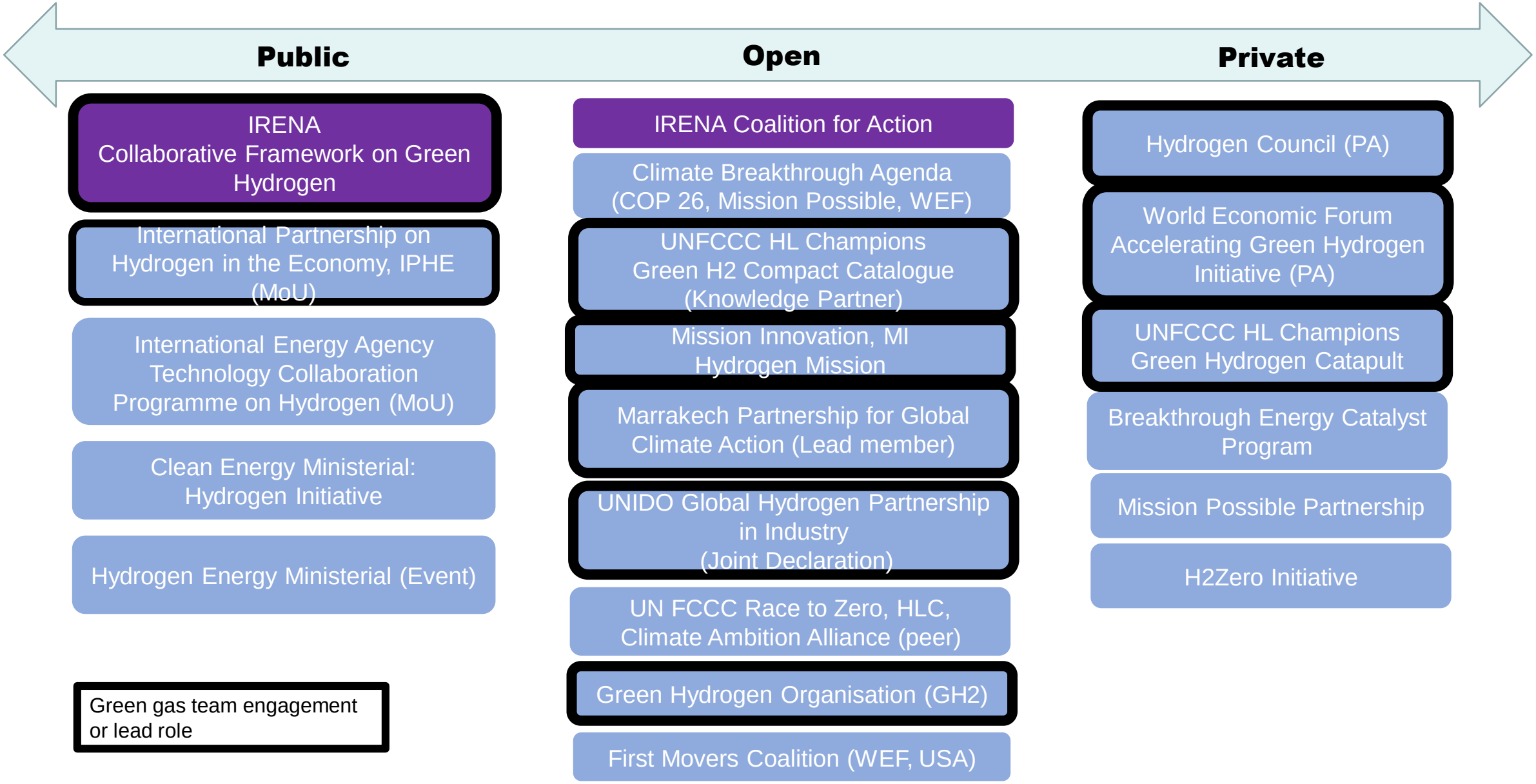
Activities:

- 4 virtual meetings (with up to 70 Member countries)
- 4 additional panel discussions, workshops
- Collaboration with WEF, IPHE, Hydrogen Council
- Wider involvement from stakeholders; academia, private sector and associations
- Establishing Working Groups on priority issues
- Next meeting 1Q22

Mandate and strategic direction from Members:

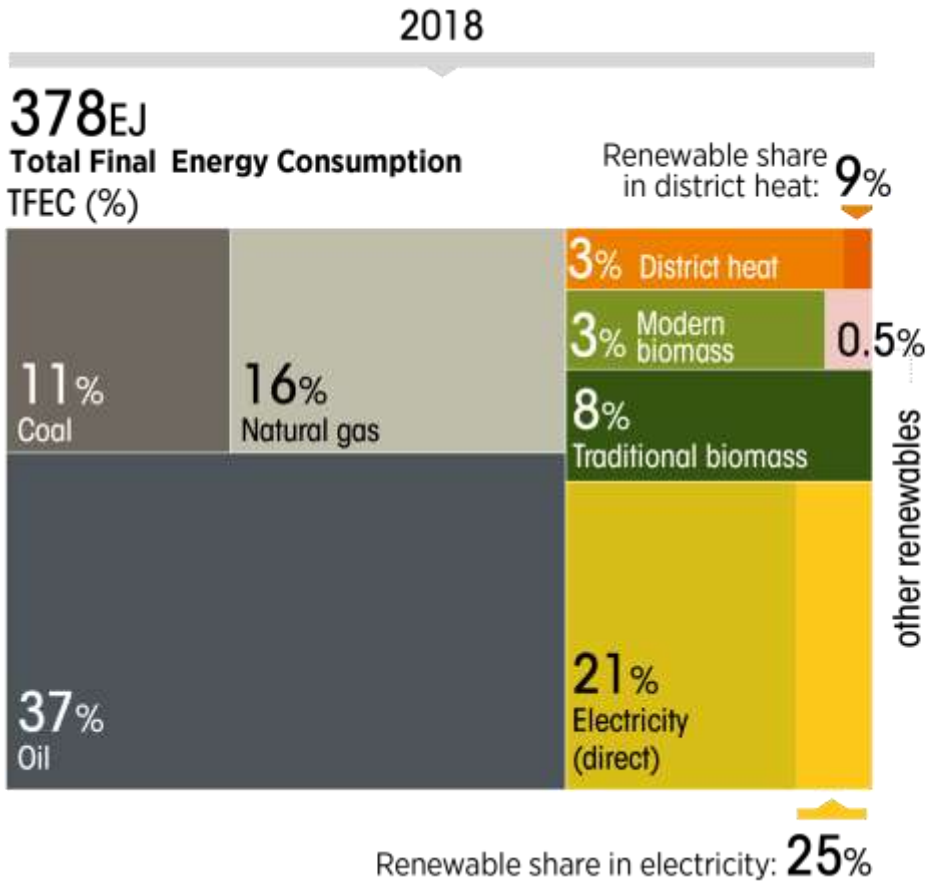
- Establish a global knowledge database for green hydrogen
- Strengthen collaboration with stakeholders and share knowledge incl finance, transportation, safety, applicability of hydrogen in small markets (such as SIDS)
- Evaluate nexus between hydrogen and renewables and flexibility from coupling power and hydrogen
- Coordinate standards and regulatory frameworks
- Stimulate early uptake in end-use sectors

