Global Status of Hydrogen

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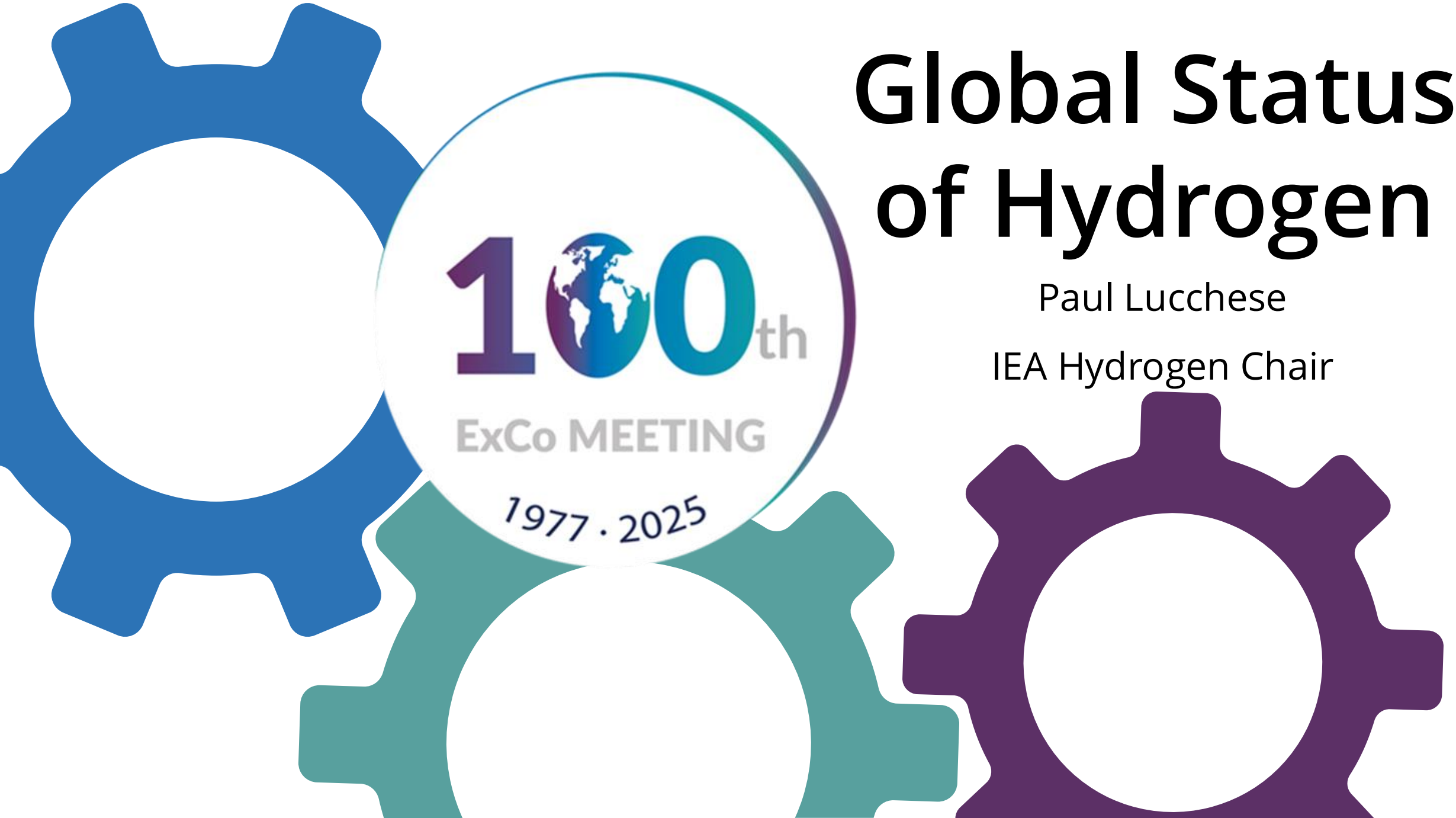
IEA Hydrogen Chair



