

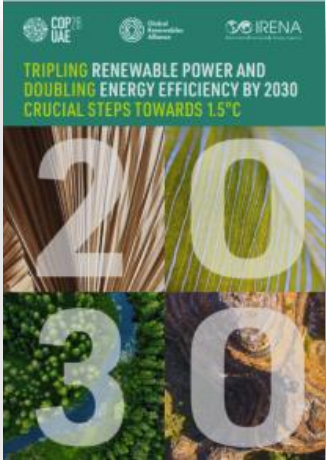


Achieving the COP28 Tripling Renewable Power Pledge: The role of trade and quality infrastructure

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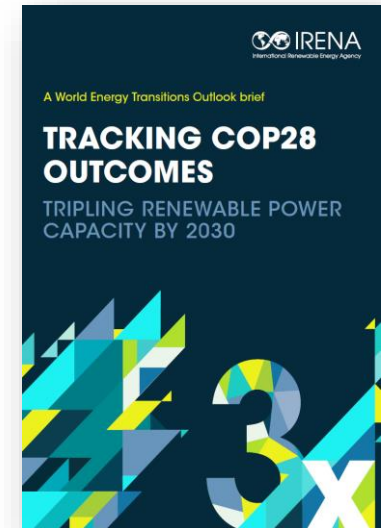
WTO – TESSD WG / 17 June 2024

COP28 UAE Consensus – Includes tripling renewable electricity capacity by 2030



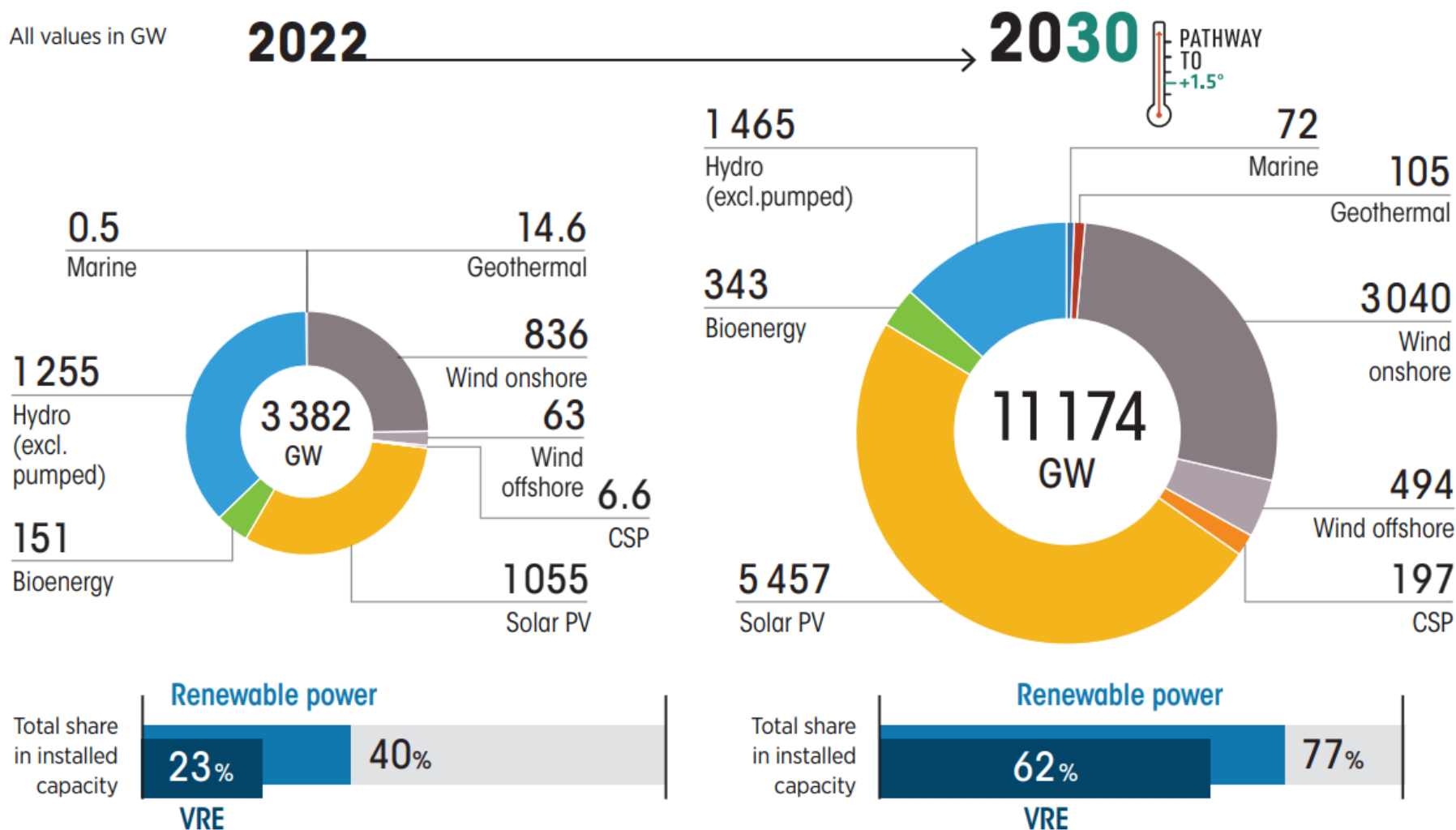
IRENA worked closely with our **Member States in 2023** to support three key commitments for 2030:

- **G7** Offshore wind (150 GW) and solar (1TW)
- **G20** 3x renewable power
- **COP28** 3x renewable power and 2x EE by 2030

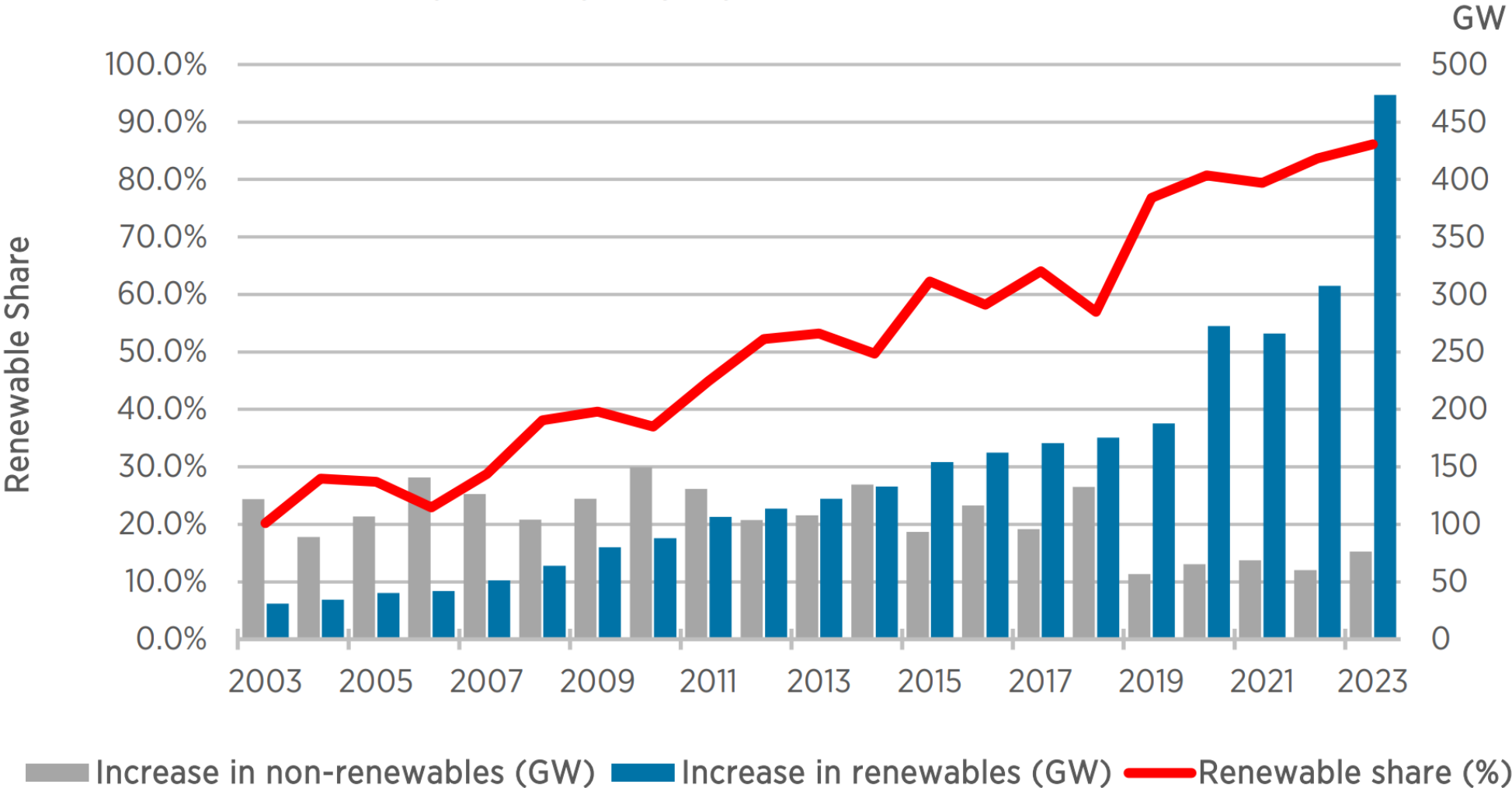


2024 – IRENA's Tracking
has started

Global renewable power capacity in the tripling pledge, 2022 and 2030

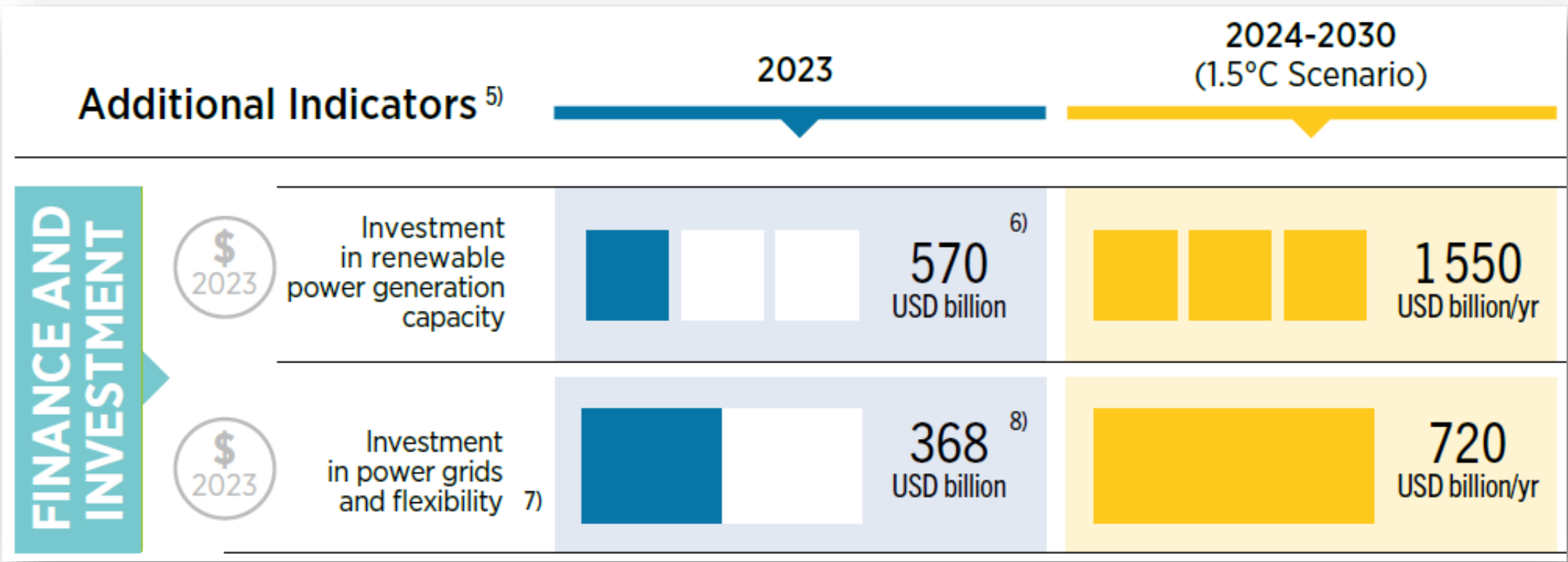


Renewable share of annual power capacity expansion



Source: IRENA (2024), Renewable capacity statistics 2024, International Renewable Energy Agency, Abu Dhabi

Renewable power record in investments – but more is needed and evenly distributed

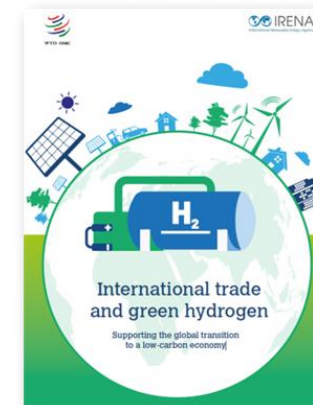
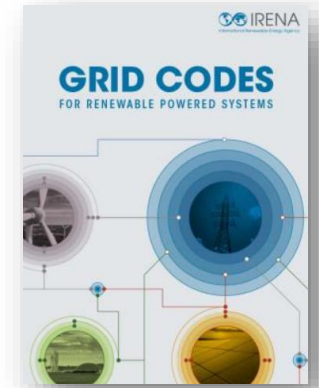


In the last two decades only 2% of global investments in RE are in Africa

How renewables create change how we trade energy