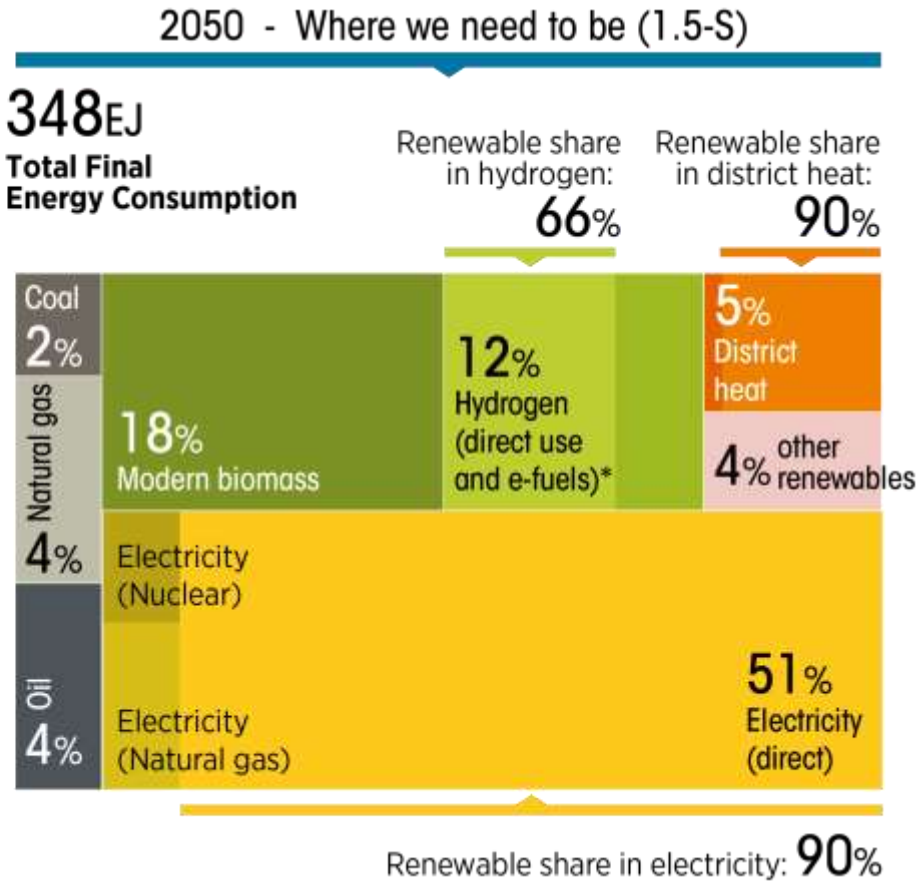
Green Gas Team engaged in all global hydrogen initiatives

