IRENA POLICY TALKS 2020
10 Nov | 19 Nov | 30 Nov | 9 Dec

IRENA
International Renewable Energy Agency

Green hydrogen: perspectives and policies

IRENA Policy Talks 2020

Policies for Green Hydrogen

19 November 2020

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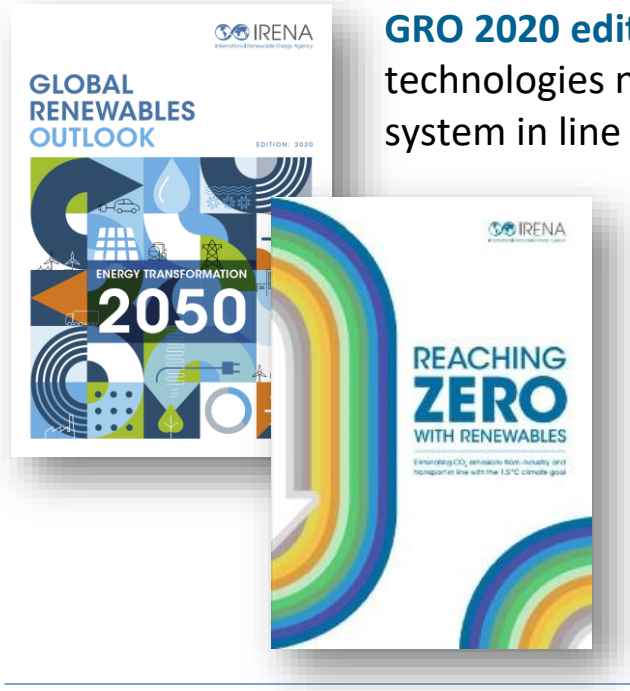
Recent work on hydrogen



GRO 2020 edition outlines the investments and technologies needed to decarbonise the entire energy system in line with the Paris Agreement.

Reaching Zero with Renewables focuses on how industry and transport could achieve zero emissions by 2060 and assesses the use of renewables and related hydrogen technologies.

Forthcoming electrolyser, hydrogen policy reports

Collaborative Framework on Green Hydrogen

The umbrella for IRENA hydrogen engagement

- IRENA has established a **Collaborative Framework on Green Hydrogen** in June 2020, **to foster dialogue between governments and private sector**
- 65 countries, Hydrogen Council and IPHE participation. ***Co-facilitated by EC.***

IRENA VIRTUAL EDITION
INNOVATION WEEK 2020

4 days | 8 sessions | 23 panels
101 speakers from 35 countries
1 600+ audience from around 1 250 companies and organisations and 137 countries

Focus: **Innovative solutions for the energy-end-use sectors of transport & industry.** Showcased emerging **renewables and hydrogen based solutions** from around the world

Collaborating with private sector, associations and other partners

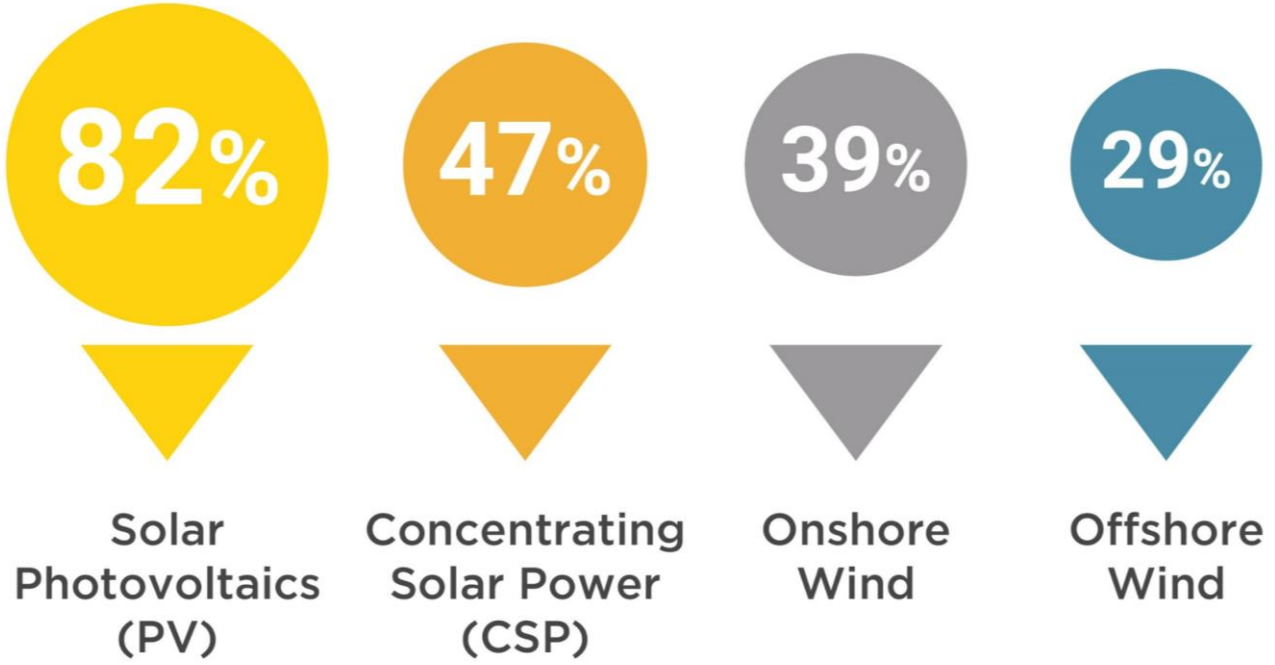
EPRI ELECTRIC POWER RESEARCH INSTITUTE · Hydrogen Council · GBEP Global Bioenergy Partnership · International Transport Forum · MISSION POSSIBLE PLATFORM · SDG7 YOUTH CONSTITUENCY YOUTH IN SUSTAINABLE ENERGY · Initiate!

