

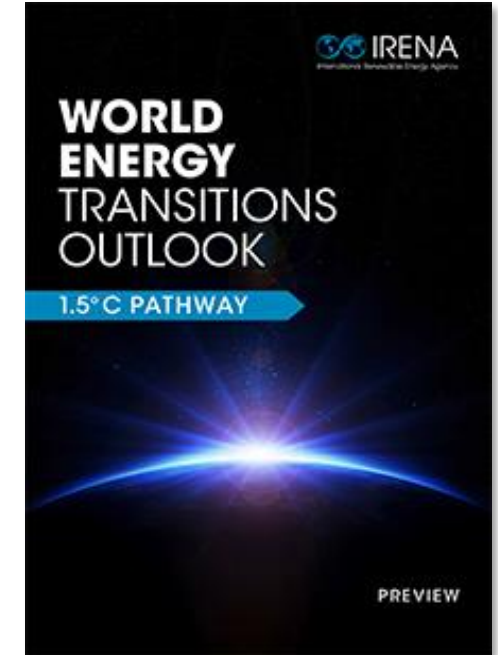
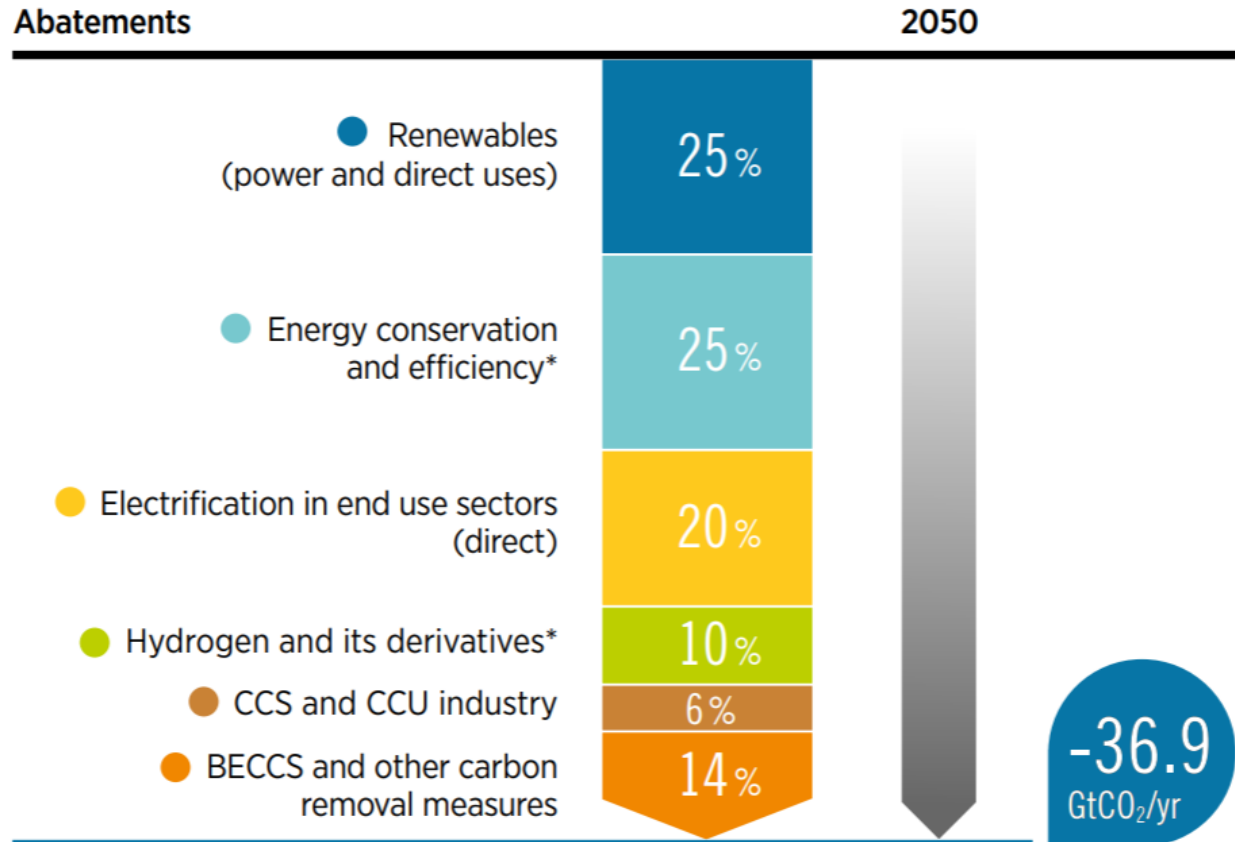
Green hydrogen: perspectives and policies

