Hydrogen Study: International H_2 Strategies

A study commissioned by and in cooperation with the World Energy Council – Germany

Energy Day 2020:
Green Recovery in Europe? Energy Future at the Crossroads

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Study objective: analyse and learn from H_2 strategies

What is the national governmental support for H_2 technologies and applications?

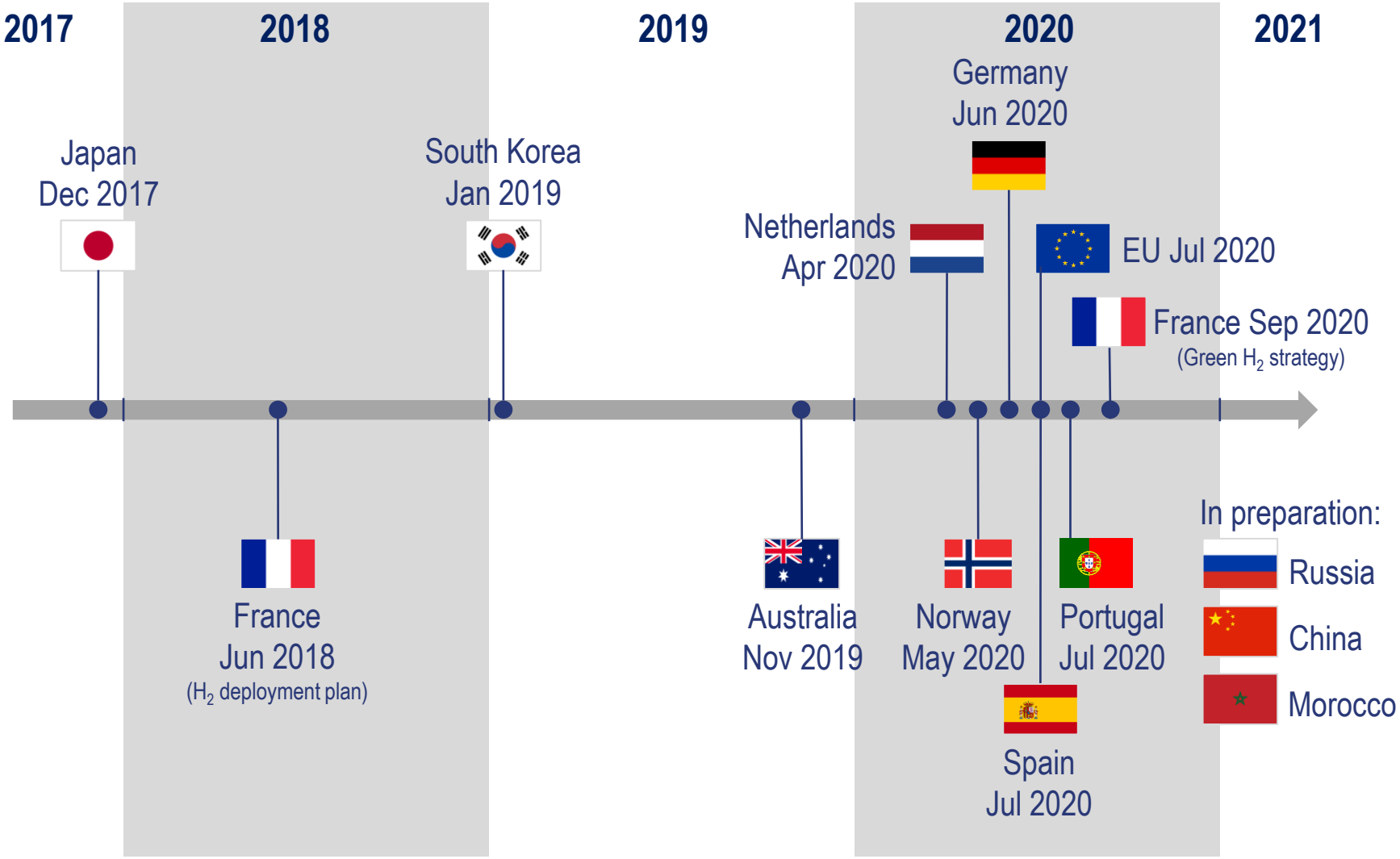
How can current experience benefit discussions of the European and German strategy?