Summaries and recordings at http://innovationweek.irena.org

Why the renewed interest in hydrogen ?

Net-zero carbon requires solutions for hard to decarbonise sectors

- Hydrogen can be a clean energy carrier
- Hydrogen is a compromise solution for the renewables industry and the gas industry
- It opens an interesting transition pathway for todays oil and gas exporting countries
- Hydrogen is widely used today:
  - 2/3 industrial applications
  - A significant source of emissions
- Falling renewable electricity cost make green hydrogen a feasible solution
  - 50-55 kWh per kg hydrogen needed
- Hydrogen is not a panacea
  - Difficult to handle
  - Fairly expensive
  - Fairly low cycle energy efficiency
  - Need to shift away from grey hydrogen



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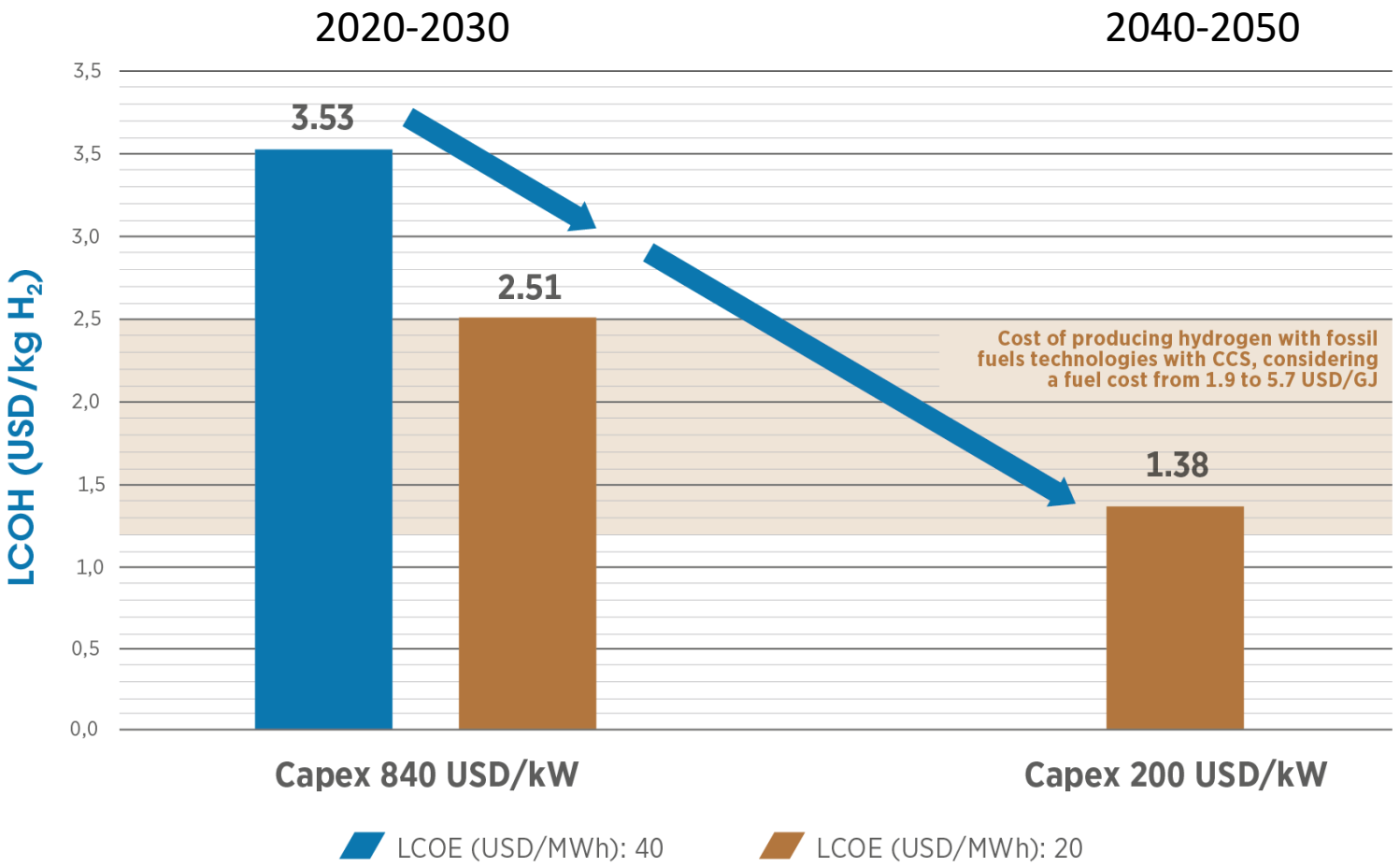
Hydrogen production costs