Green hydrogen supply: policies and insights

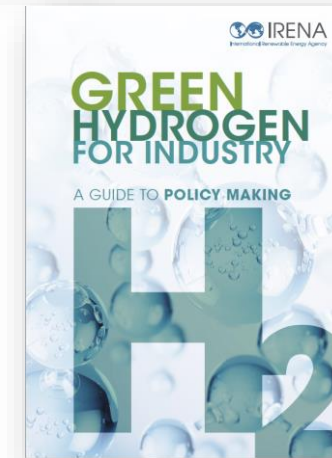
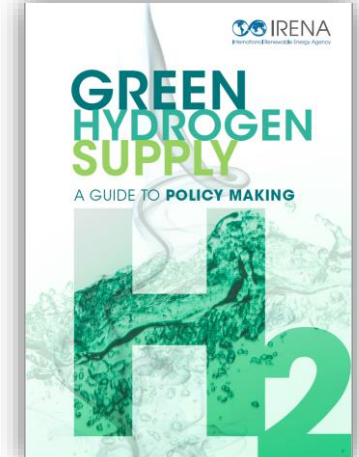
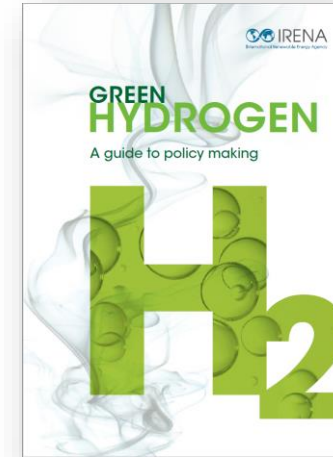
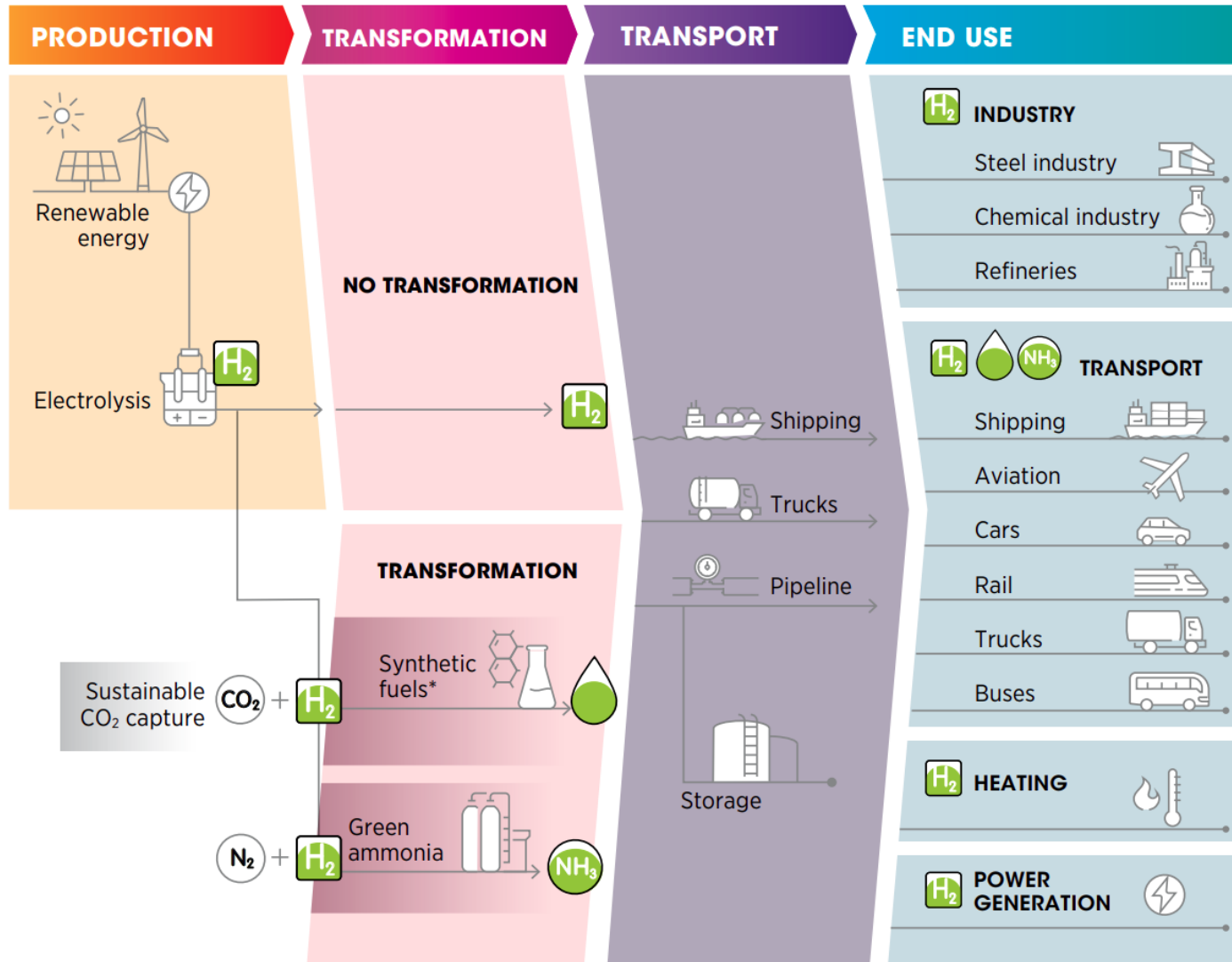