IEA Hydrogen TCP In a nutshell

33

Members

26 Member Countries
+ New members Brazil Uruguay…
+ European Commission
7 Sponsors

47+

Tasks

7 Open
39 Finished
≅ **5** in definition

300+

Experts involved

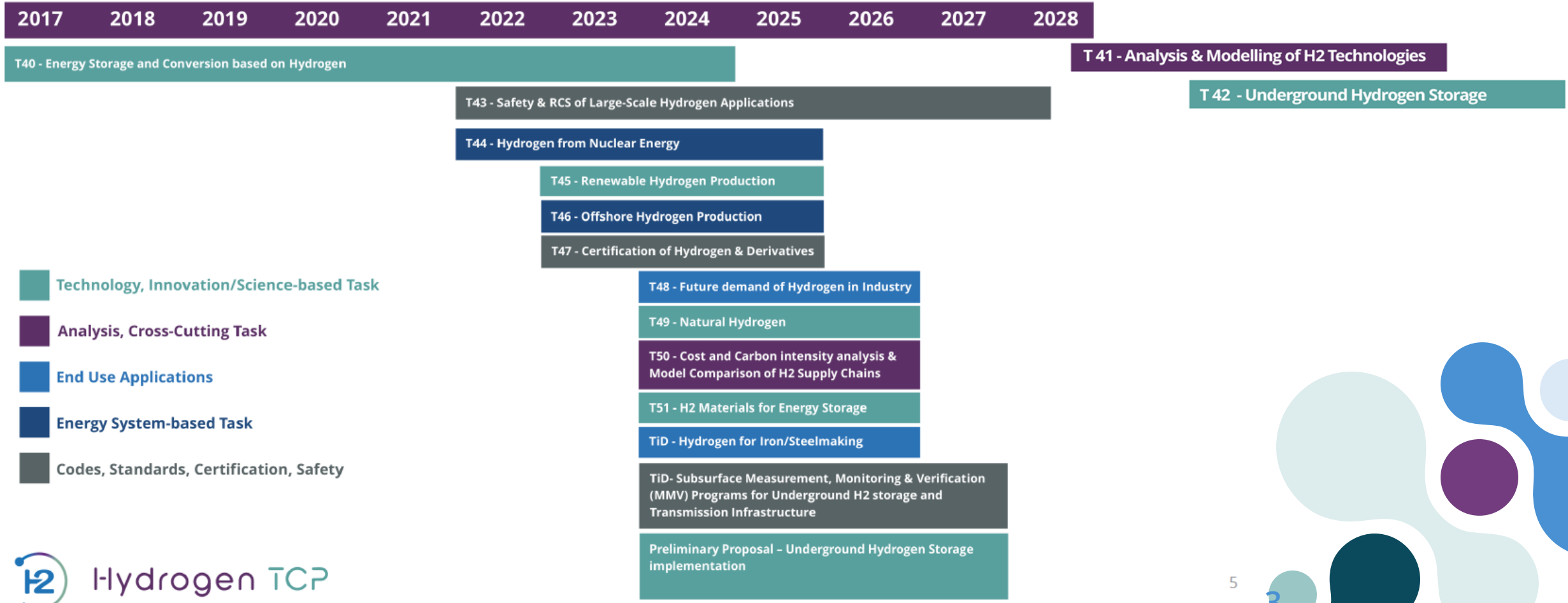
In collaborative research on hydrogen and hydrogen technologies