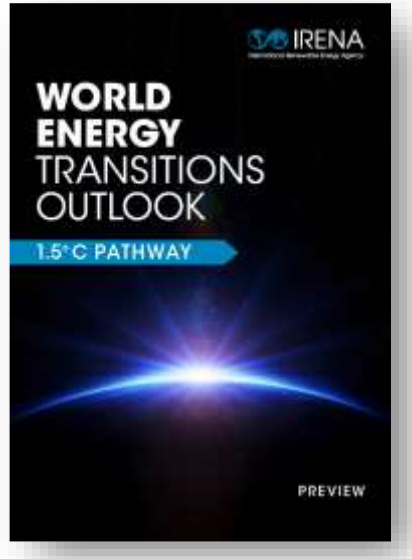


World Energy Transitions Outlook (WETO) 2021

IRENA
International Renewable Energy Agency





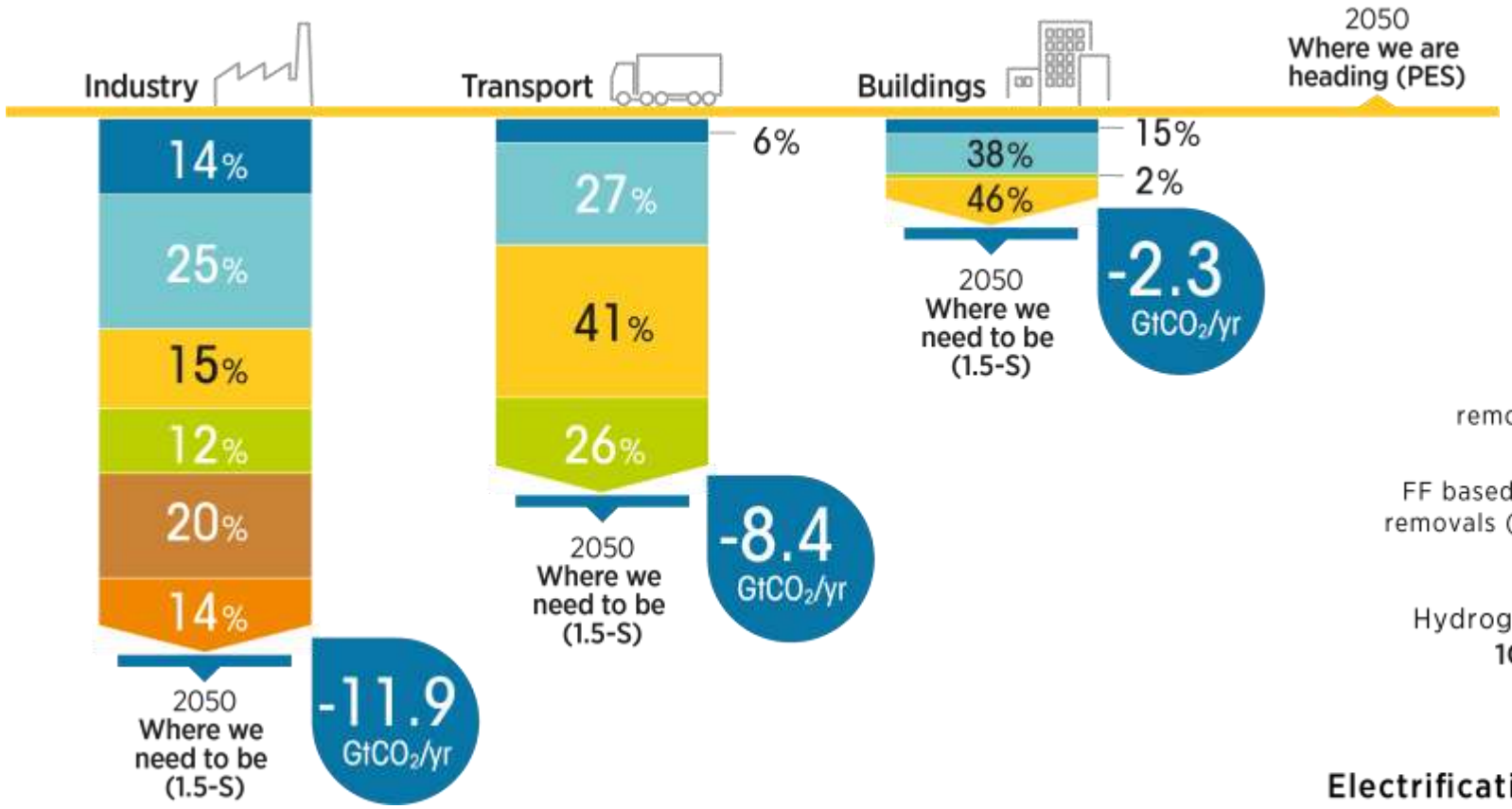


Electricity is main energy carrier in 2050 but nearly half of energy use cannot be electrified

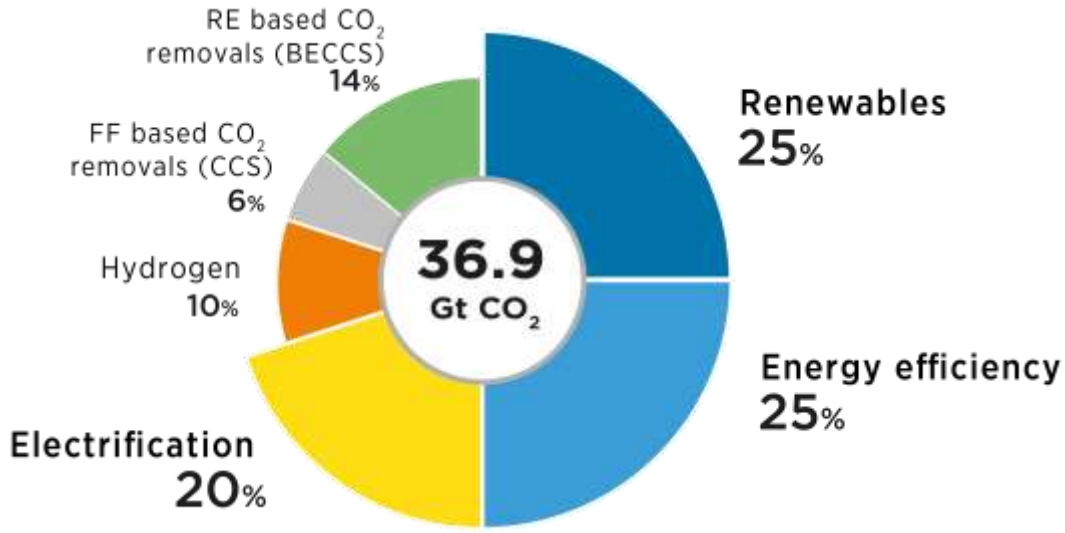
Hydrogen has a role in reducing emissions from HTDS of aviation, heavy transport and heavy industry

WETO: CO_2 abatement options

End-use CO_2 reduction by electrification and green H2



Six components of the energy transition strategy



Hydrogen has a role in reducing emissions from HTDS of aviation, heavy transport and heavy industry

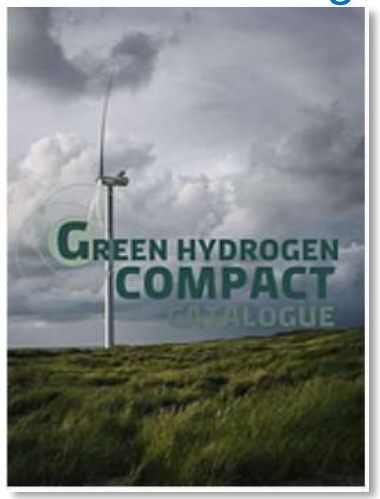
Nearly 70% hydrogen will be green hydrogen from renewable energy