Green hydrogen is essential to achieve a net zero emissions system

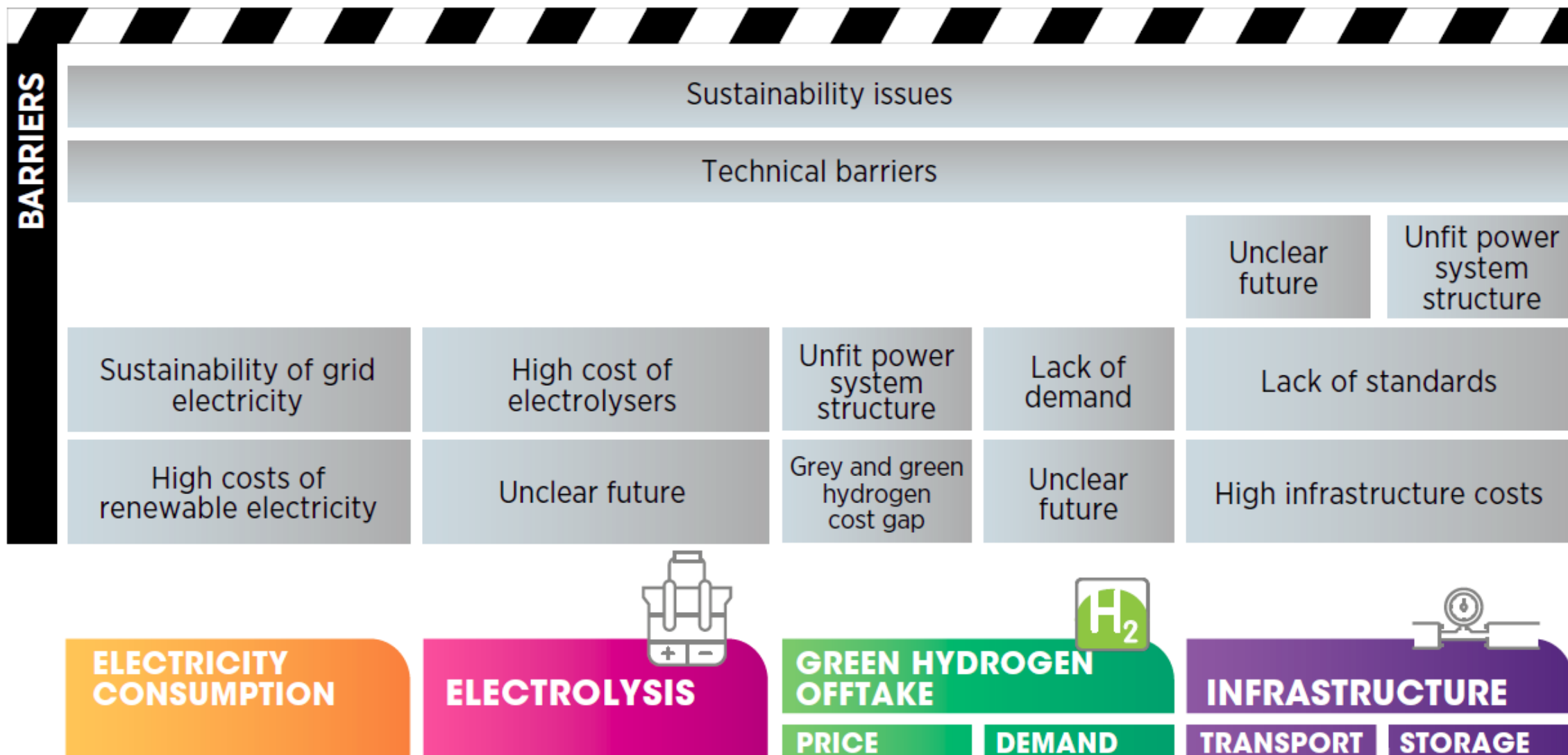
Emissions Pathway to Net Zero



Delving into the challenges... and the solutions



Main challenges for green hydrogen supply



Support to reduce electrolyser costs

High cost of
electrolysers

Unclear future



ELECTROLYSIS

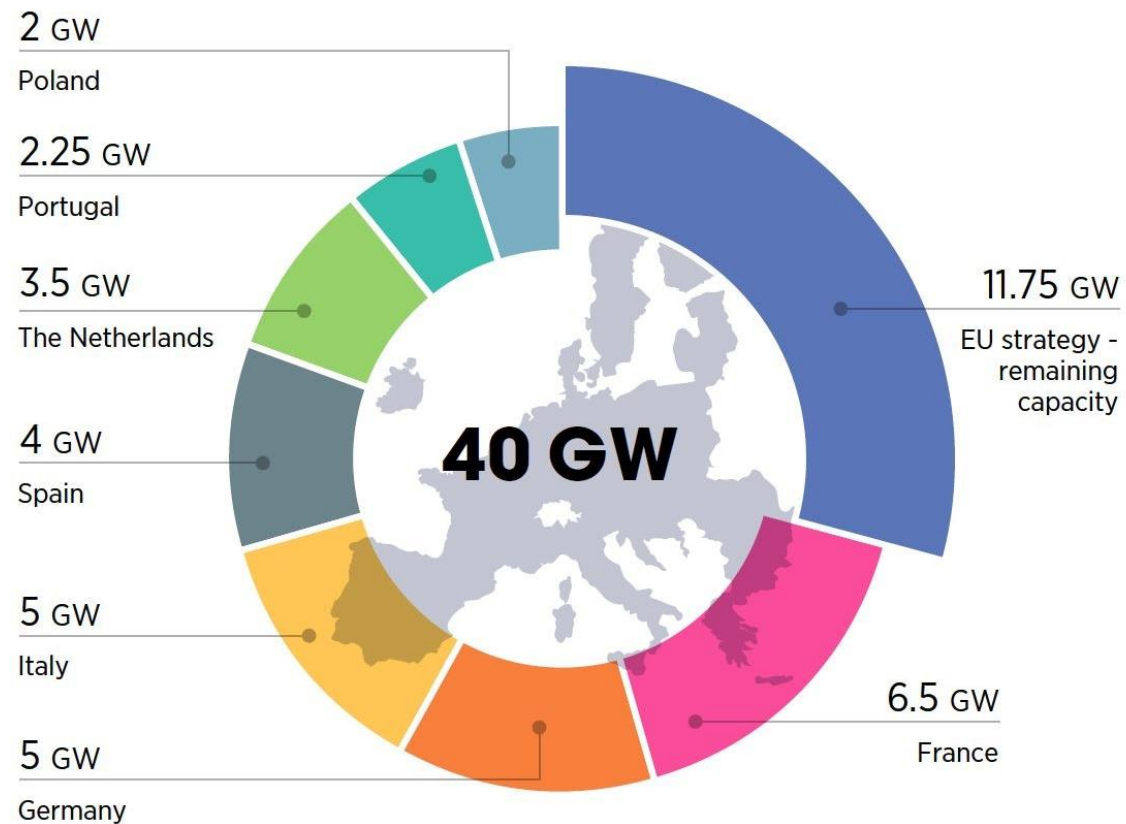
Direct financial support

Manufacturing capacity
support

Capacity targets

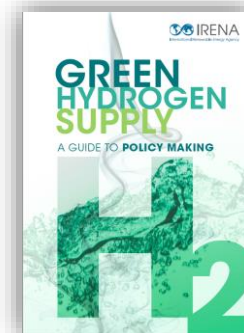
Fiscal incentives

Electrolyser capacity targets in European hydrogen strategies, 2030



Note: The diagram takes the average of the target ranges adopted by the Netherlands and Portugal.

Source: IRENA analysis based on national strategies.