The energy transition will change trade patterns. Fossil fuel trade will decline, trade in other areas will grow, for example:

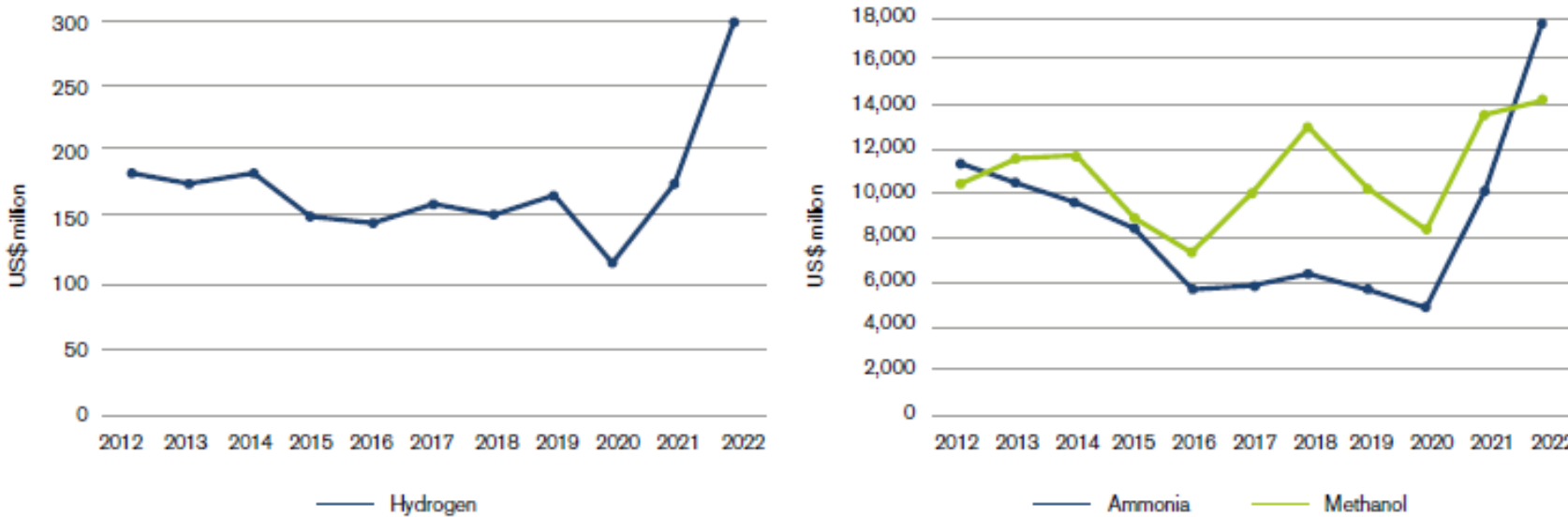
- 1. Trade in renewable energy-related goods and technologies:** These include a wide range of goods and technologies, from **solar PV panels** and blades for wind turbines to smart meters, batteries and electrolyzers.
- 2. Electricity trade:** Will increase as additional interconnections make grids more stable and resilient. Electricity interconnections based on **regional grid codes** can be made between neighbouring countries, at a regional scale and possibly even inter-continentially.
- 3. Trade in renewable energy fuels:** Such as biofuels, **green hydrogen**, ammonia and methanol.