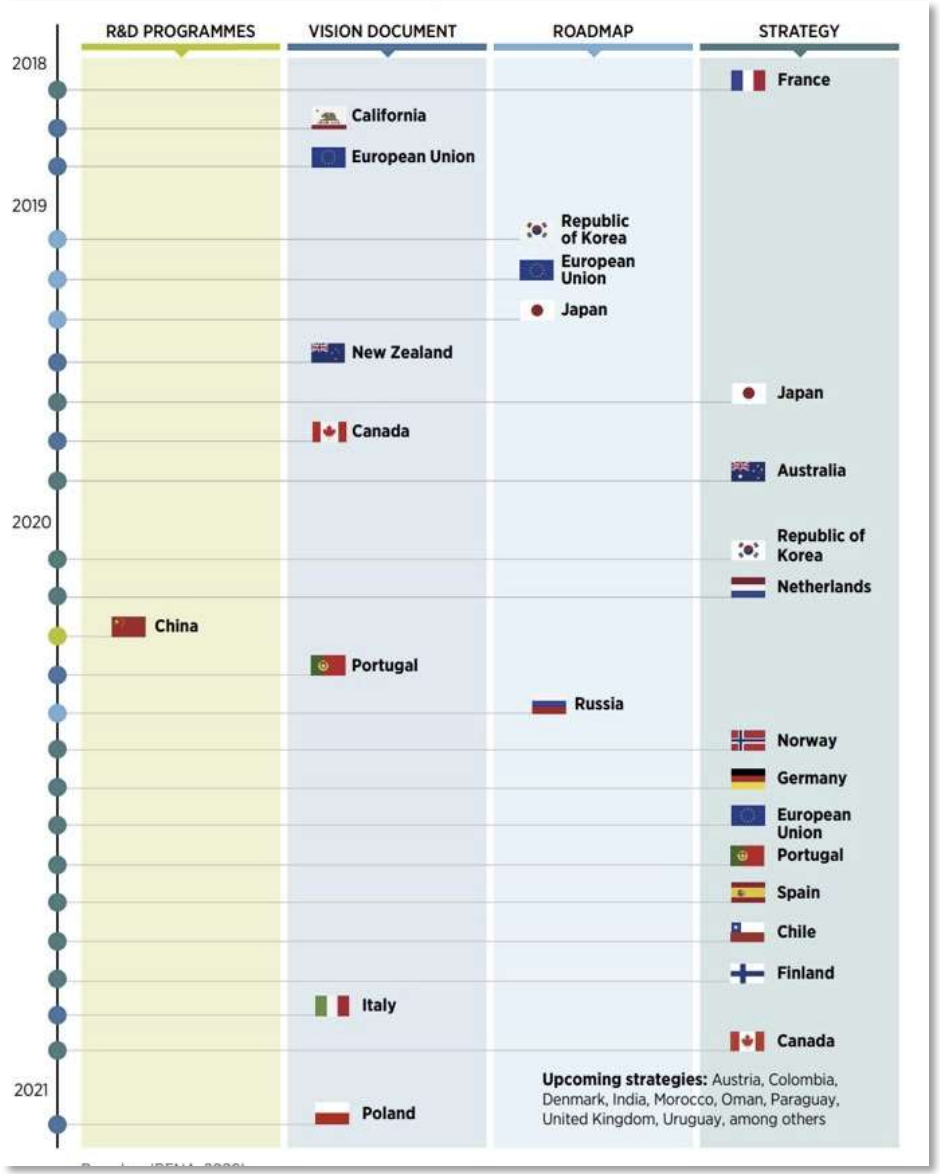
Growing global commitment to develop green hydrogen

19 National Hydrogen Strategies issued to date

Over 30 UN Energy Compacts for green hydrogen

- 268 GW new renewable capacity by 2030
- 129 GW of new electrolyser capacity by 2030 (26MTpa)
- Brazil has submitted GHC – ambitions in R&D and knowledge and capacity building