Green hydrogen will be cheaper than blue hydrogen

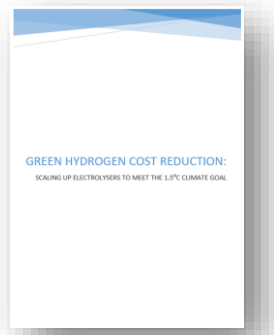


Source: IRENA (2019)

Key assumptions electrolyser: Load factor: 4200 hours (48%), conversion efficiency 65% (today), 75% (2050)

Today:

- 98% grey hydrogen supply
- 1% of all hydrogen supply is green and 1% is blue
- 0.3 GW electrolysers
- 60 GW pipeline of electrolysers

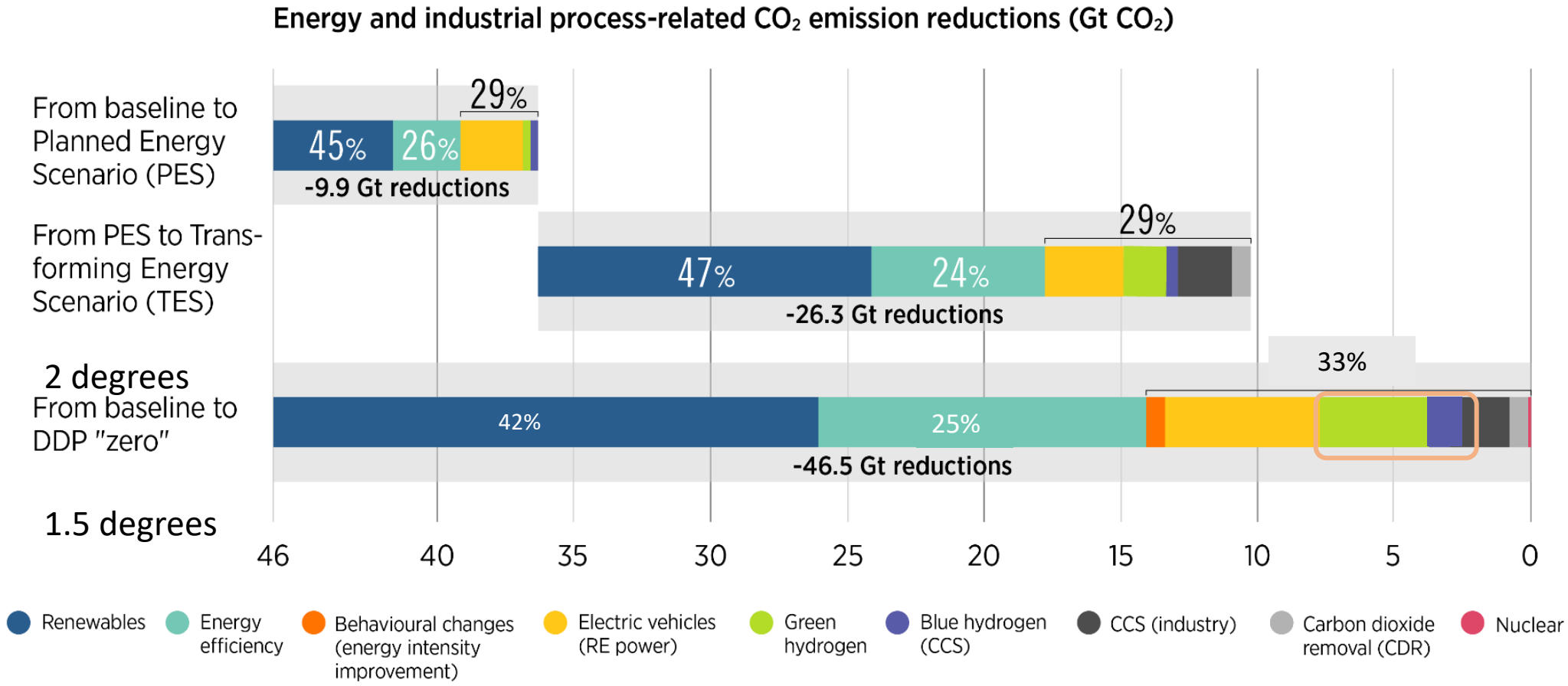


Upcoming

2050:

- 2/3 of supply is green and 1/3 is blue
- Electrolyser system cost may drop to 200 USD/kW in 2050
- Electrolyser efficiency may improve to 45 kWh/kg
- Hydrogen production can increase RE power demand significantly and provide additional flexibility

Global Renewables Outlook outlines options to cut energy-related CO2 emissions to 2050