National goals	▪ Which countries are supporting H_2 implementation? ▪ What are the goals of national governments in supporting hydrogen technologies and applications?
Target sectors and infrastructures	▪ Which sectors, applications, and infrastructure developments are targeted primarily?
Measures and H_2 requirements	▪ Which support strategies or measures are discussed? ▪ What are associated requirements (e.g. blue vs. green H_2)?
Achievements and recommendations	▪ What has been achieved and what can be learned from developments so far? ▪ What are the conclusions for the EU and DE strategy?

Selected countries

- ➔ Understand international trends and developments
- ➔ Taxonomy of international H_2 strategies
- ➔ Put national activities into context
- ➔ Generate a solid basis for upcoming discussions
- ➔ Identify major topics for the political discussion

“Hot” strategic hydrogen summer 2020



Overview H_2-strategies and activities (Status: August 2020)

31	Europe
11	Asia & the Pacific
6	South America & the Caribbean
5	Middle East & Africa
3	North America

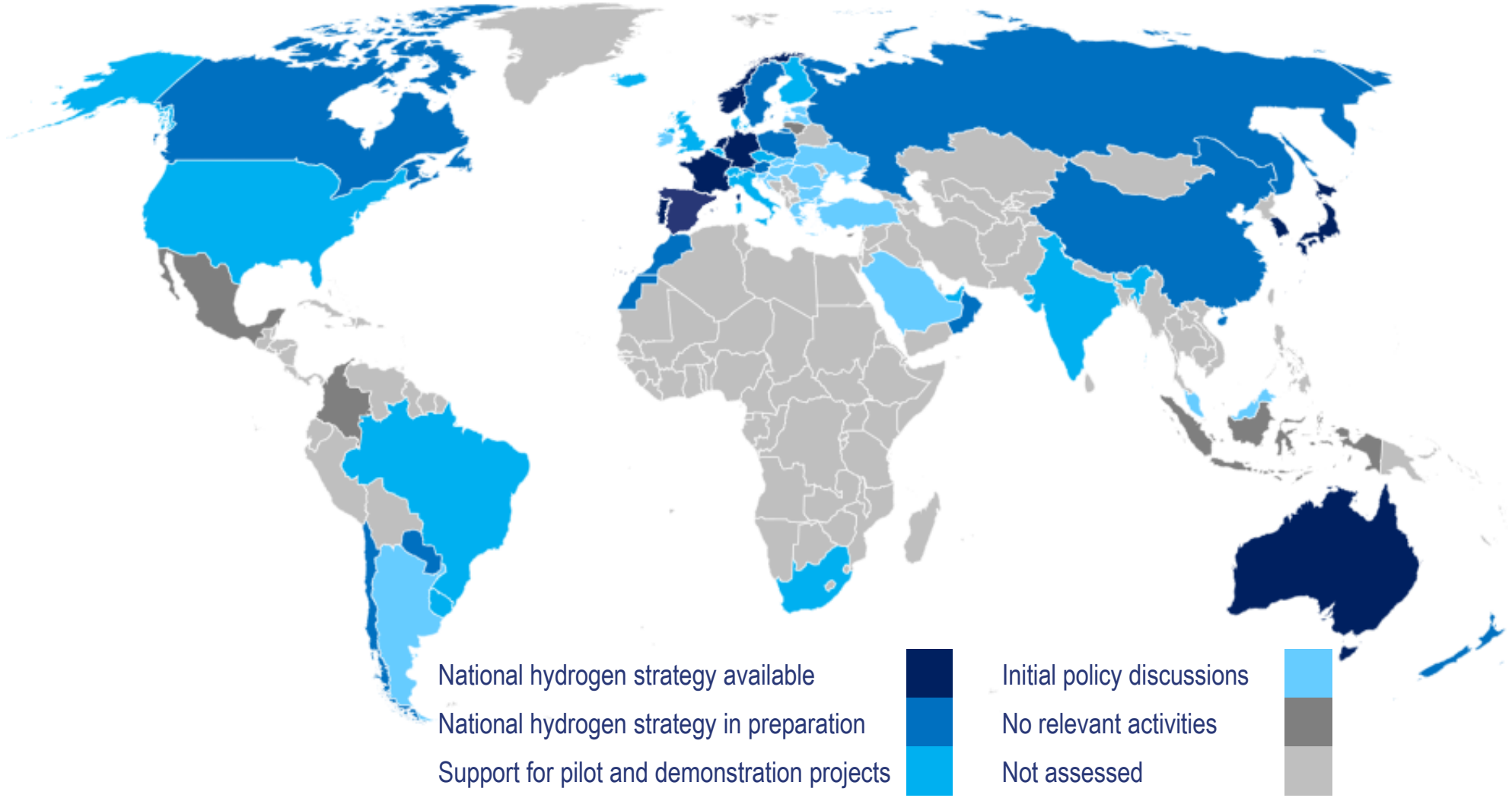
56

No. of countries analyzed

9	National hydrogen strategy available
11	National hydrogen strategy in preparation
14	Support for pilot and demonstration projects
17	Initial policy discussions
5	No relevant activities

August 2020, World Energy Council, LBST

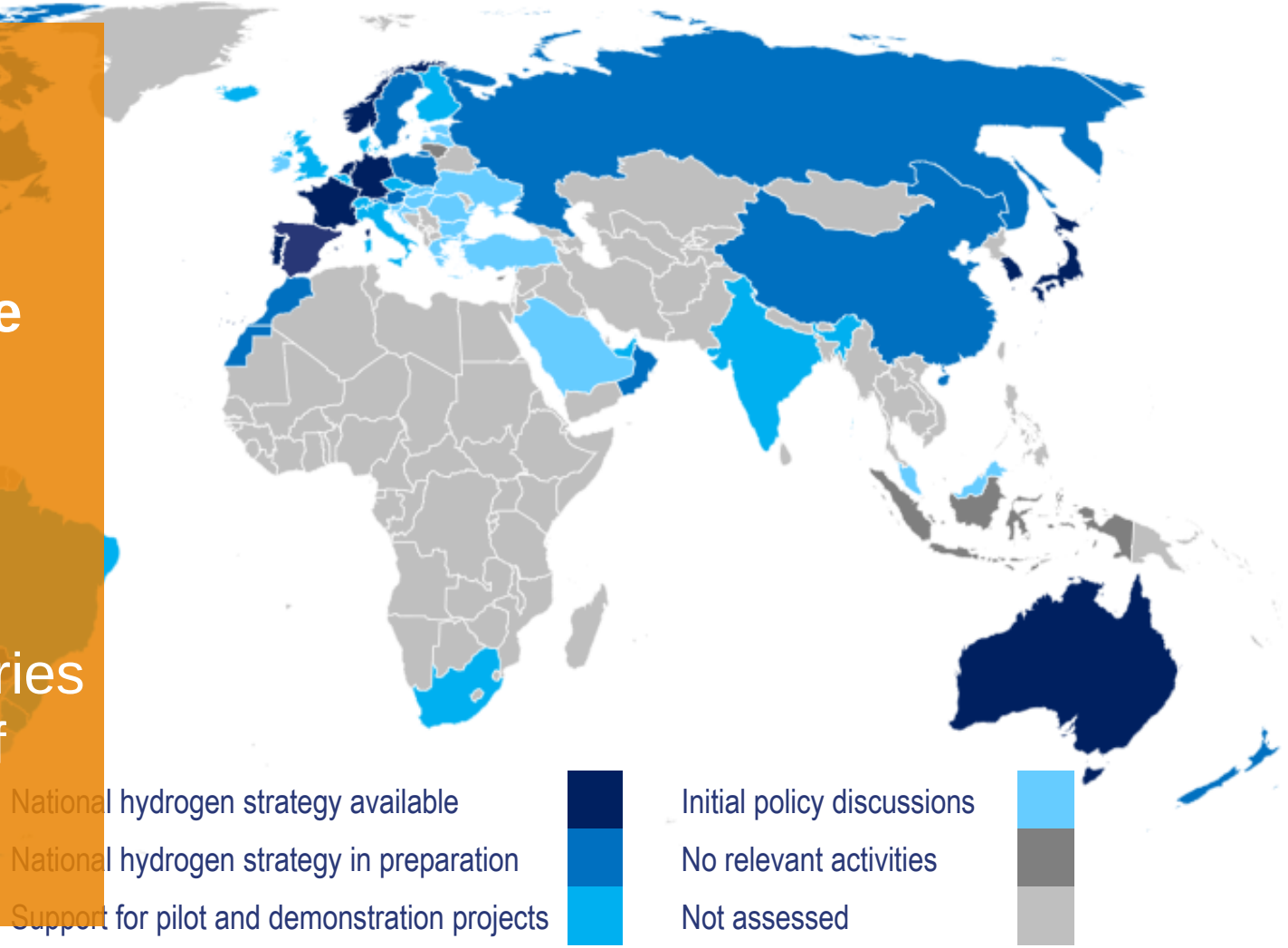
Overview H_2 strategies and activities (Status: August 2020)