Green Hydrogen trade: most trade across oceans would be as hydrogen derivatives

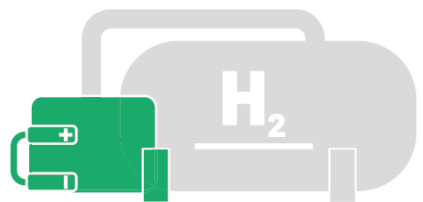
Global imports in hydrogen and derivatives (ammonia and methanol)

Source: WTO Secretariat Analytical Database based on data originally sourced from WTO Integrated Database, UN Comtrade and Trade Data Monitor.

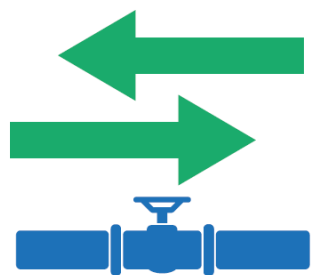


- Trade of hydrogen and derivatives is **increasing since 2020**
- Current trade of **hydrogen is rather small compared to ammonia and methanol** – almost two orders of magnitude
- Hydrogen in the order of 300 USD millions, while **Ammonia and Methanol** in the order of **18 and 14 USD billions** respectively in 2022

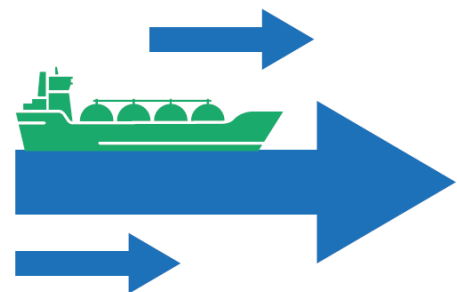
Note: Trade data do not allow for the differentiation of hydrogen based on the energy used in production.



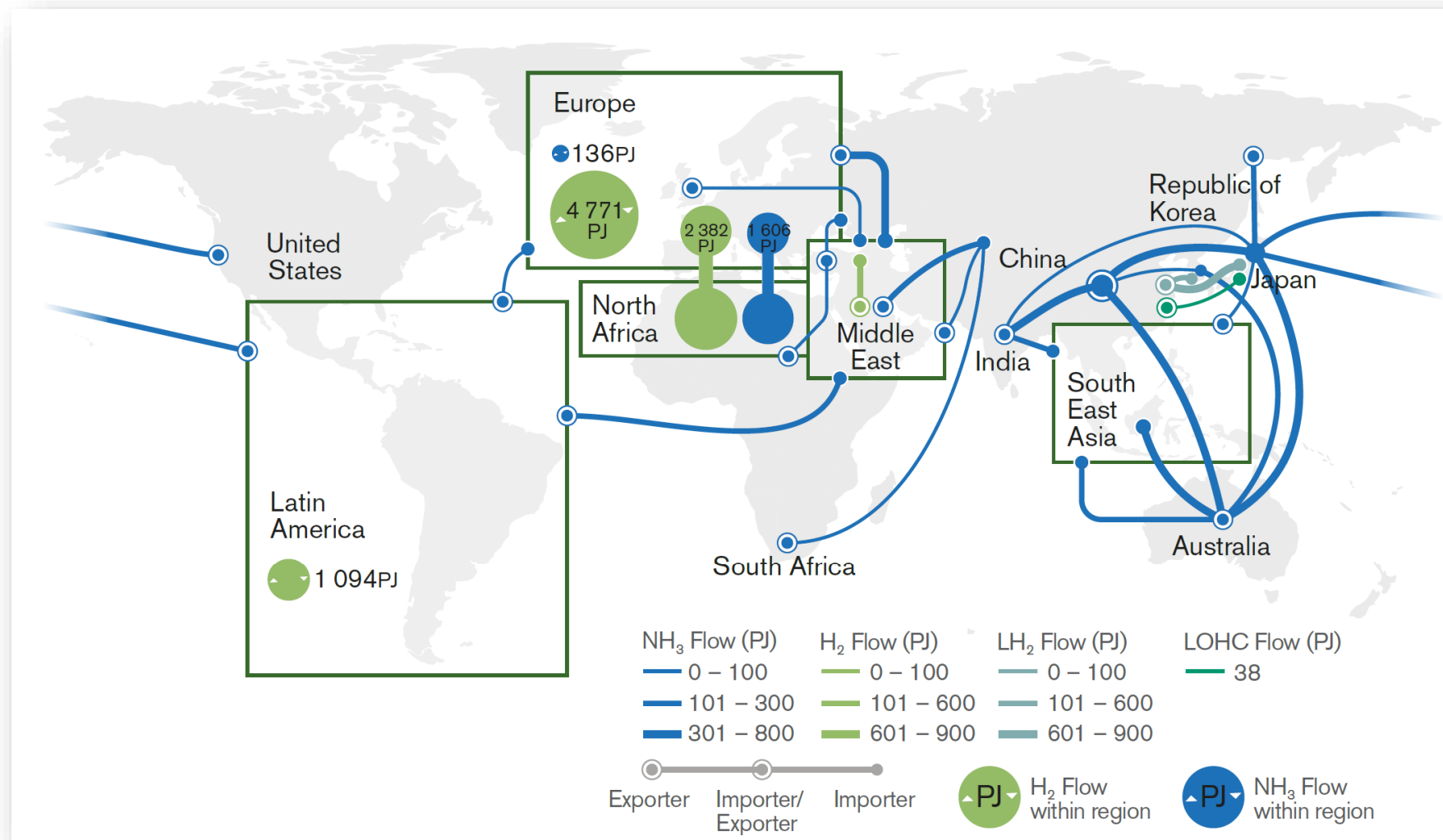
By 2050, international trade could satisfy about 1/4 of the total global hydrogen demand in IRENA's 1.5°C scenario.