Hydrogen demand 2050 will be 2-4 times todays level

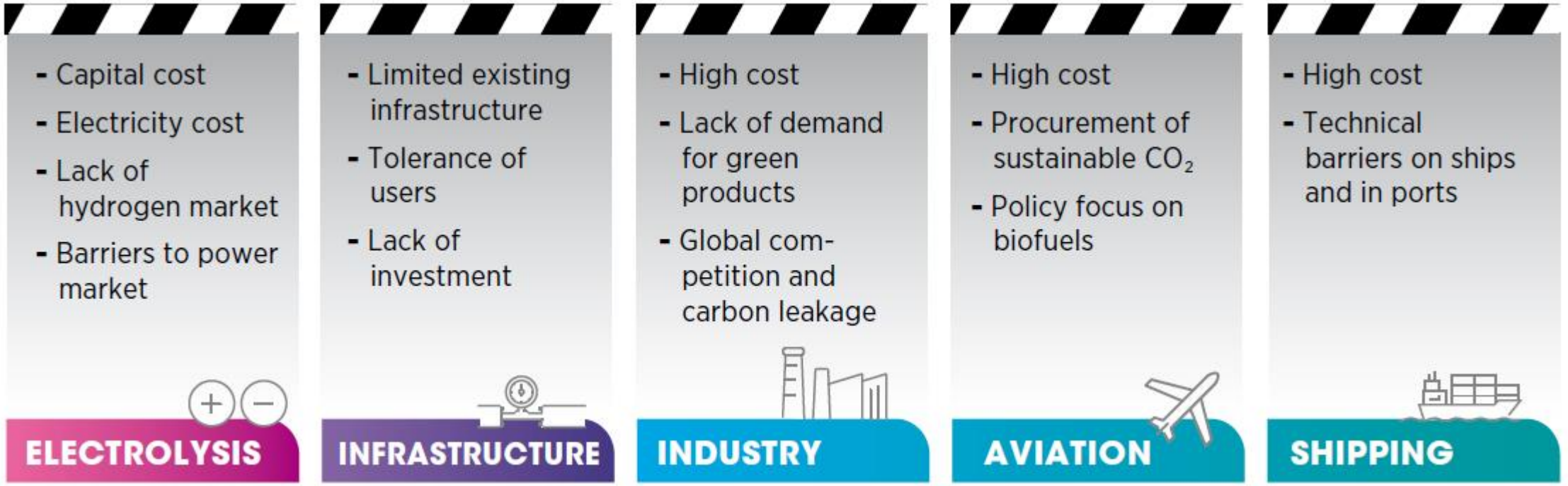
Future transportation sector demand is a key uncertainty

Hydrogen is one part of a more comprehensive energy transition

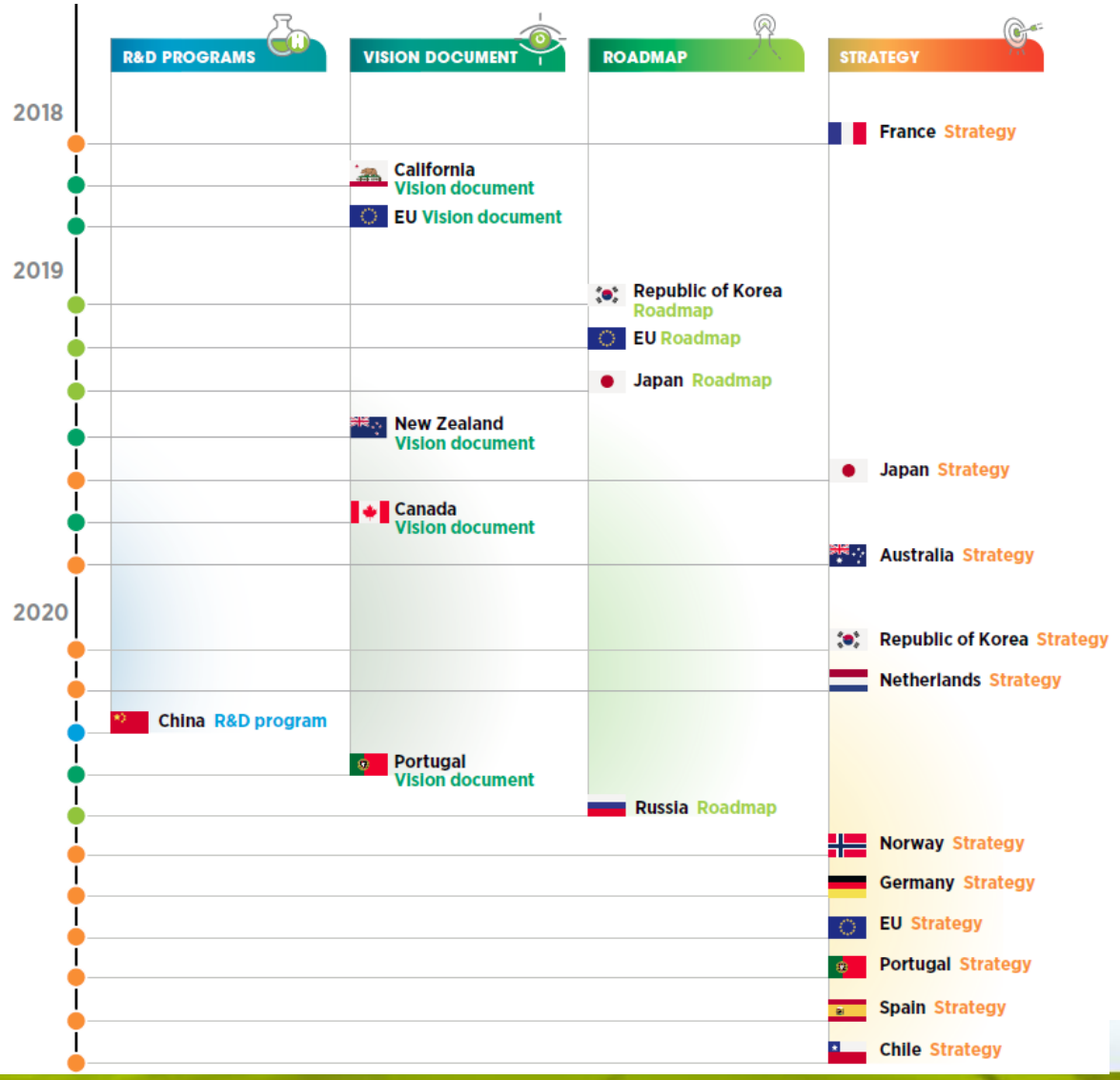
Annual energy-related CO_2 emissions would need to decline by at least 70% below today's level by 2050. End-use electrification, green hydrogen and synthetic fuels will play a crucial role to reach zero emissions.