Support to make electricity affordable and sustainable

Sustainability of grid electricity

High costs of renewable electricity

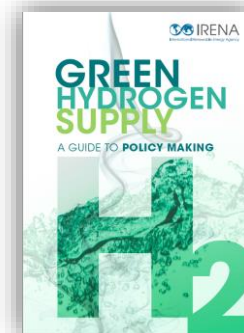
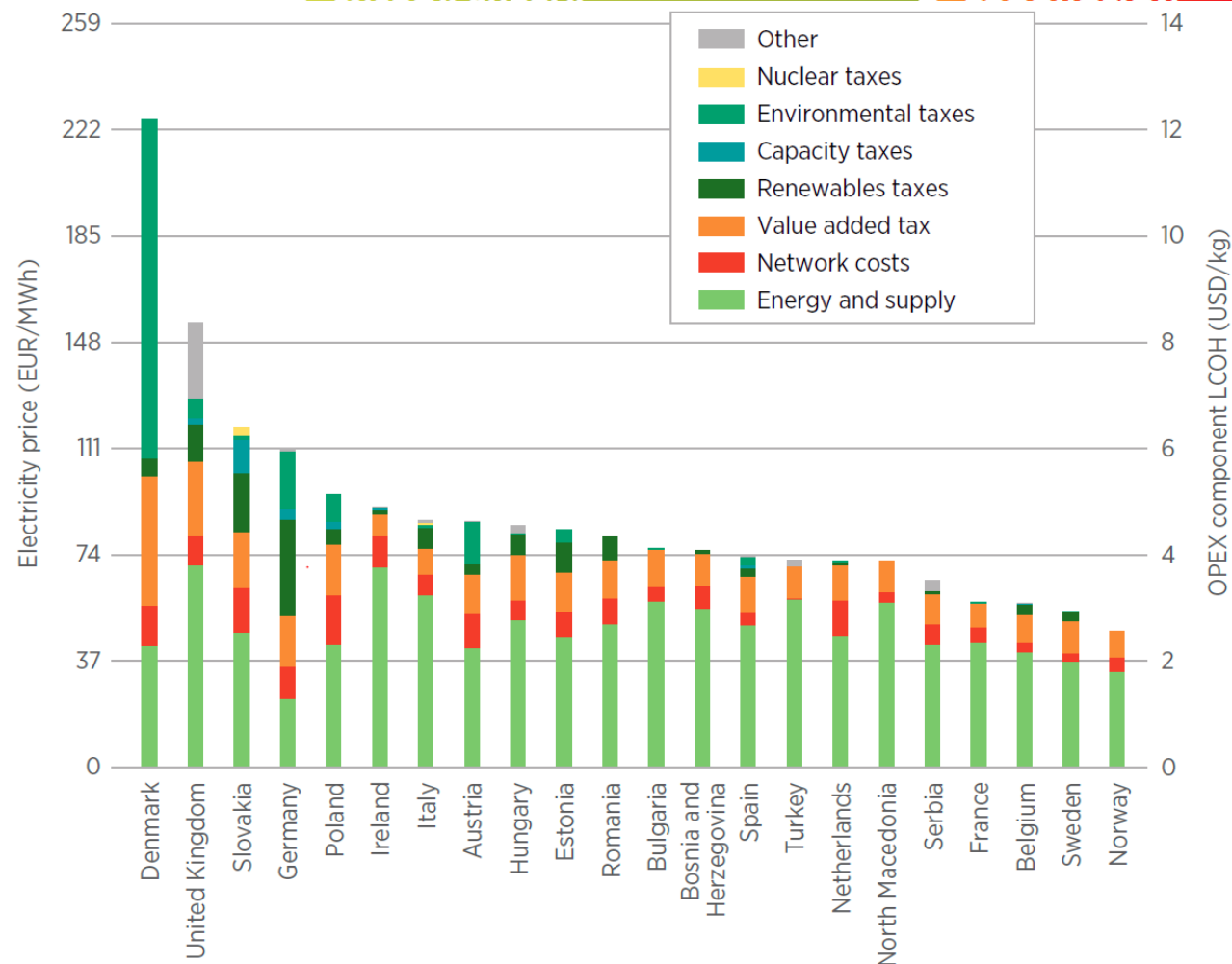
ELECTRICITY CONSUMPTION