Overview H_2 strategies and activities (Status: August 2020)

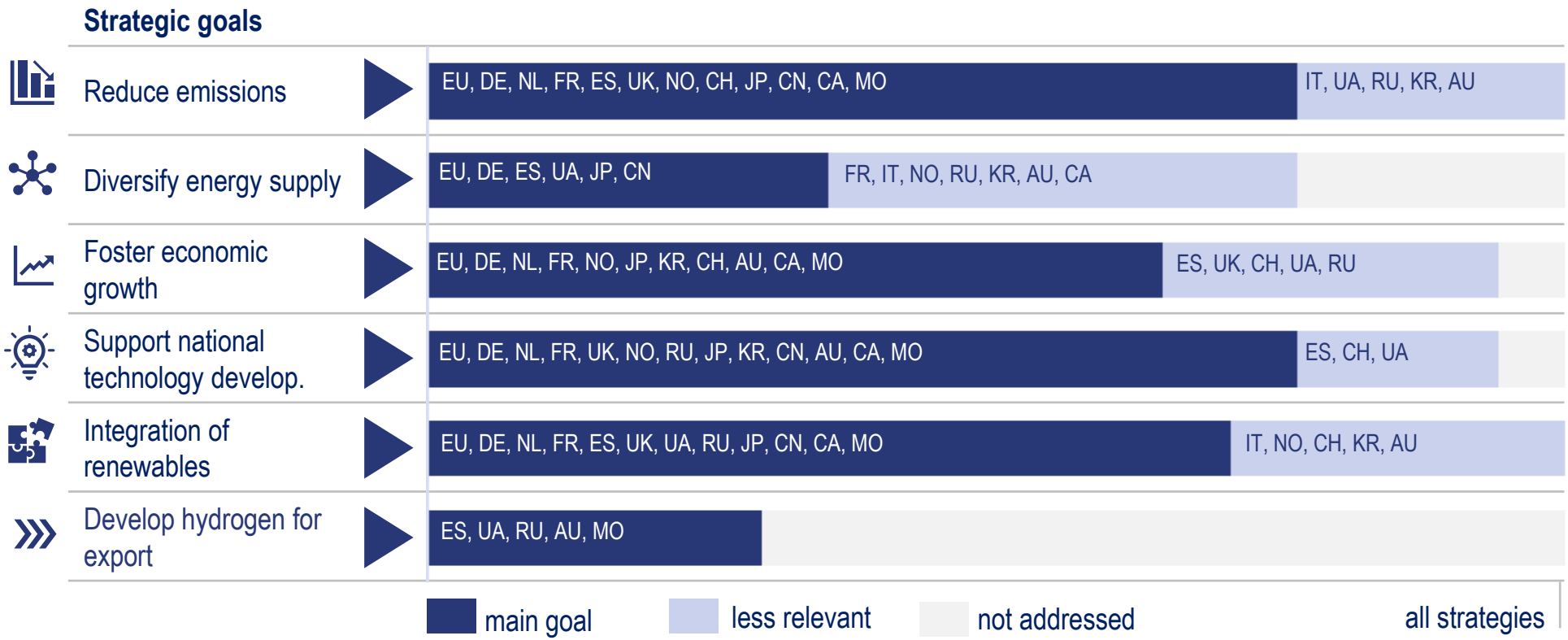
National H_2 strategies in place or in preparation in at least 20 countries