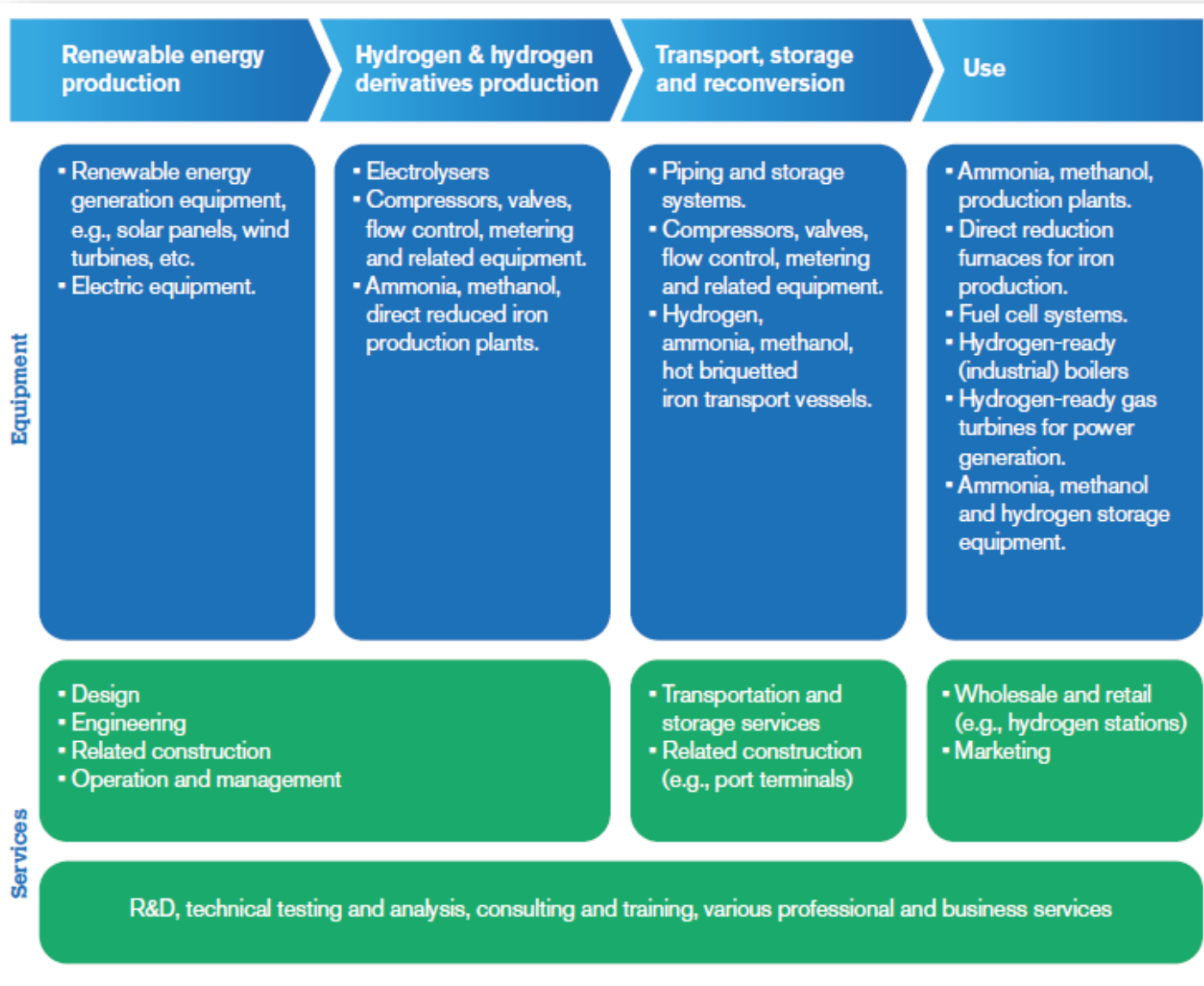
55% of this hydrogen would be traded via pipelines.