Exemptions from electricity taxes and levies

Sustainability assurance measures

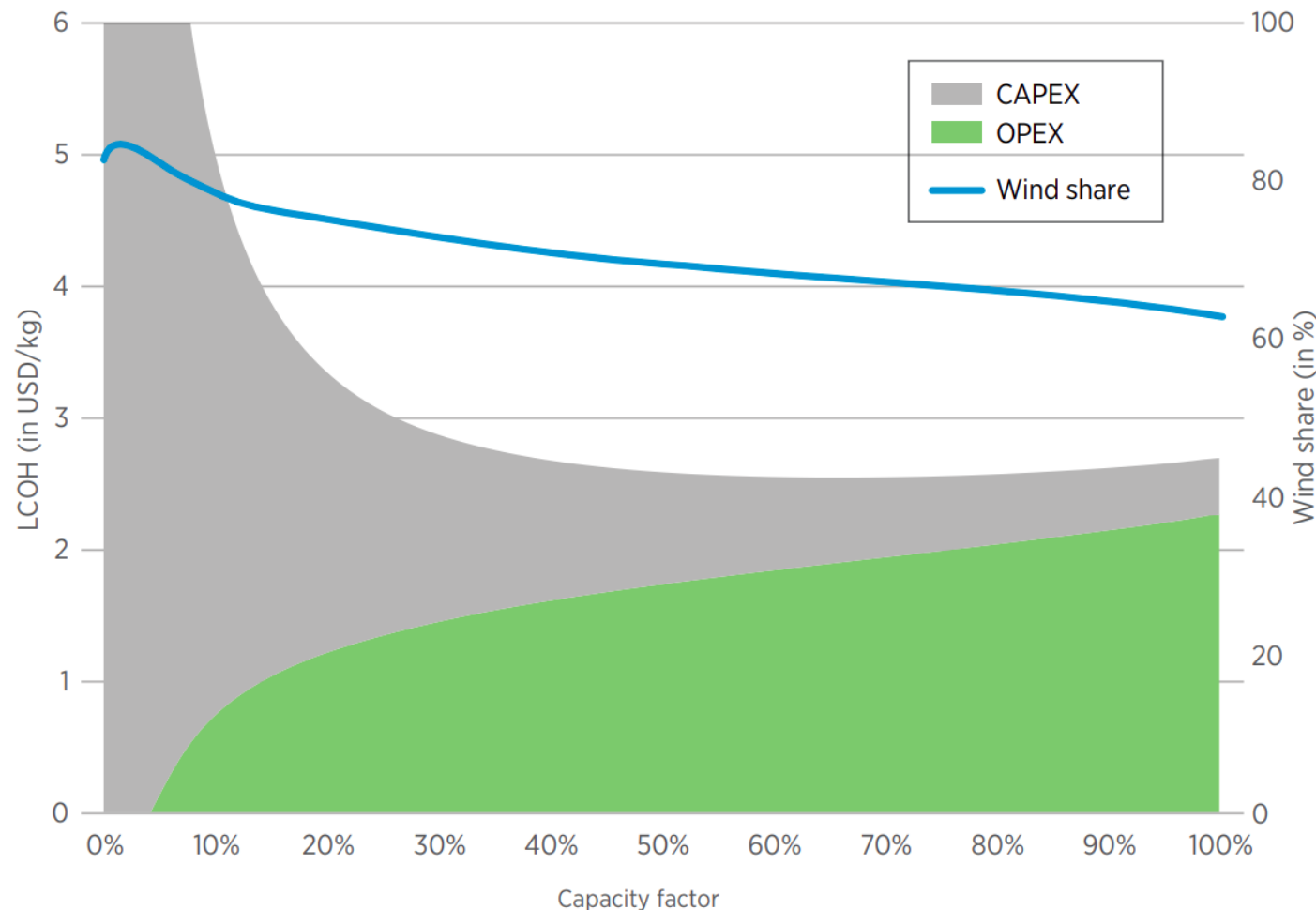


Industrial electricity prices by component, in selected European countries, 2019



Support to make electricity affordable and sustainable

Correlation between levelised cost of hydrogen and capacity factor of a grid-connected electrolyser, western Denmark, 2019