Current Tasks Portfolio

Tasks

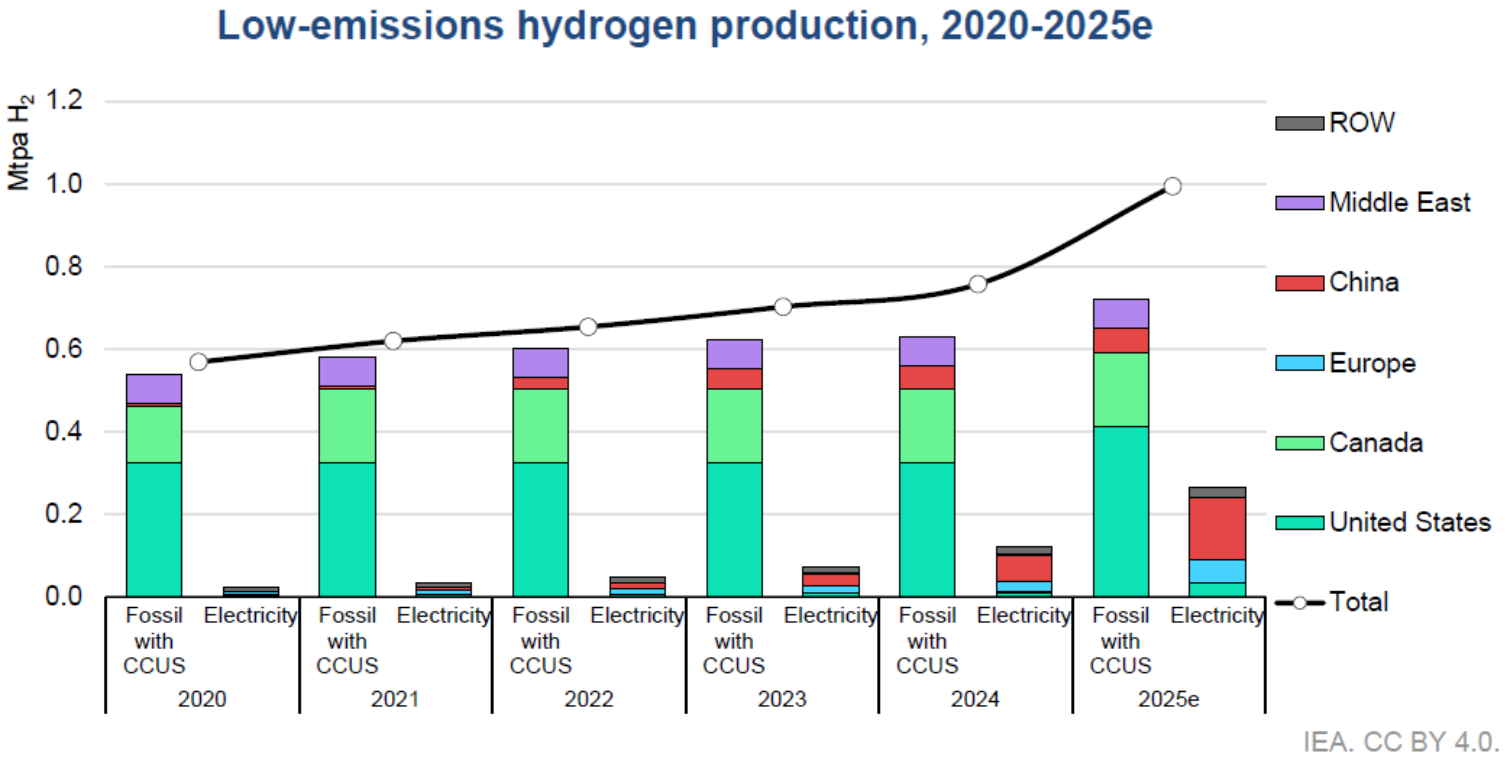
Consistently Generate Valuable Content

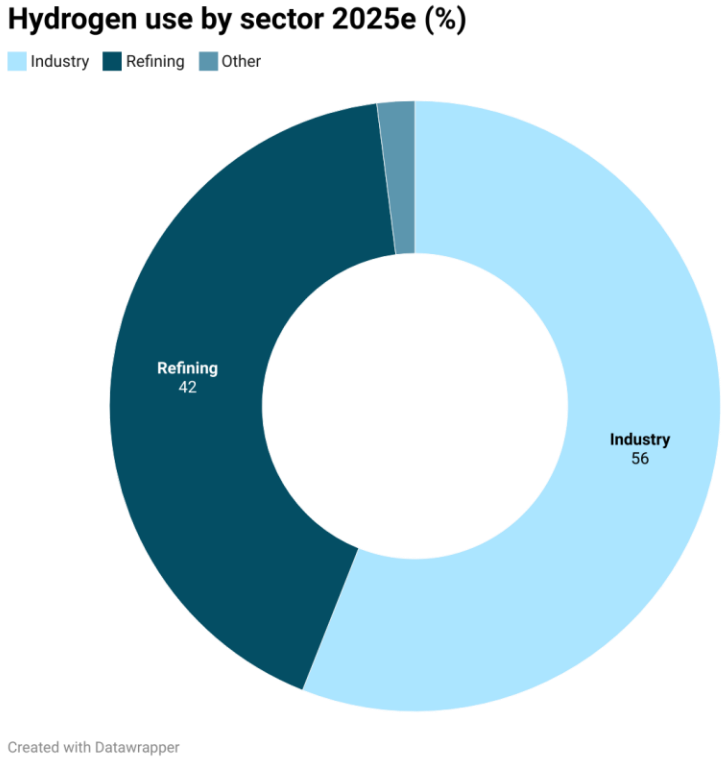
10 Open Tasks, 2 Tasks in Definition and 1 Preliminary Proposal