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

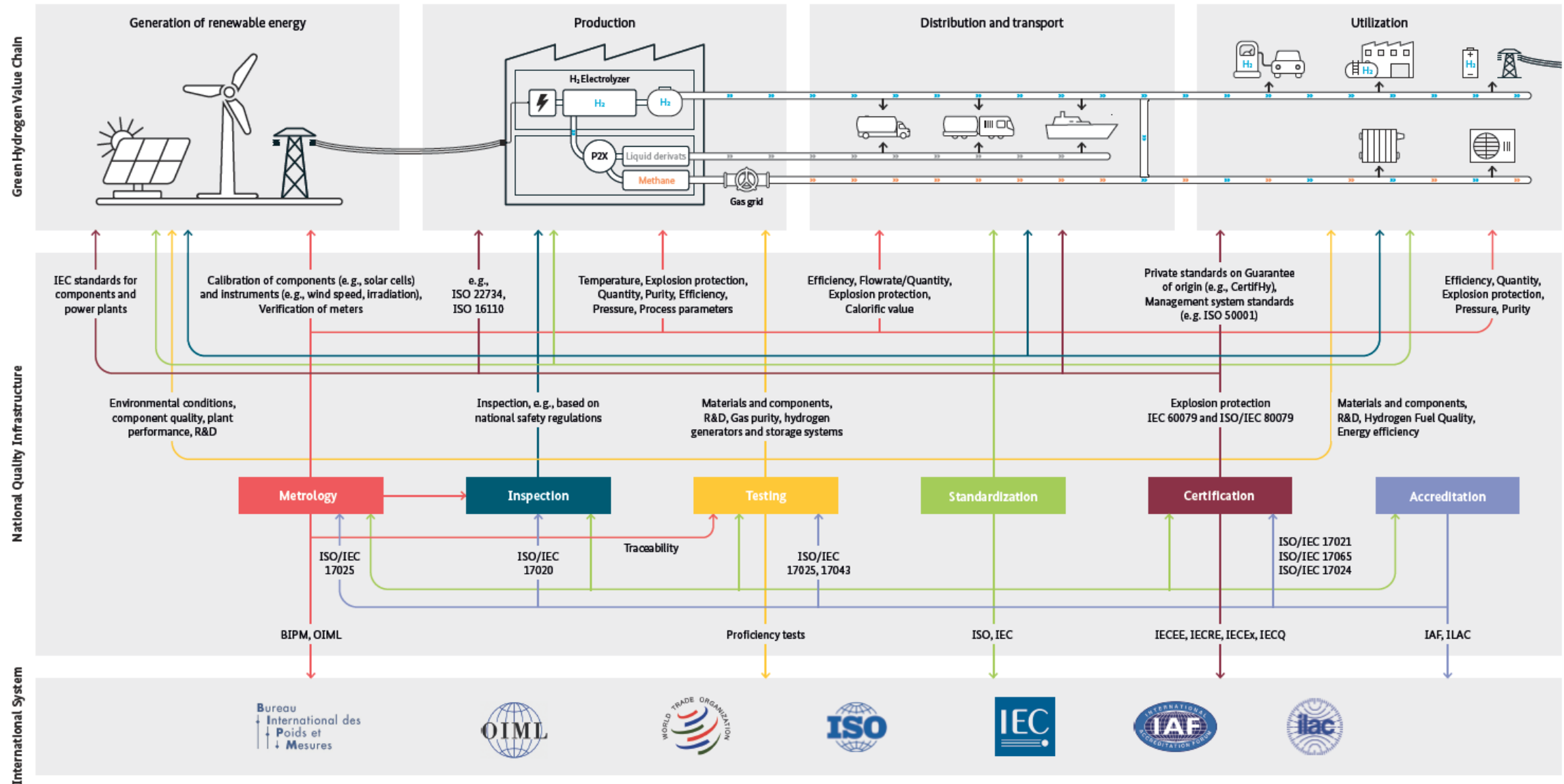


Global trade needed across the whole Green Hydrogen value chain



- While there is increasing attention on facilitating the trade of hydrogen and its derivatives a final products, a global GH2 economy requires **increased trade flows across the whole value chain: Renewable electricity supply, equipment (electrolysers, compressors, etc.), transport, storage and reversion**

Quality Infrastructure –standards, certification and beyond- taking a holistic approach including Personnel



QI for GH2 ROADMAP

Pre-requisite to have before looking into QI Services

Develop GH2 Strategy

Have a strategic vision that will allow for GH2 economy development



Assess GH2 Economy Potential

Countries need to determine their supply and demand potential for green hydrogen economy

Step 1



Step 2



National Quality Infrastructure system

Undertake an assessment of the general state of the national Quality Infrastructure system.

Ideally steps 2 & 3 should happen in parallel

Step 3

Quality Infrastructure service offering and demand

Identify future requirements and existing Quality Infrastructure services.



Step 4



QI Action Plan

Develop a practical action plan to develop the Quality Infrastructure according to the requirements identified

Step 5

Example of a good practice – Germany's National Hydrogen Strategy includes QI

„The chief components of this measurement and quality assurance infrastructure which needs to be built up and networked at national and European level are metrology and physical and chemical safety technology.