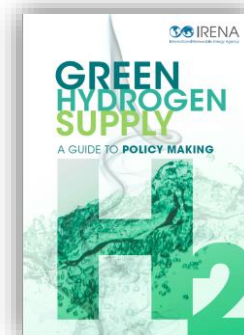
Sustainability of grid electricity

High costs of renewable electricity

ELECTRICITY CONSUMPTION

Exemptions from electricity taxes and levies

Sustainability assurance measures



Support to the infrastructure

Unclear future

Unfit power system structure

Lack of standards

High infrastructure costs

INFRASTRUCTURE

TRANSPORT STORAGE

Support for green trucks and ships

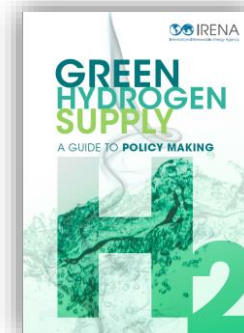
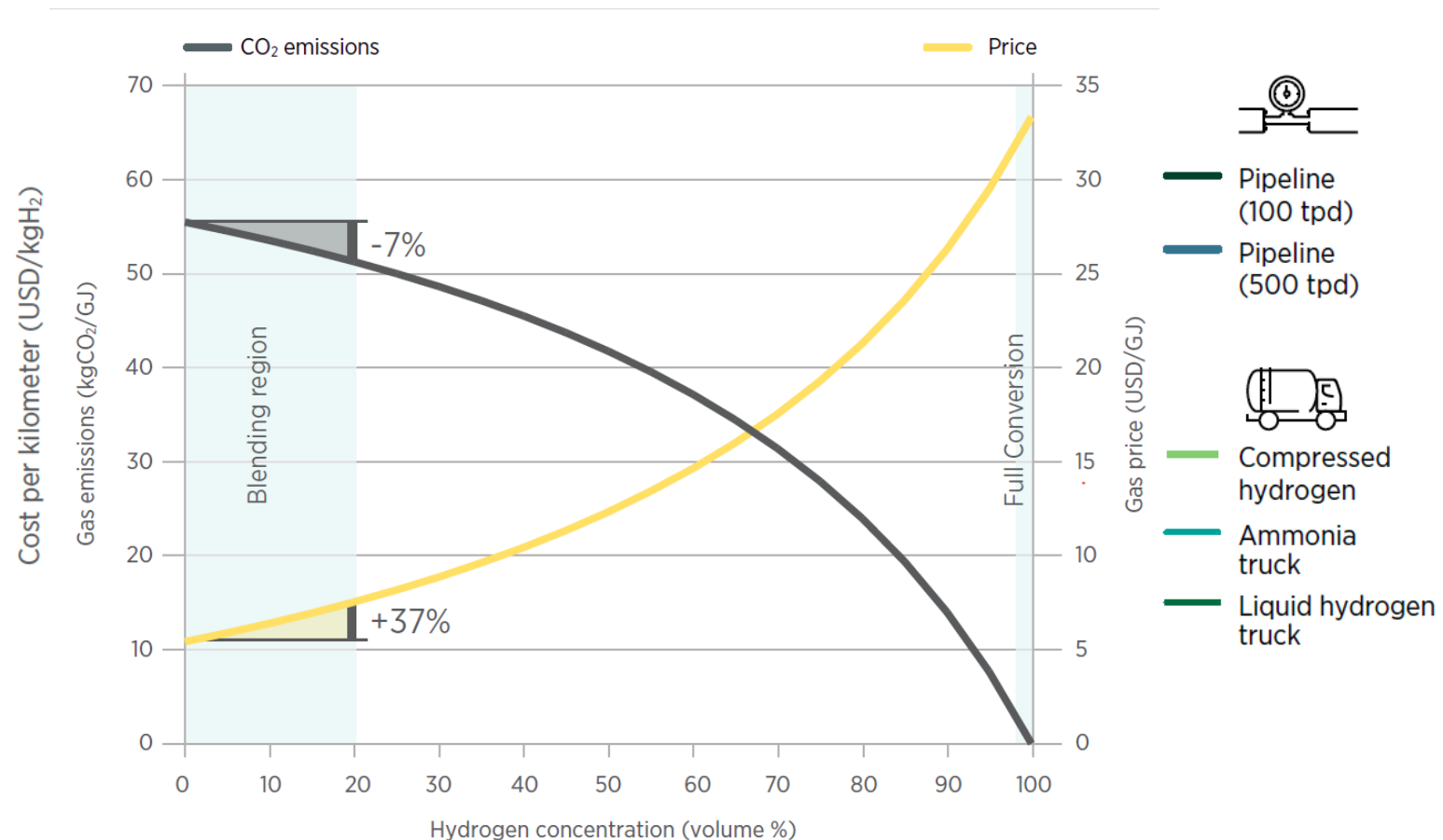
Seasonal storage support

Planning

Creation of standards

Financing

CO₂ benefit and gas price increase from blending and converting the gas grid to hydrogen
Costs for hydrogen transport as a function of the distance by selected transport mode



How to create demand?