Hydrogen TCP

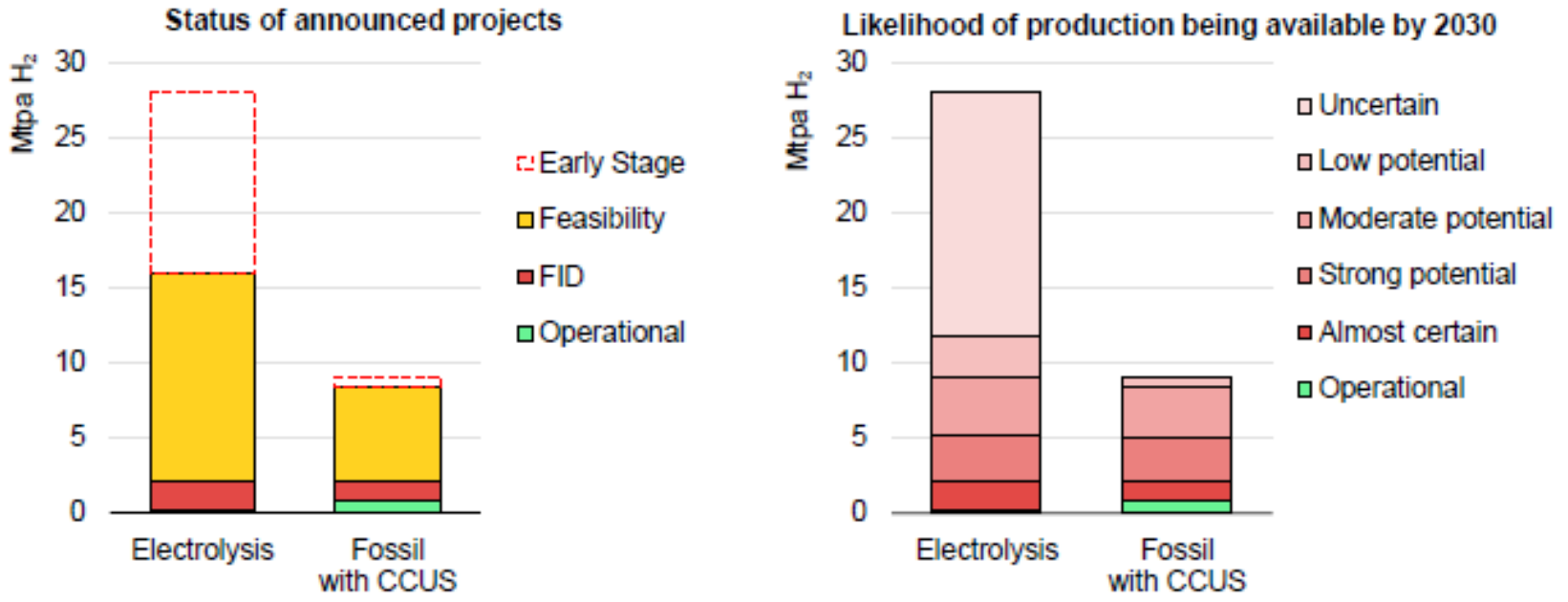
Around 25% of low-carbon hydrogen produced during 2025 was electrolytic. Uses mainly in industry and refining.