..., there is a need for scientifically accepted and regulated measurement methods and assessment criteria, and internationally accepted standards and technical standards.“

**The National Hydrogen Strategy 2020, FEDERAL MINISTRY FOR ECONOMIC AFFAIRS
AND CLIMATE ACTION, page 8**

- **Quality Infrastructure to be explicit part of national H2 strategies** –i.e. **standards, certification, testing, metrology, accreditation, inspection**–
- On the right side a **non-exhaustive list of international standards** developed for the hydrogen sector. Need to expand efforts and shift focus towards key emerging applications
- National standards should be based on international standards and countries should **engage in international standardization – Standardisation & Conformity Assessment**–

Standards:

The following standards provide overall guidance across the hydrogen value chain:

Design:

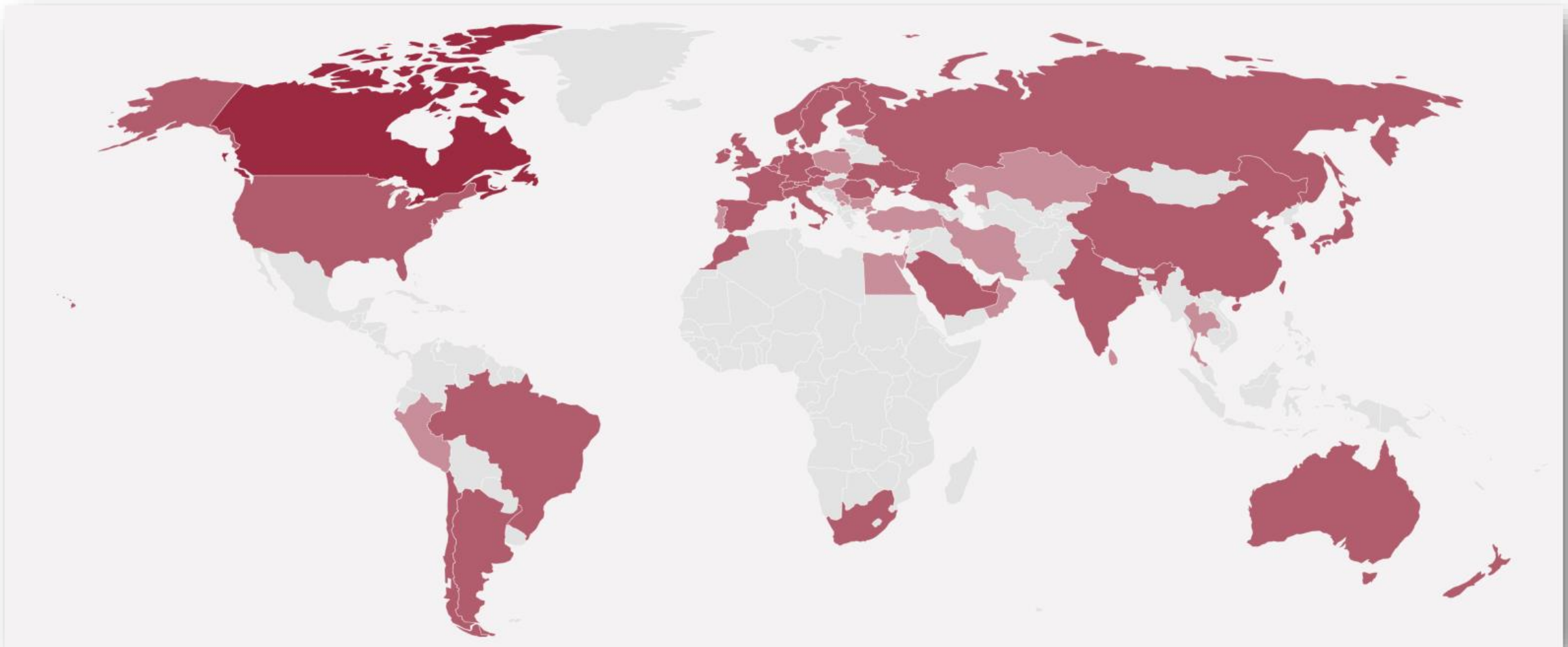
- ISO 22734-1 Hydrogen generators using water electrolysis – Industrial, commercial, and residential applications – Part 1: General requirements, test protocols and safety requirements.
- ISO TR 22734-2 Hydrogen generators using water electrolysis – Part 2: Testing guidance for performing electricity grid service.
- ISO 17268 Gaseous hydrogen land vehicle refuelling connection devices ISO 19884 Gaseous hydrogen – Cylinders and tubes for stationary storage.
- ISO 16111 Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride.
- ISO 19880-1 Gaseous hydrogen – Fuelling stations – Part 1: General requirements
- ISO 19880-3 Gaseous hydrogen – Fuelling stations – Part 3: Valves
- ISO 19880-5 Gaseous hydrogen – Fuelling stations – Part 5: Dispenser hoses and hose assemblies ISO 19880-6 Gaseous hydrogen – Fuelling stations – Part 6: Fittings
- ISO 19880-7 Gaseous hydrogen – Fuelling stations – Part 7: O-rings
- ISO 19880-8:2019 Gaseous hydrogen – Fuelling stations – Part 8: Fuel quality control
- ISO/CD 19880-9 Gaseous hydrogen – Fuelling stations – Part 9: Sampling for fuel quality analysis
- IEC 60079-10 series on Area Classification
- IEC 60079-14 Installation
- IEC 60079-17 Inspection
- IEC 60079-19 Repair and Overhaul of Equipment
- ISO/TR 15916, Basic Safety considerations for safety of hydrogen systems.
- ISO 16110 series Hydrogen generators
- ISO 17268 - Gaseous hydrogen land vehicle refuelling connection devices.