Source: IRENA

Barriers to the deployment of green hydrogen

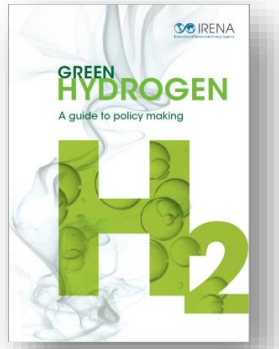


Policy pillar 1: National hydrogen strategies

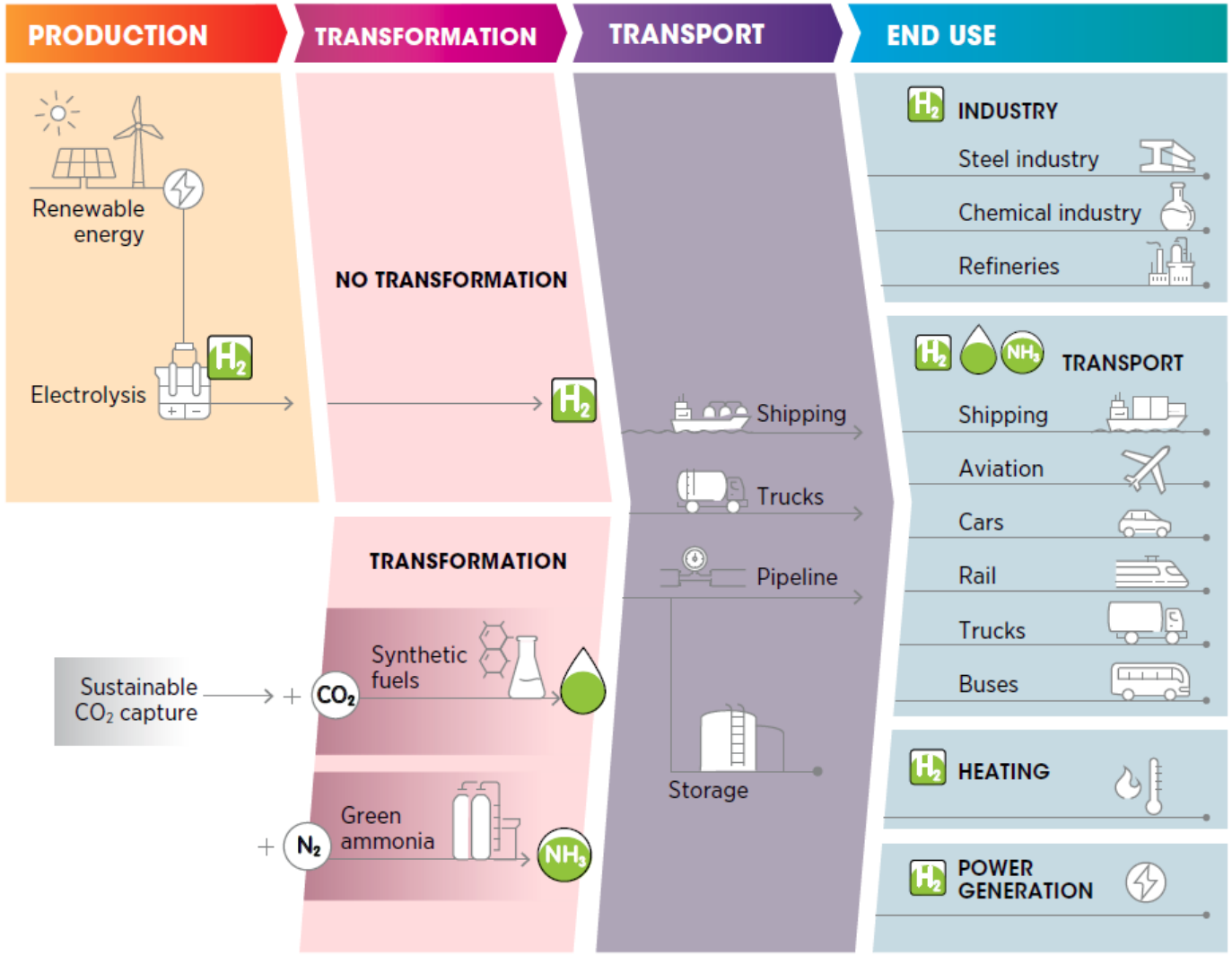


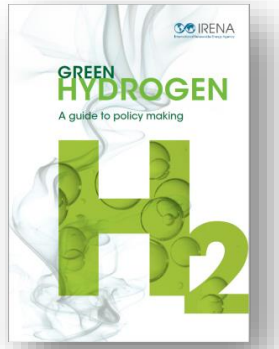
Upcoming Strategies:

- Austria
- Colombia
- Denmark
- Italy
- Morocco
- Oman
- Paraguay
- UK
- Uruguay
- ... and more to come



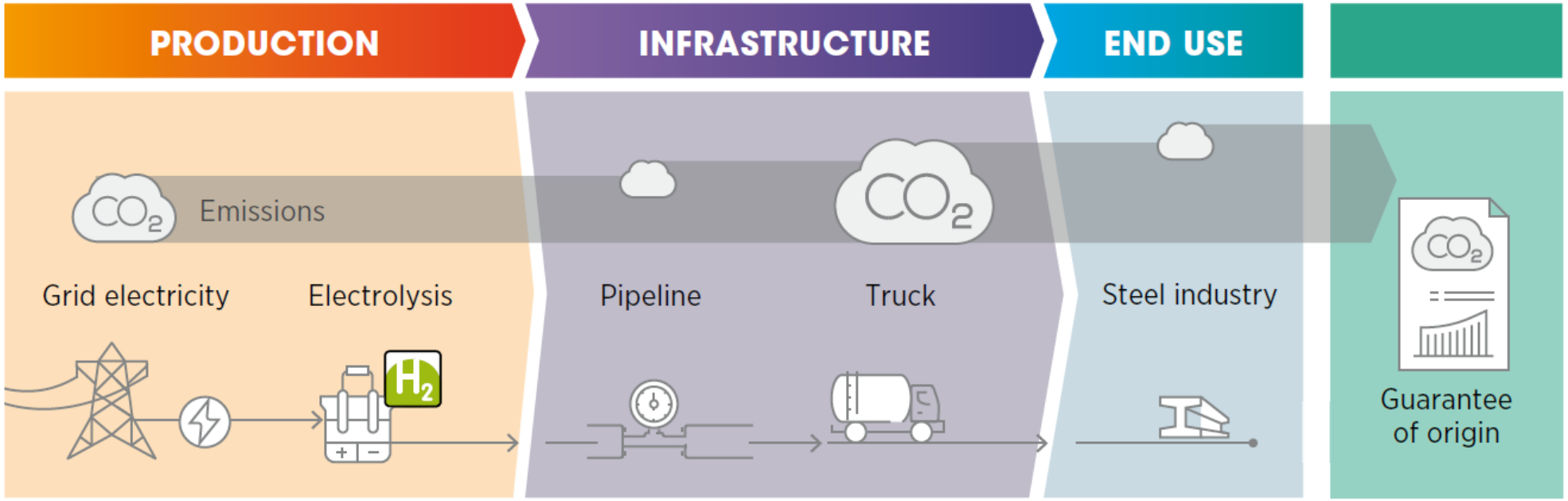
Policy pillar 2: Policy priorities

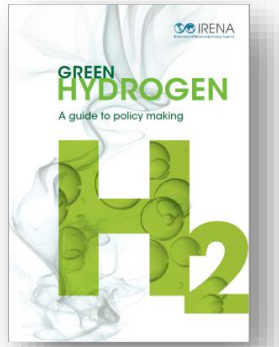




- Green hydrogen can be utilised in a wide range of end-uses
- Identify the applications that provide the highest value and prioritise action towards them
- Maintain the principle of additionality