By 2025 H_2 strategies are expected in countries representing > 80% of global GDP



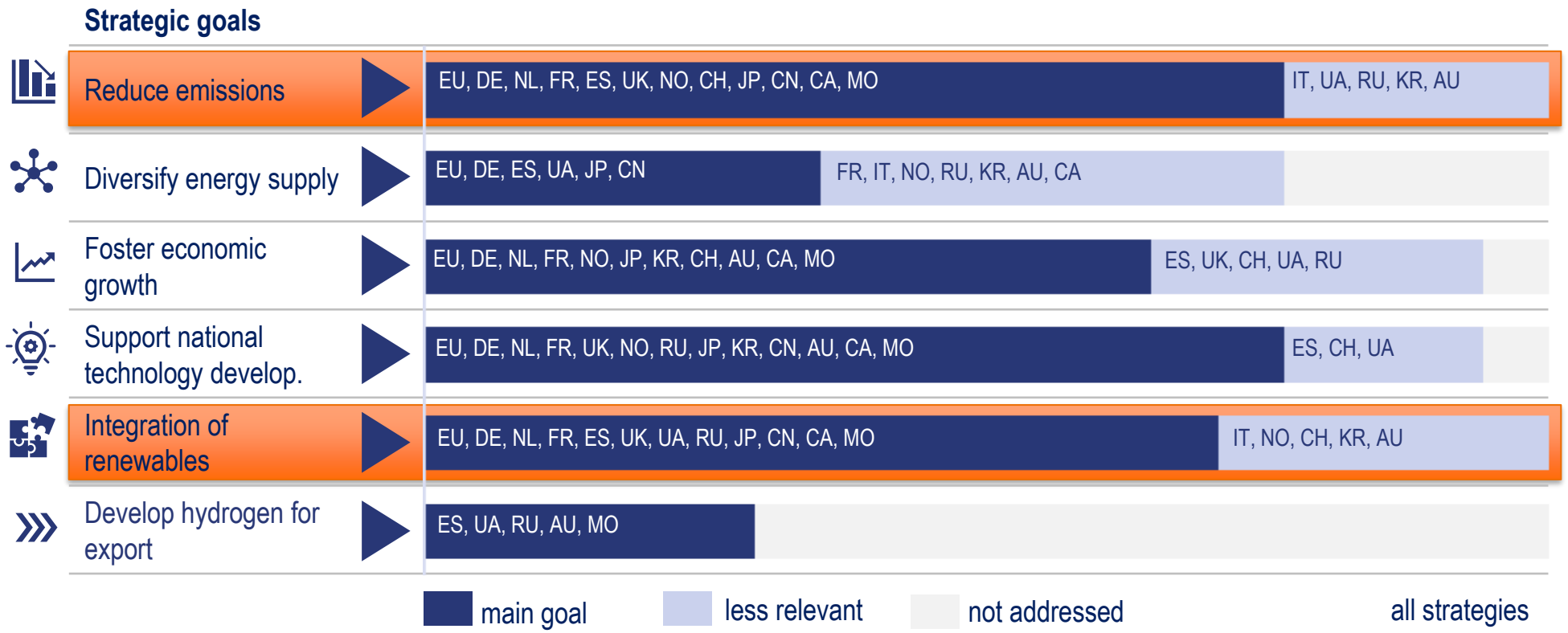
16 countries + EU selected for detailed analysis