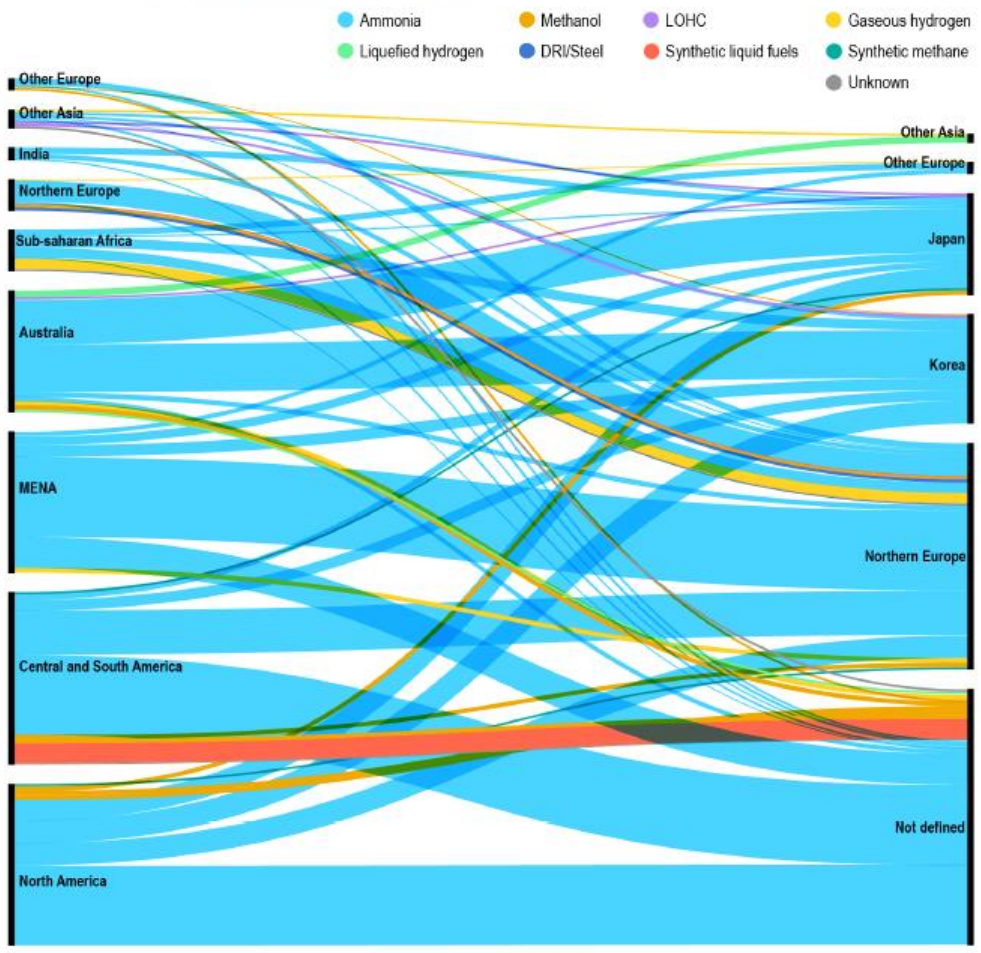
The pipeline of low-emissions production projects has shrunk, but a strong expansion by 2030 is still in sight

Low-emissions hydrogen production by technology, status and likelihood of being available by 2030, based on announced projects



Notes: FID = final investment decision; CCUS = carbon capture, utilisation and storage.
Source: IEA Hydrogen Production Projects Database (September 2025).

Bilateral trade flows of low-emissions hydrogen by carrier, excluding projects at earlier stages, 2030