- ISO 19880 series- Gaseous hydrogen – Fuelling stations
- ISO 19882 Gaseous hydrogen – Thermally activated pressure relief devices for compressed hydrogen vehicle fuel containers
- ISO 26142 Hydrogen detection apparatus – Stationary applications
- IECEx Certification System via IECEx OD 290 Standardised approach to Testing and Certification of Hydrogen dispensing Equipment and Systems

Installation and infrastructure:

- ISO 19880-x series – Gaseous hydrogen – Fuelling stations
- IEC 60079-x series – General requirements for construction, testing and marking of Ex Equipment and Ex Components intended for use in explosive atmospheres.
- ISO 22734-1 Hydrogen generators using water electrolysis – Industrial, commercial, and residential applications – Part 1: General requirements, test protocols and safety requirements.
- ISO TR 22734-2 Hydrogen generators using water electrolysis – Part 2: Testing guidance for performing electricity grid service.
- ISO 19884 Gaseous hydrogen – Cylinders and tubes for stationary storage
- ISO 16111 Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride ISO.
- CEN Standard EN16325
- ISO/TR 15916, Basic Safety considerations for safety of hydrogen systems.
- ISO 16110 series Hydrogen generators
- ISO 17268 - Gaseous hydrogen land vehicle refuelling connection devices.
- ISO 26142 Hydrogen detection apparatus – Stationary applications
- IEC 80069

Members ISO TC 197 – are developing countries engaged?



10 Priorities to Develop a Quality Infrastructure for Green Hydrogen

10. Foster International Collaboration

It is a well-established fact that international collaboration will be instrumental to harmonize, ensure environmental integrity, create value opportunities in global South and developed robust GH2 markets based on QI.

9. Strengthening the link between policy and QI

International and regional bodies should engage in continuous efforts to create awareness about the benefits of QI for safe and sustainable production and trade of products like hydrogen.

8. Provide a voice for developing countries

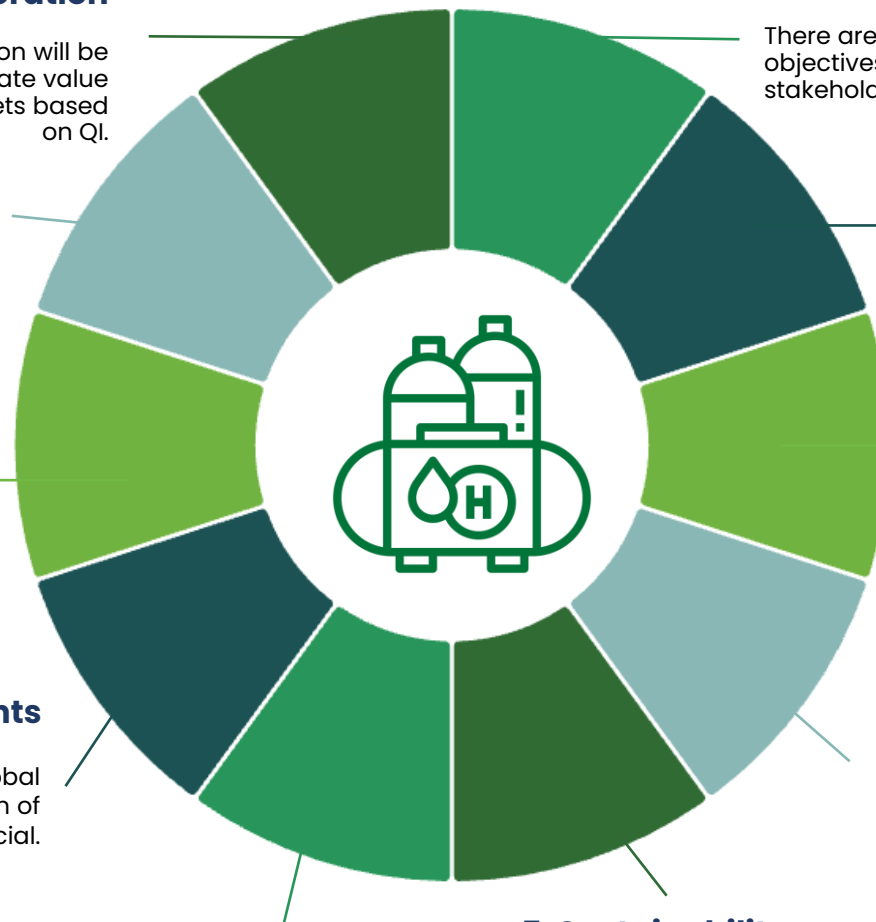
Engagement of developing countries in international standardization TCs must be promoted and supported.

7. Promote harmonization of QI elements

To create a level playing field and ensure fair access to global markets for H2 and its derivatives, international harmonization of quality and safety standards is crucial.

6. Promote digital solutions

Leveraging existing digitalization tools and standards can support streamlining the requirements in standards across the whole H2 value chain. The adoption of digital avenues can also promote enhanced traceability and compliance with QI requirements.



1. Strike the correct balance for QI conformity

There are strong efforts need to develop QI while balancing the following key objectives: a) environmental and social integrity and b) not overburden stakeholders with requirements that delay the deployment of green hydrogen.

2. Align Standards with market trends

Supporting standardization bodies is crucial for staying updated on market trends to develop the standards that are more urgent to foster the market.

3. Invest in training skilled personnel

Countries' quality and safety initiatives must also focus on building the skills of personnel responsible for managing various elements in the H2 value chain.

4. Carbon accounting standards must be all encompassing

Carbon accounting standards, like ISO's forthcoming 19870, covering emissions across the entire life cycle. It's essential for all stakeholders contribute to improve these standards.

5. Sustainability aspects must not be overlooked

It is important to look beyond emissions accounting and ensure that sustainability standards must better cover aspects related to impact on water & land demand and the associated social impacts.

THANK YOU