Main goals of current H_2 strategies per country



Main goals of current H_2 strategies per country

decarbonisation



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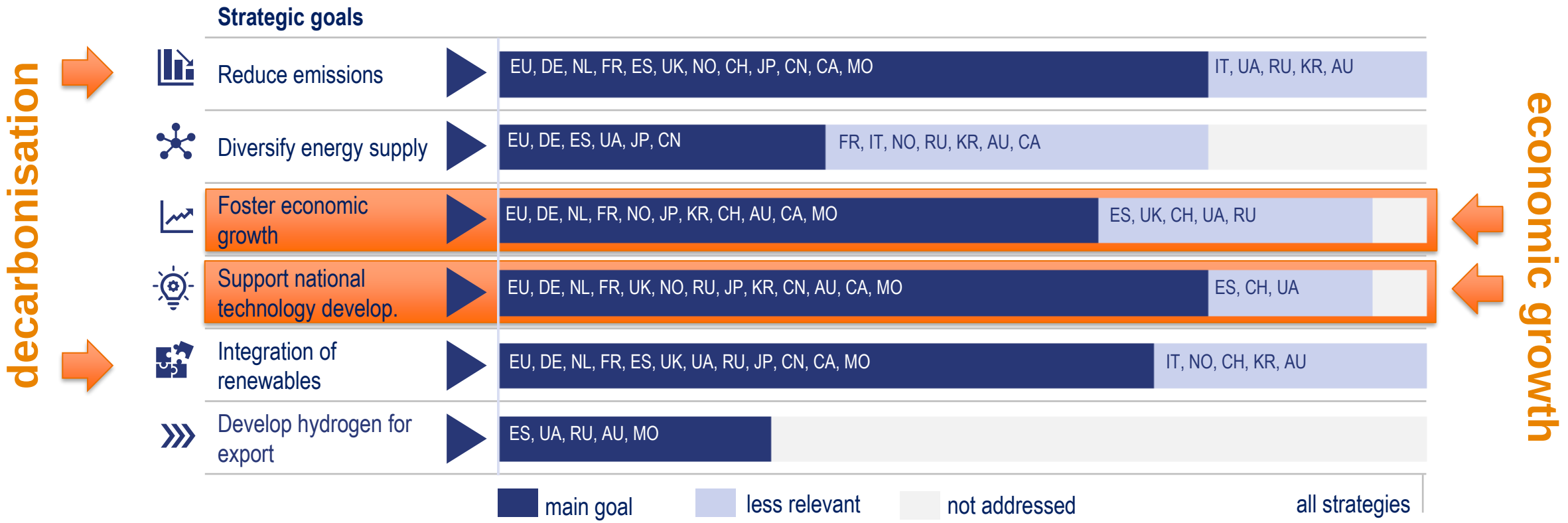
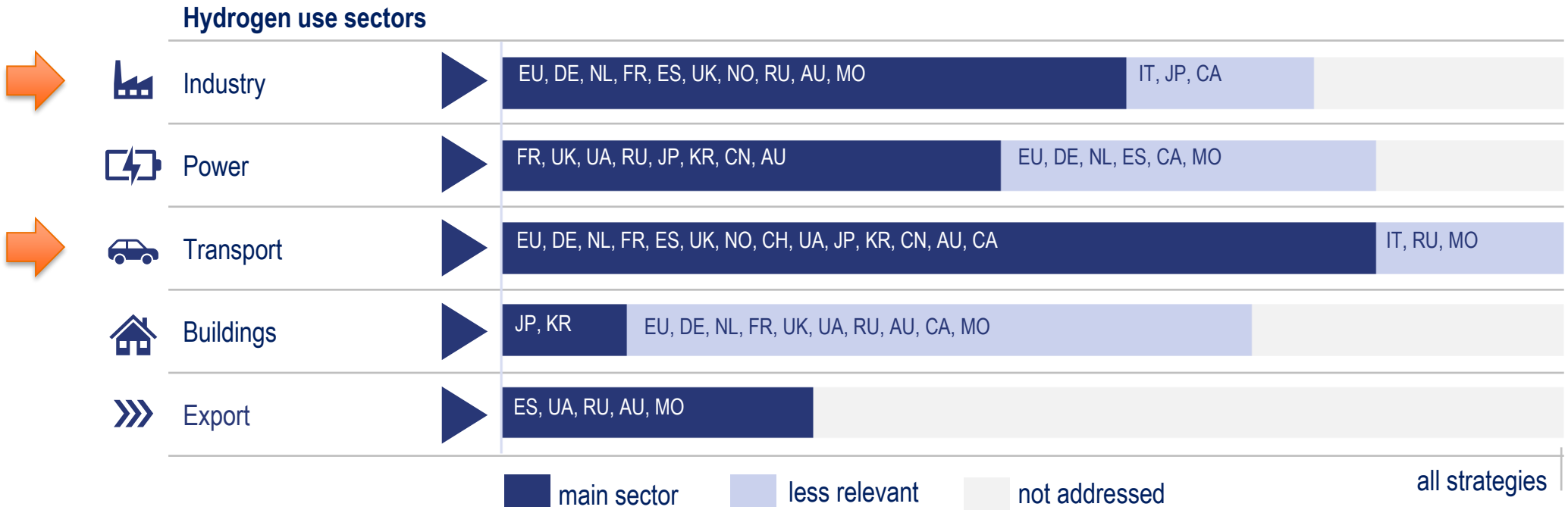