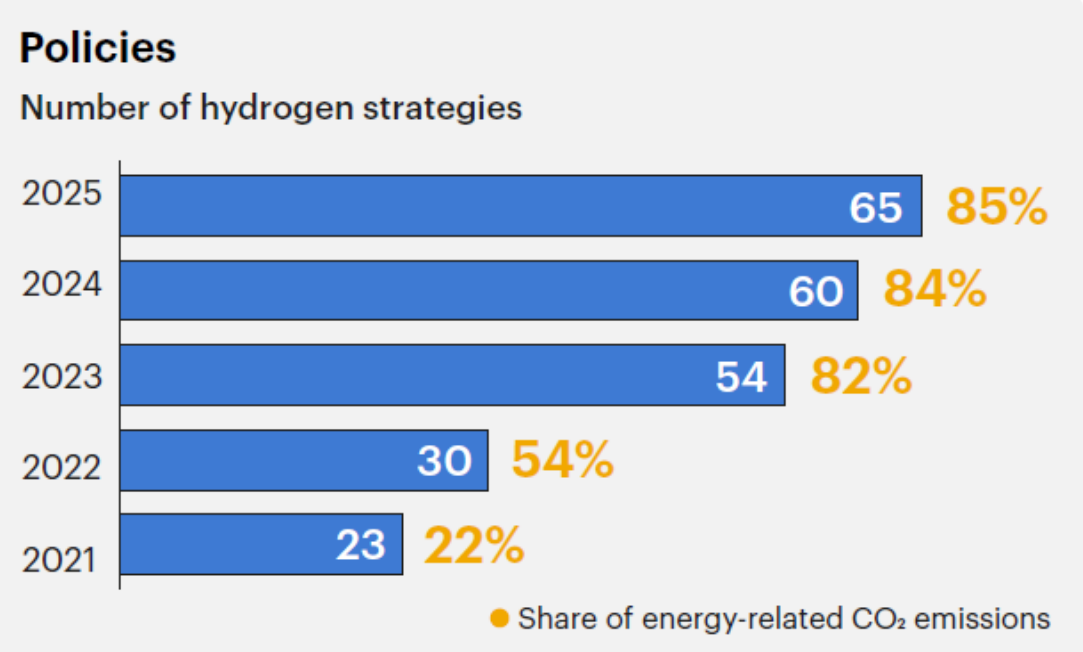


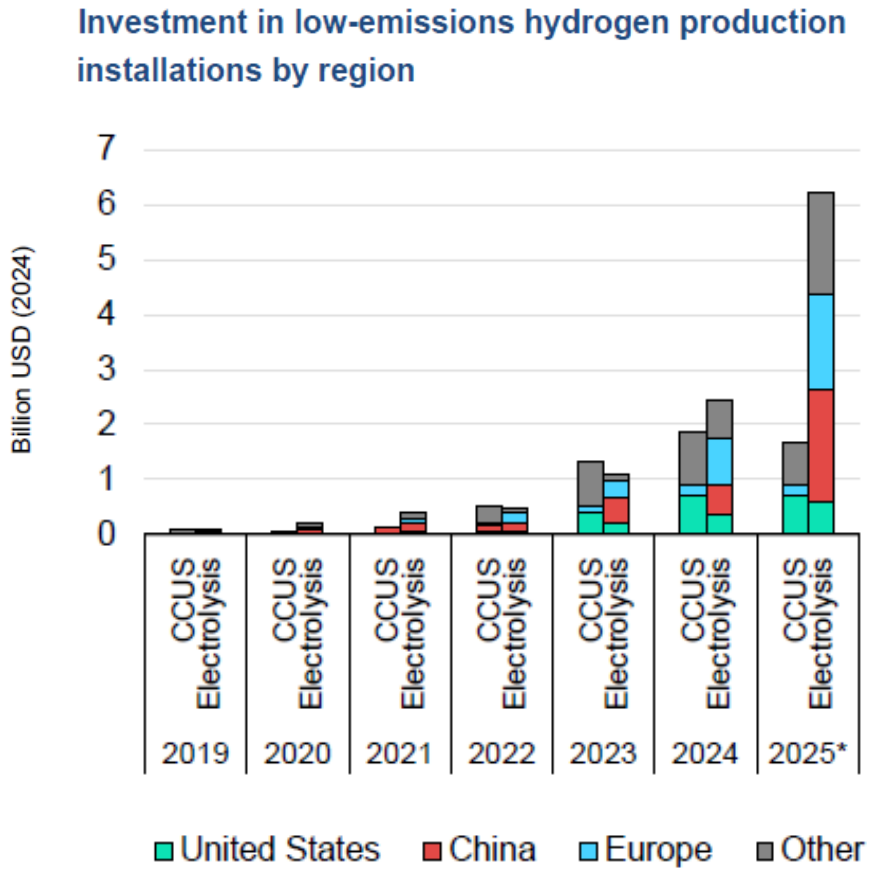
Notes: HBI = hot briquetted iron; LOHC = liquid organic hydrogen carrier. "Not defined" refers to projects for which the import destination has not been identified or disclosed. Earlier-stage projects that are not included are those that remain at the conceptual stage and have not yet progressed to feasibility studies. Total traded volume represented in the diagram corresponds to 9.6 Mtpa H_2-eq by 2030.

Source: IEA Hydrogen Production Projects Database (September 2025).

Hydrogen TCP

Hydrogen-related strategies continue to increase year by year, laying solid ground for the necessary investments





The Hydrogen TCP continously supports the development of the hydrogen economy through its targeted tasks

Task 40: Energy Storage and Conversion Based on Hydrogen

Task 43: Safety and RCS of Large Scale Hydrogen Energy Applications

Task 44: Hydrogen from Nuclear Energy

Task 45: Renewable Hydrogen Production

Task 46: Offshore Hydrogen Production

Task 47: Certification of Hydrogen and Derivatives

Task 48: Future Demand of Hydrogen in Industry

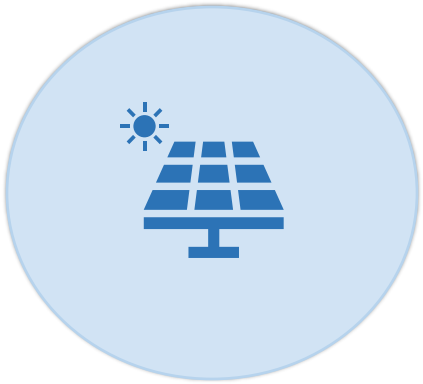
Task 49: Natural Hydrogen

Task 50: Cost and Carbon Intensity Analysis and Model Comparion of Hydrogen Supply Chains