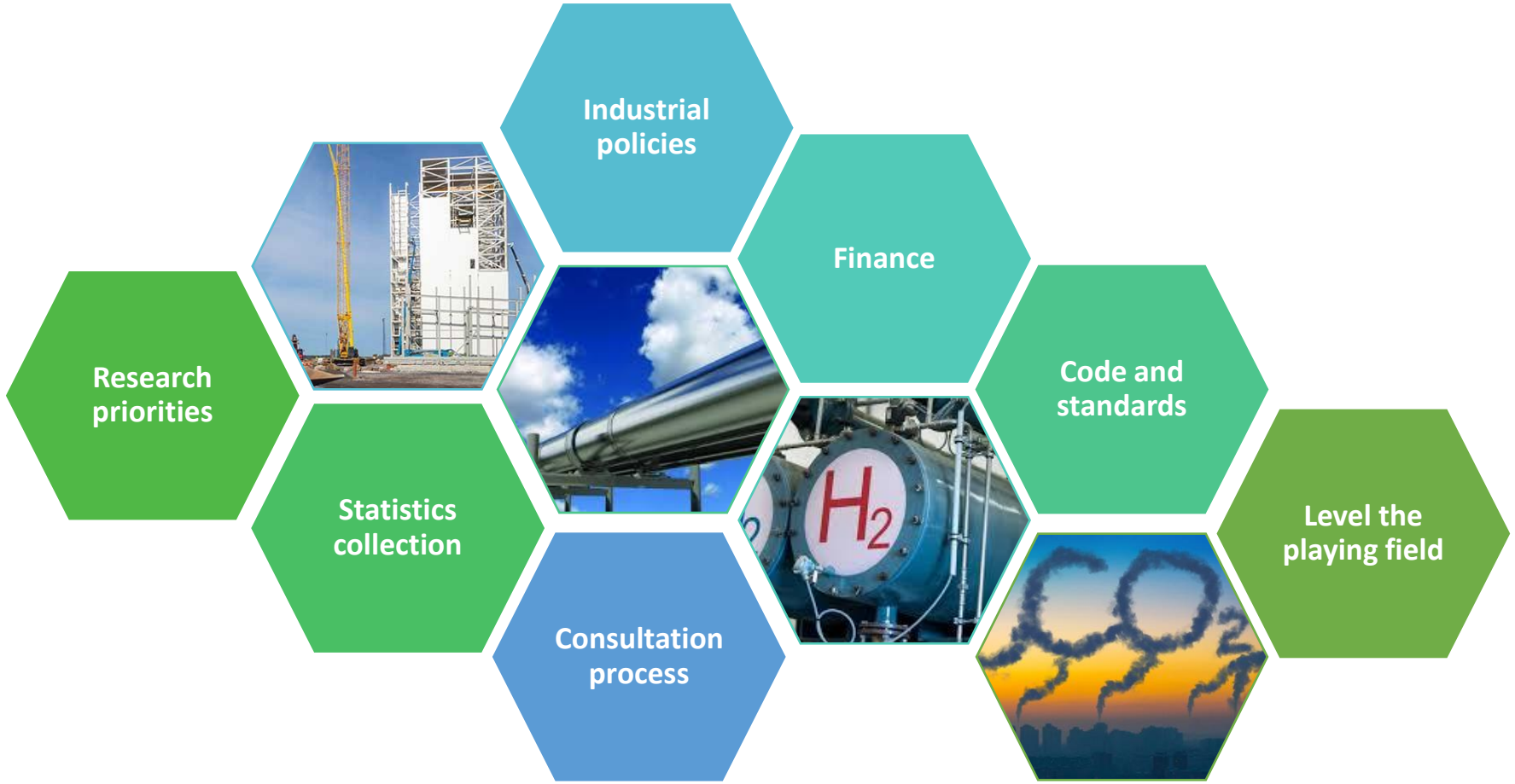
Policy pillar 3: Guarantees of origin

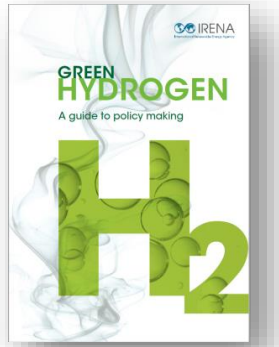




Guarantee of origin schemes should be based on life cycle GHG emissions, from upstream activities such as electricity generation to end uses

Policy pillar 4: Enabling policies

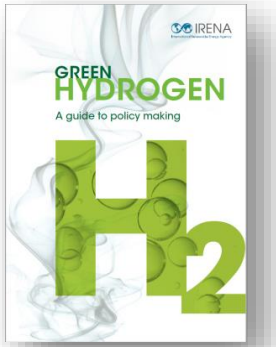




Hydrogen as part of a wider technology portfolio for the Energy Transition

International Renewable Energy Agency

	RENEWABLES	DIRECT ELECTRIFICATION	ENERGY EFFICIENCY	GREEN HYDROGEN
HEATING	• Solar water heaters, direct geothermal use, biomass (low-grade heating)	• Heat pumps	• Retrofit of buildings • Technological advancement	• High-grade heating
INDUSTRY	• Solar drying, biomass (productive uses)	• Electric industrial application (e.g. arc furnaces)	• Use of best available technologies	• Steelmaking refineries • Chemical industry
LAND TRANSPORT	• Biofuels	• Battery electric vehicles	• Performance standards • Travel avoidance	• FCEVs
SHIPPING	• Biofuels • Wind energy	• Short-distance shipping	• Ship design • Operation optimisation • Travel avoidance	• Green ammonia • Methanol
AVIATION	• Biojet fuels	• Short-distance aviation	• Plane design • Travel avoidance	• Hydrogen and synthetic fuels for aviation