Main target sectors of current H_2 strategies per country



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A dynamically growing market for hydrogen

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National H_2 strategies in place or in preparation in at least 20 countries

By 2025 H_2 strategies are expected in countries representing > 80% of global GDP

- With **emission reduction** and **economic growth** as main national drivers, H_2 is clearly recognised as an **essential element of a decarbonised energy system**
- Scaling upper H_2 demand expected for 2050 in national strategies to global level indicates a **potential of up to 9000 TWh**
- In several countries with high energy needs, a **substantial share of this demand will be served by imports**, initially on the basis of **bilateral agreements**
- Initial applications focus on **transport and industry sectors**
- **Green H_2 central to all strategies**;
  blue H_2 mainly plays a role in a transition period before 2050
- **Market ramp-up in 3 phases**:
  activation (<2030) ⇨ growth (>2030) ⇨ established (2050)

Emerging opportunities for commercial actors

Large H_2 production capacities required

A > 40 B€ market alone in the EU until 2030

- Large **industrial partnerships** will be formed for production and export/import
- **Refineries and chemical industry** to become the first important large-scale green H_2 markets in the mid-term
- **Road transport market** (vehicles and trucks) currently stronger in Asia than in Europe
- **Green synthetic liquid e-fuels (PtL)** can grow into an interesting opportunity with large potential quantities particularly in the aviation and/or maritime sector

New policies needed to achieve strategic aims

Most strategies focus on targets rather than measures

Policy development is lagging behind strategic aims

Current measures insufficient to catalyse envisaged strong growth

- Building on earlier successes, policies should focus on commercialisation:
  - **Sectoral quota** stimulate large scale demand
  - Targeted support for **establishing comprehensive value chains**, providing nuclei for sustainable business
  - Move from CAPEX to **OPEX support**
  - Globally **high CO_2 prices** help further reduce cost gap
  - Provide **long-term perspective and security of investment**
- A broadly agreed **green or low carbon hydrogen certification** mechanism is crucial
- **Infrastructure development** requires public financing and central coordination for planning and harmonisation
- Complement all activities with measures supporting **public acceptance**

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