Hydrogen projects around the world

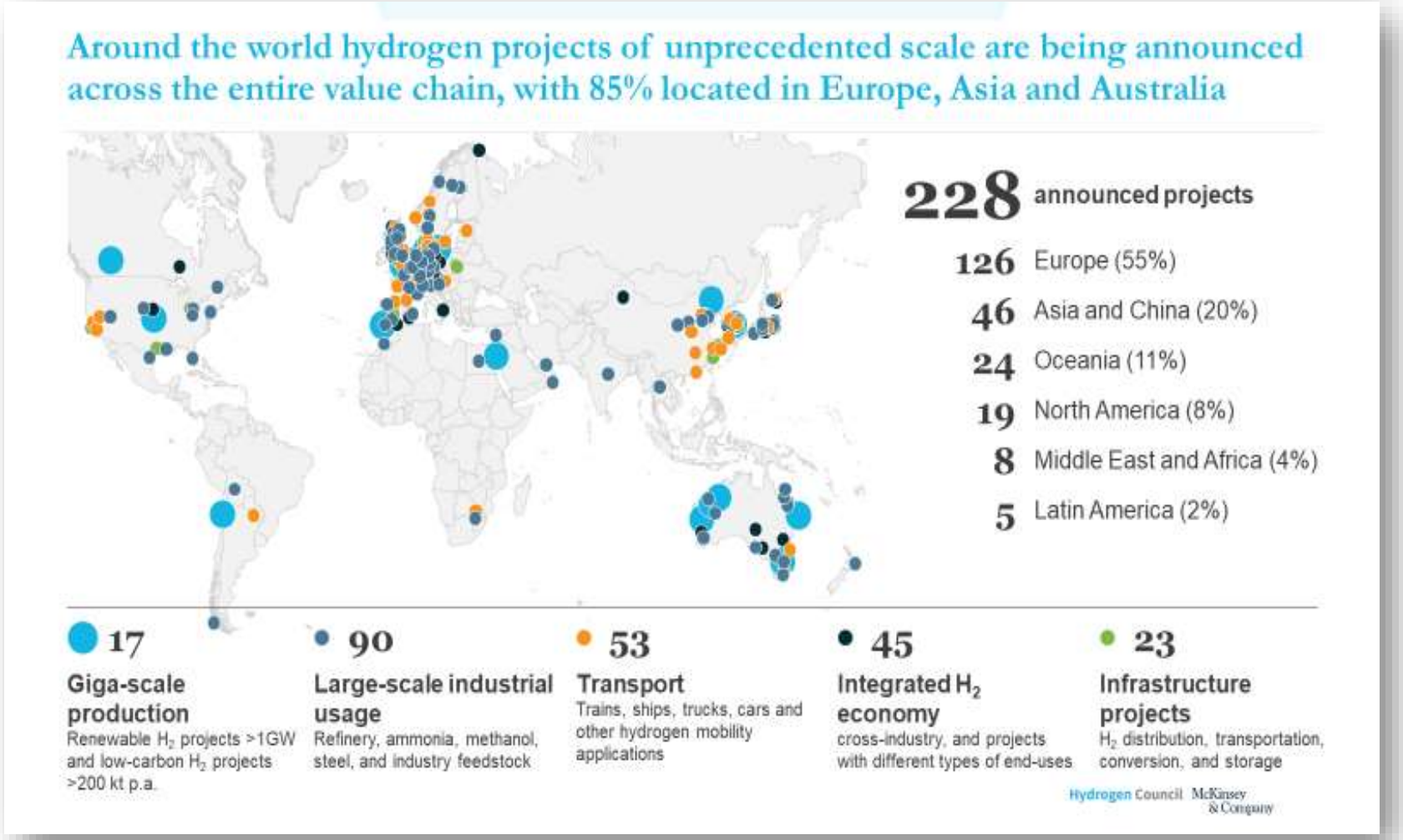
121 GW green hydrogen capacity under development.

85% projects in EU & Asia.

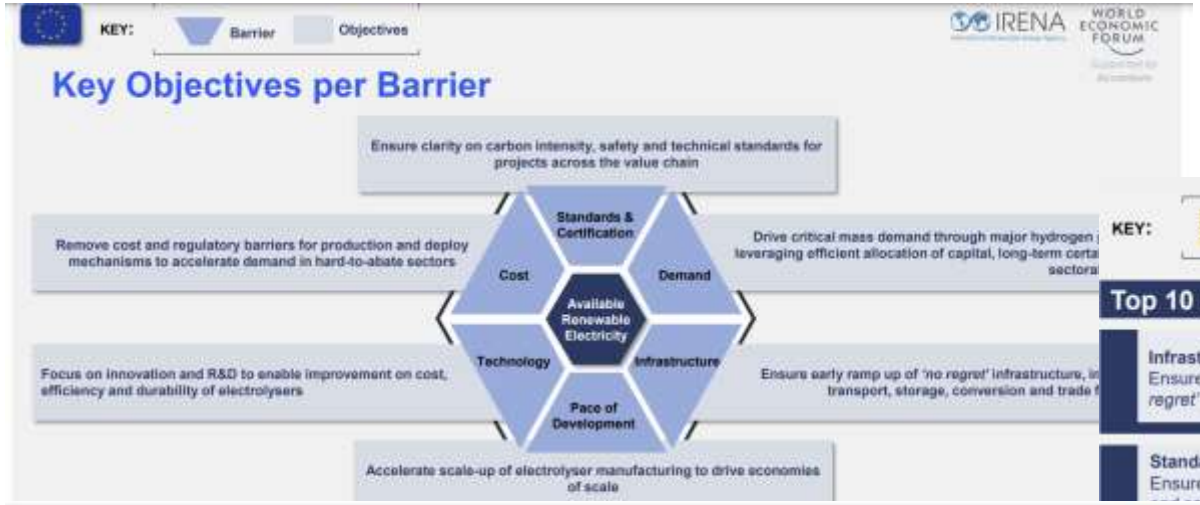
Forecast electrolysis scale up from sub-10 to 100-500 MW by 2026.