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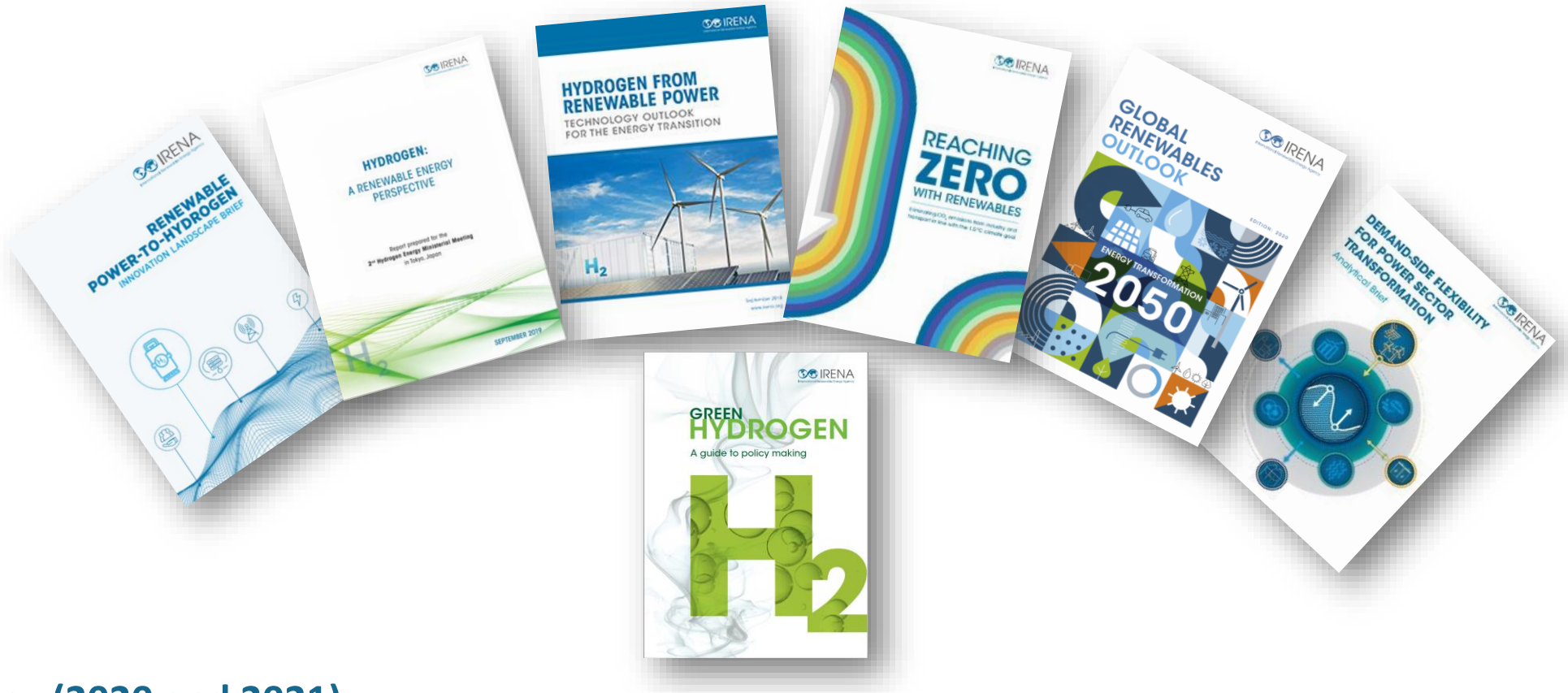
Upcoming reports



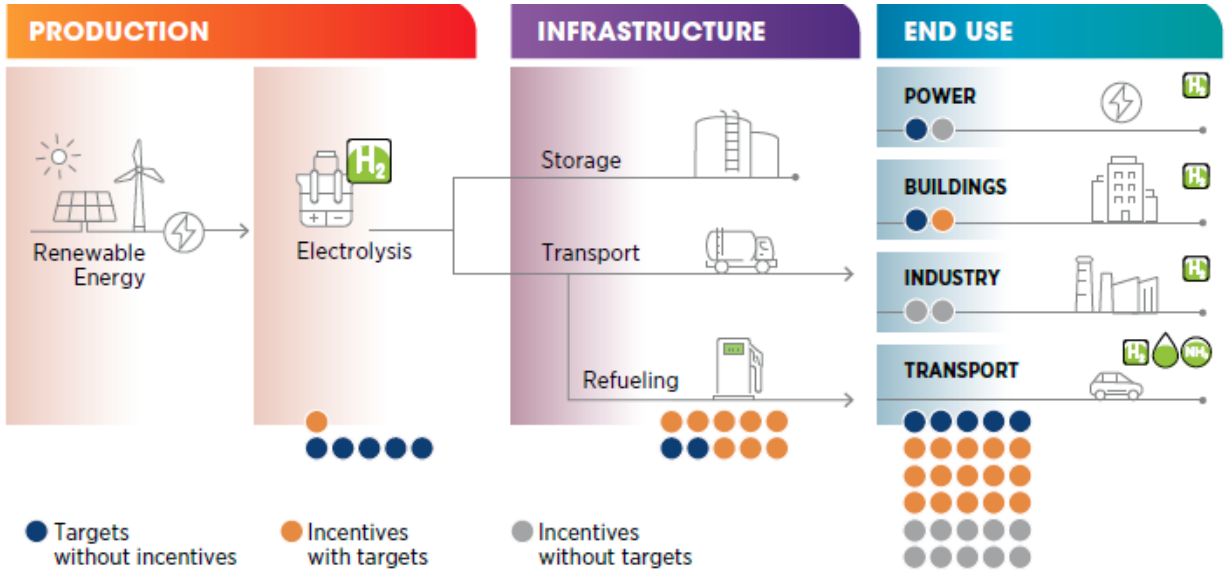
Upcoming (2020 and 2021):

- **GREEN HYDROGEN COST REDUCTION: SCALING UP ELECTROLYSERS TO MEET THE 1.5 ^{o}C CLIMATE GOAL**
- **SECTORIAL POLICY BRIEFS**

Current policy landscape of green hydrogen

The old wave of interest

Hydrogen policies at a global level by segment of the value chain



15 countries + EU considered

The new drivers