Lack of demand

Unclear future



**GREEN HYDROGEN
OFFTAKE**

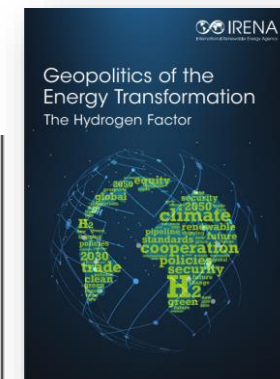
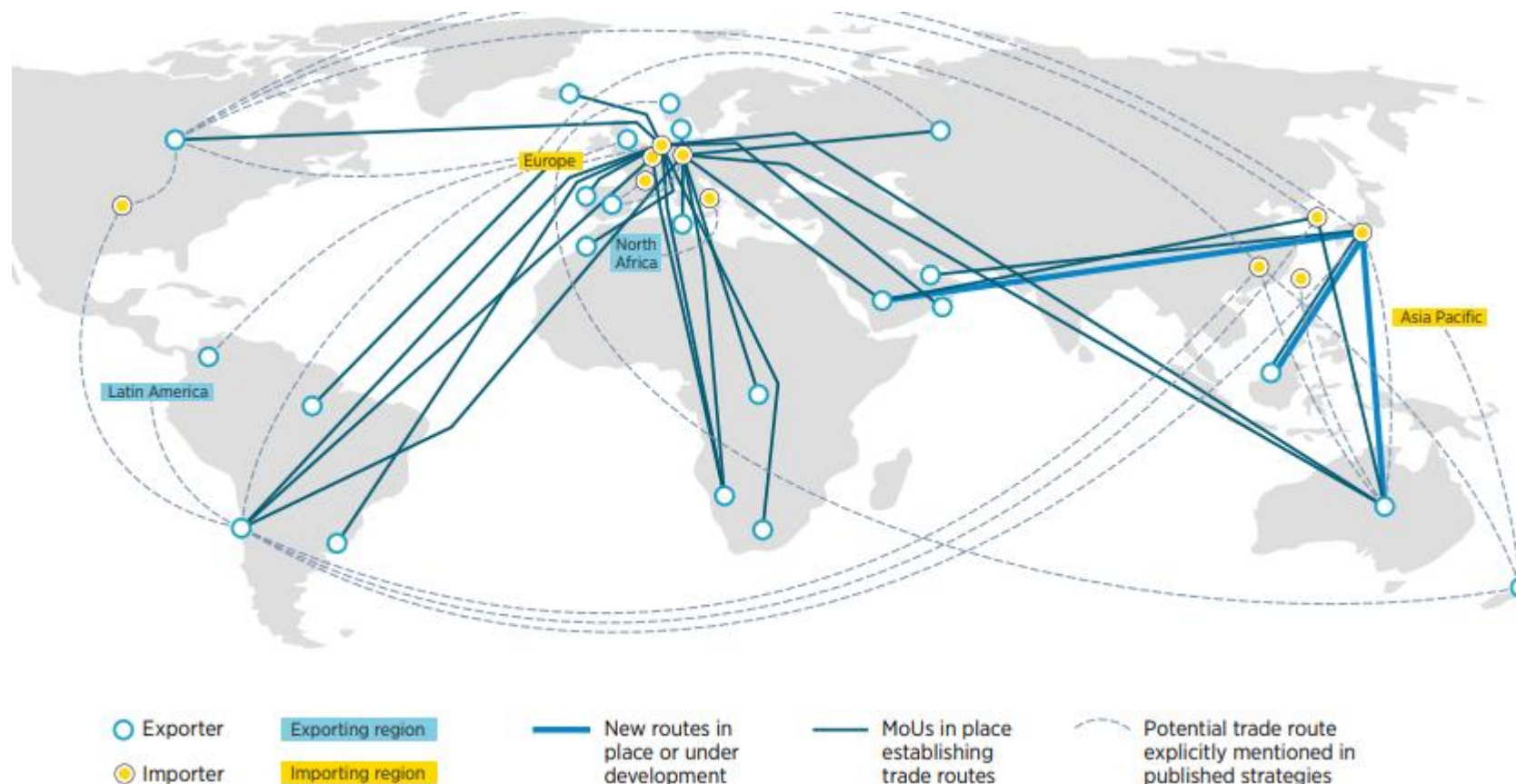
DEMAND

International agreements

Virtual blending

Gas targets

Envisaged trade routes for hydrogen as of 2022



How to decrease the costs of hydrogen?

Comparison between average auction results for solar PV globally (2010-2019) and green hydrogen cost range in 2020

Unfit power system structure

Grey and green hydrogen cost gap



GREEN HYDROGEN OFFTAKE

PRICE

Auctions

Green gas premium

Fiscal incentives

Ancillary market participation