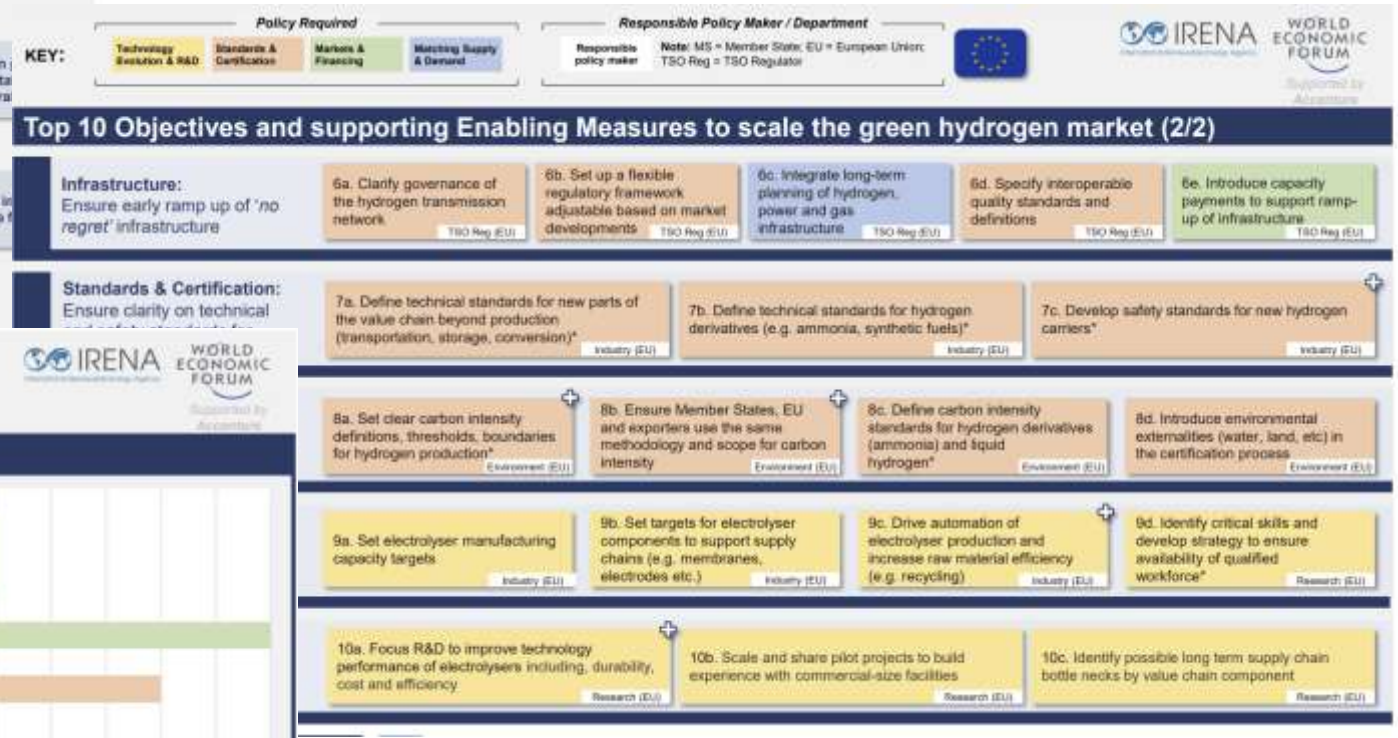
Over US$300 Bn project investment. Hydrogen Council

Green H2; 136 projects in plan/devt phase. Largest cluster 136 projects in Australia. Upstream



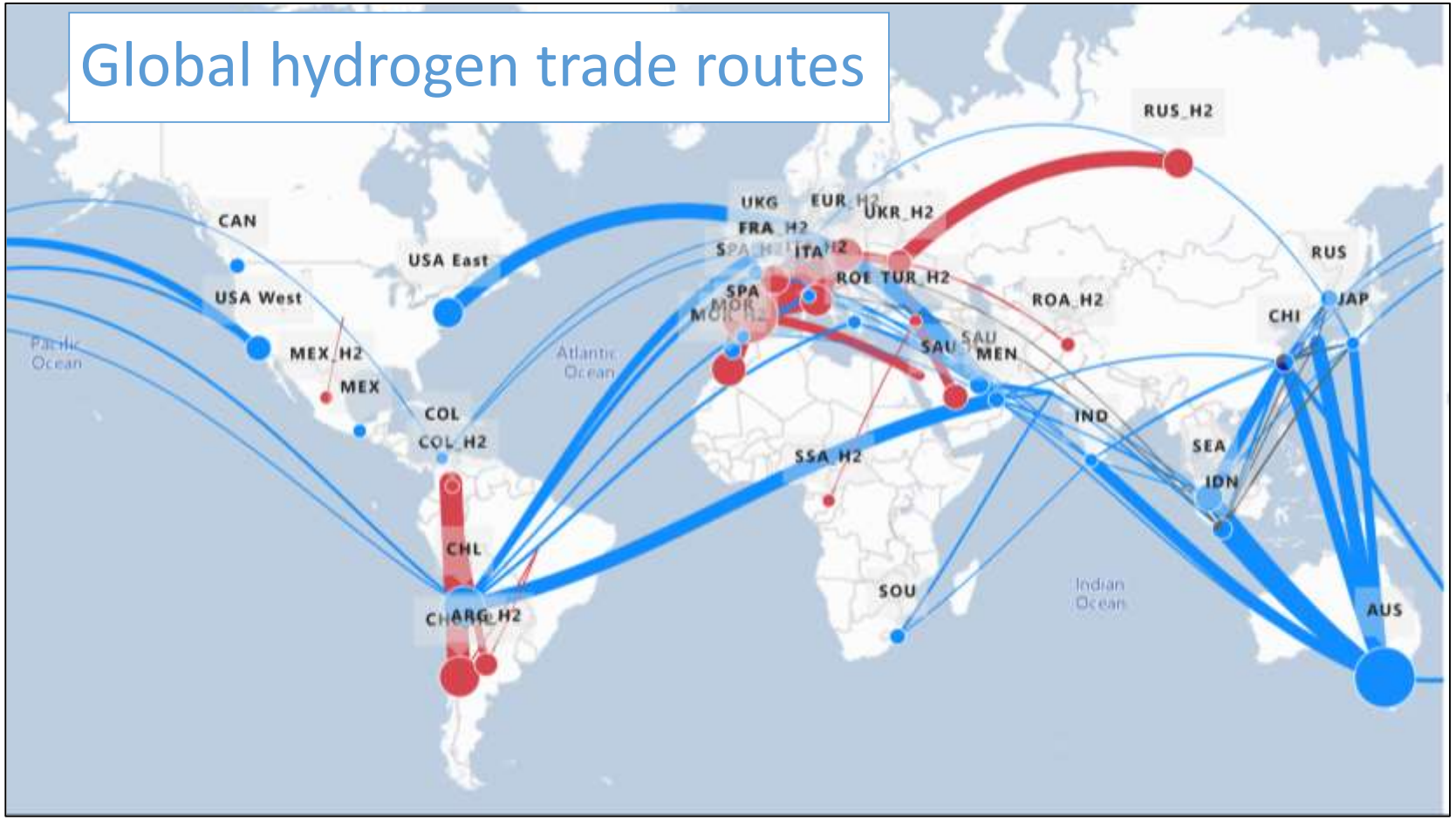
Enabling Measures Roadmaps for Green Hydrogen





Policy needs to enable global hydrogen trade

Preliminary results of IRENA trade analysis



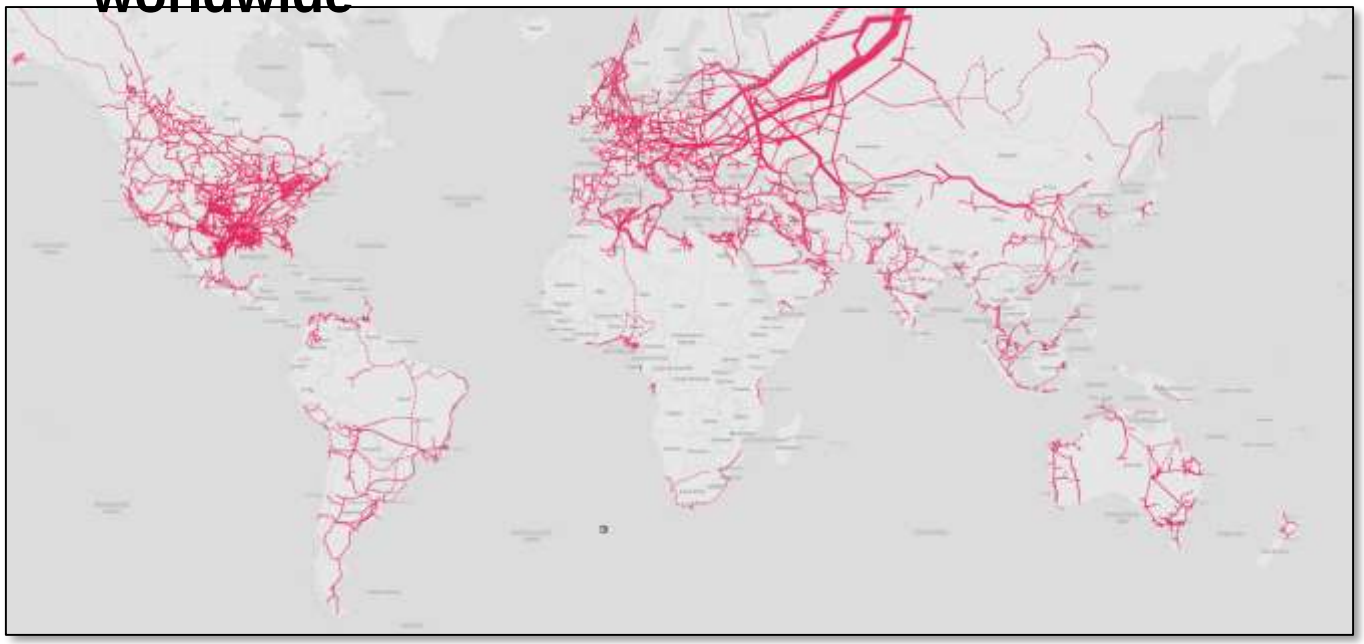
25-30% of hydrogen will be traded.

Half trade by ship as ammonia, other half pipeline.

Trade may be mostly regional.

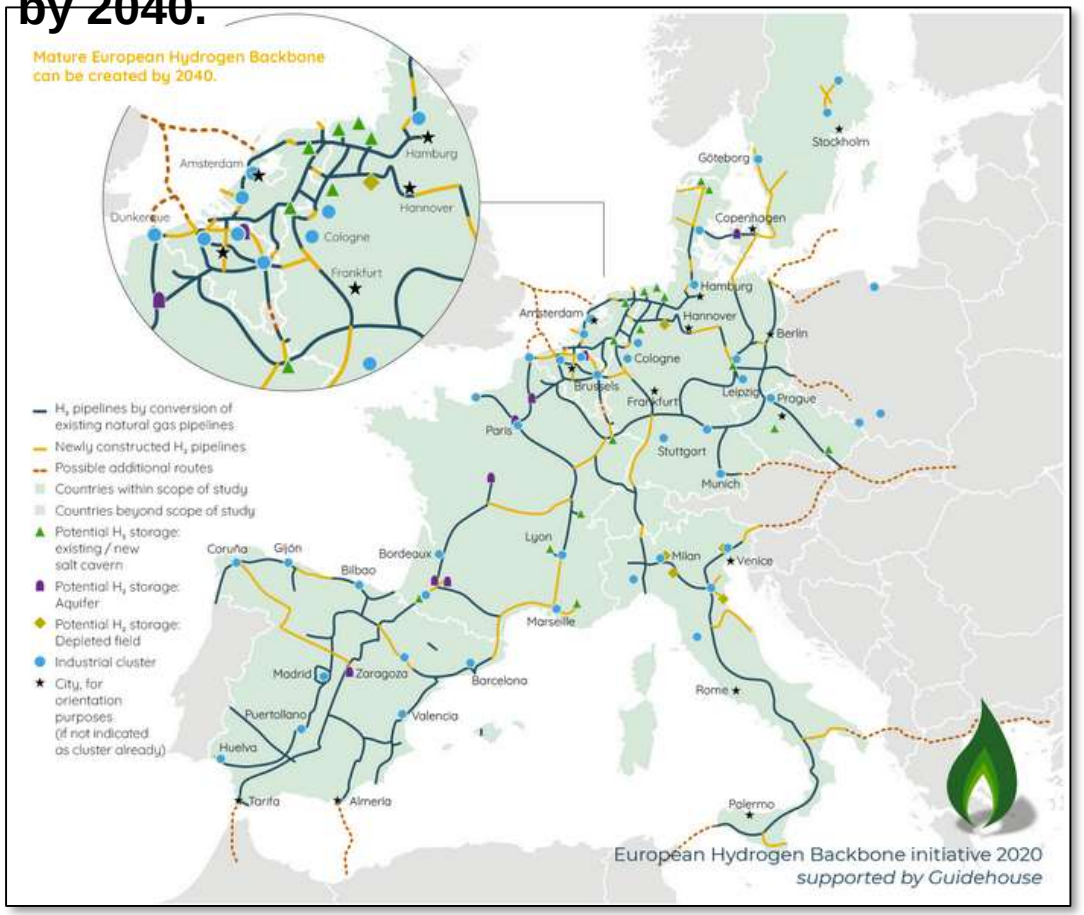
Many opportunities from the gas grid

2.5 billion km gas transmission pipelines worldwide



http://www.snamatlas.it/

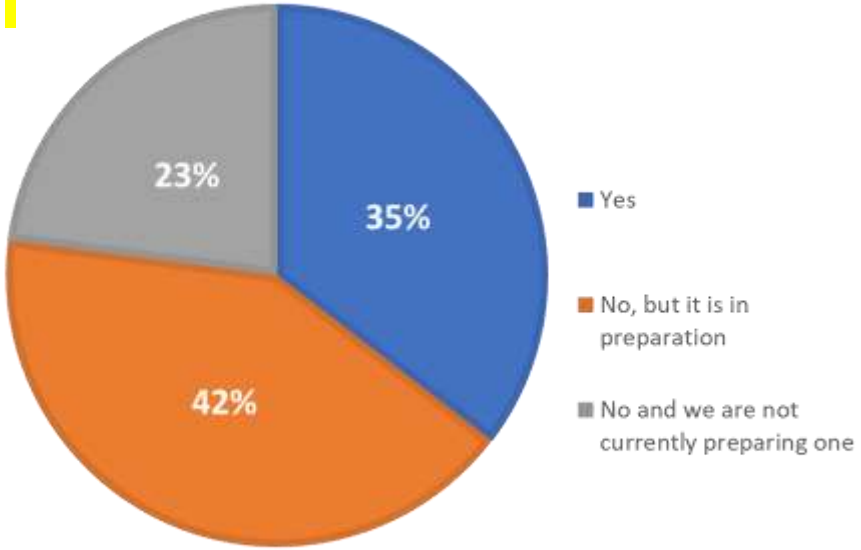
EU Hydrogen Backbone – ~40,000 km pipelines in 21 countries can be repurposed by 2040.



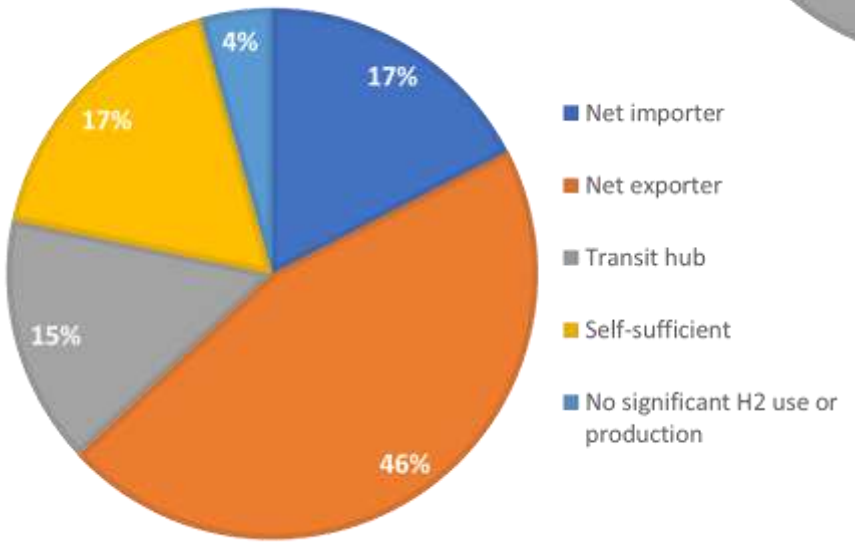
https://gasforclimate2050.eu/ehb/

Geopolitics survey – need for collaboration and prioritisation

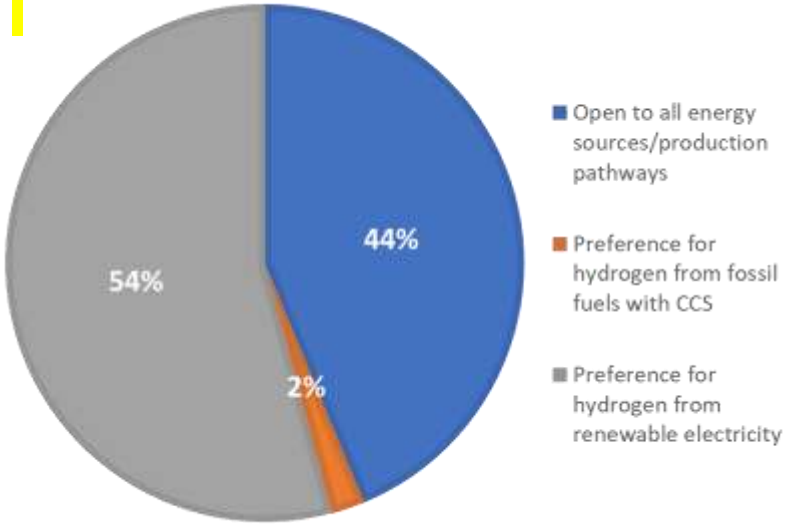
Majority of countries have or plan to have a hydrogen strategy



Significant role of hydrogen trade but 46% expect to be net exporter v 17% importer



Majority of respondents planning renewable hydrogen production



Conclusions

1. **Role of green hydrogen is gaining recognition as part of energy transition**
2. **Sands are shifting fast - growing commitment to developing and trading green hydrogen, disruptive in business**
3. **IRENA plays an essential role as collaborator within the global network of initiatives.**
4. **IRENA will continue to conduct essential techno-economic and policy work.**
5. **Green hydrogen can become cost competitive**
6. **Enabling Measures Roadmaps for Green hydrogen are an effective tool;** the measures presented are common to all regions
7. **IRENA keen to work closer with Brazil to assist implement hydrogen strategy**