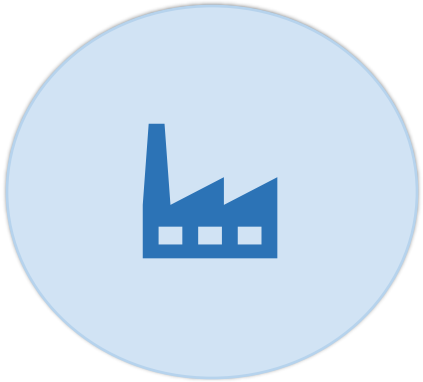
Task 51: Hydrogen Materials for Energy Storage

Current status of TRL development in IEA's surveyed hydrogen technologies

Production



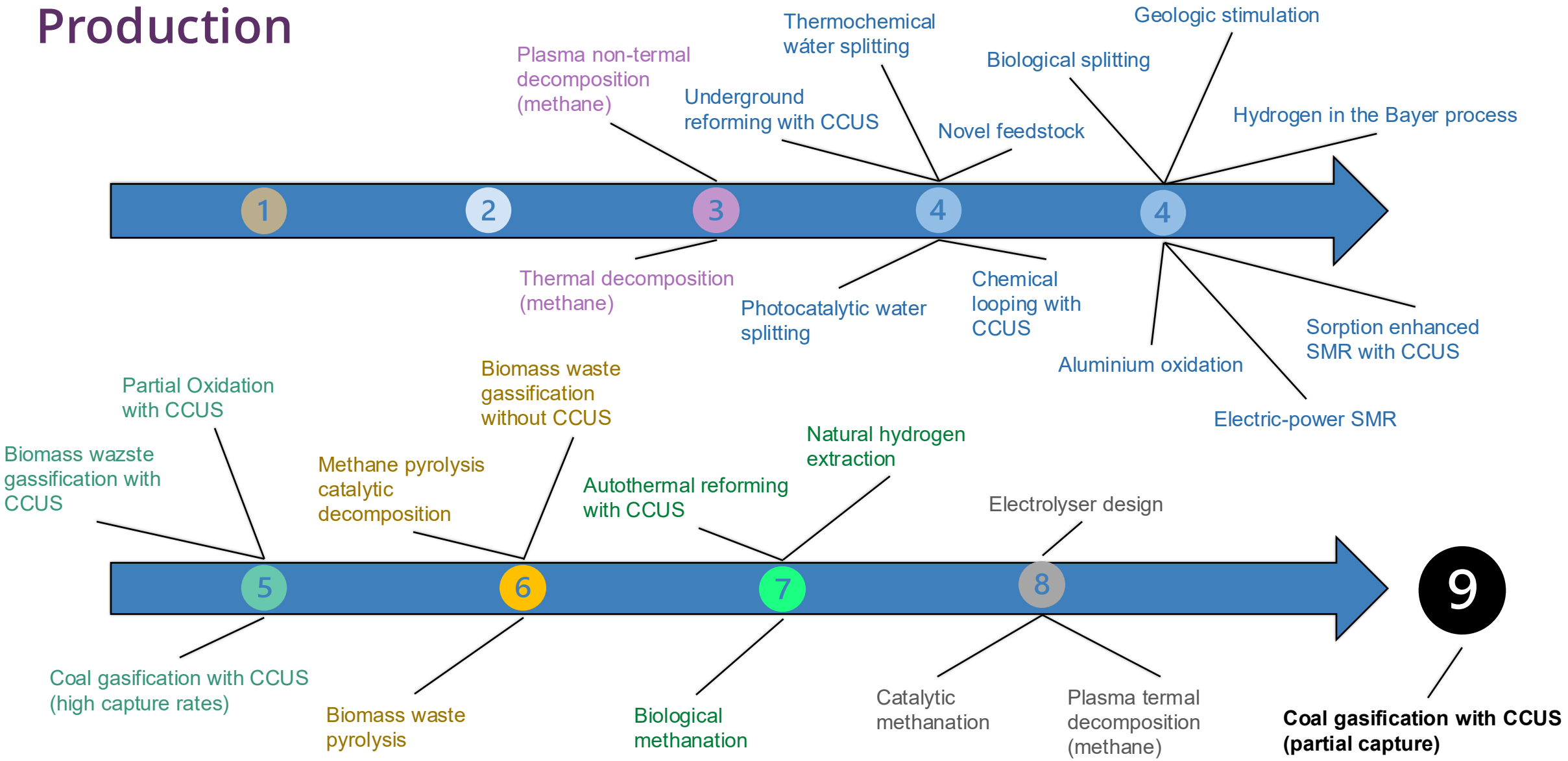
Industrial applications



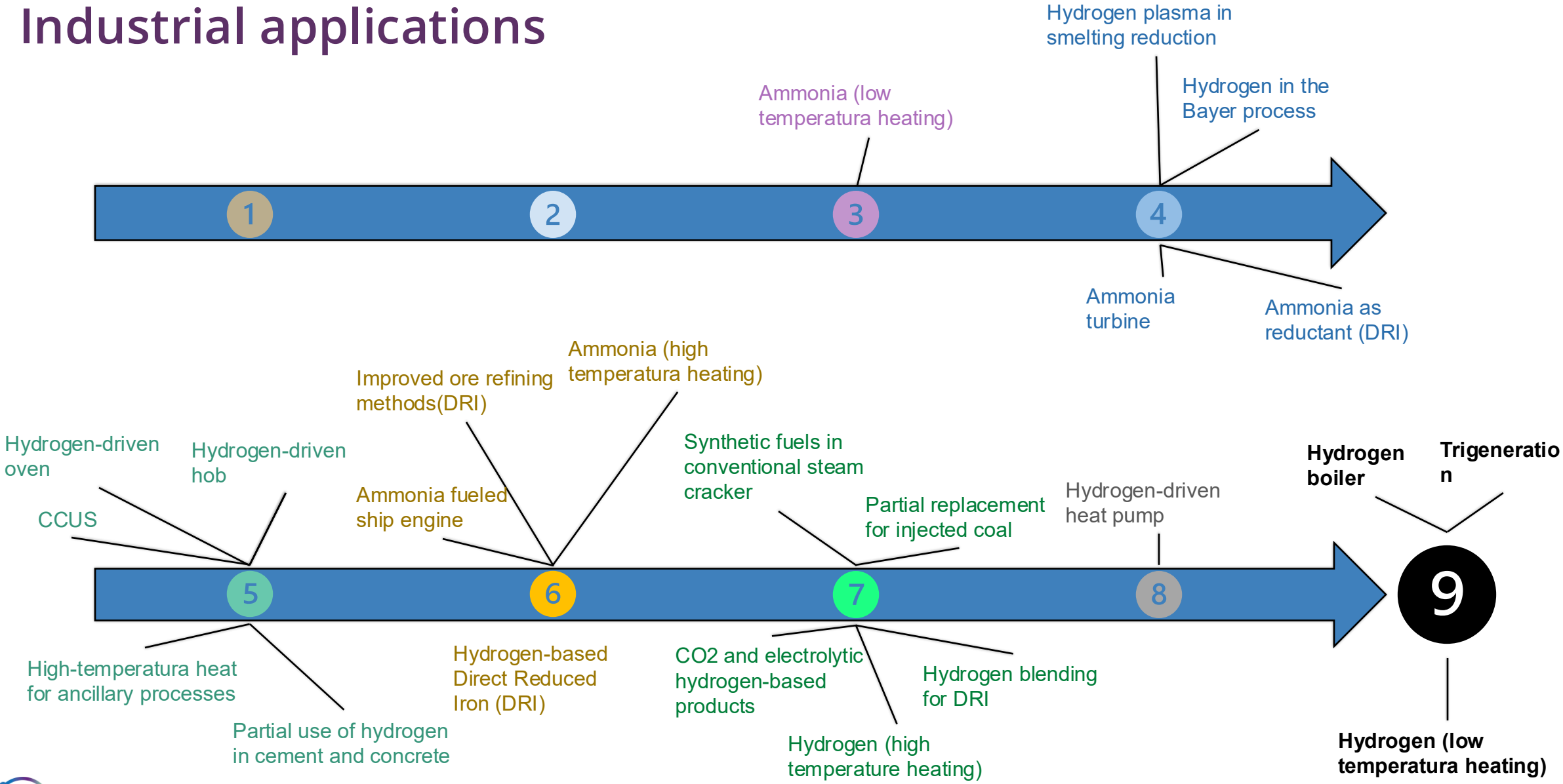
Storage

Transport, distribution and refueling

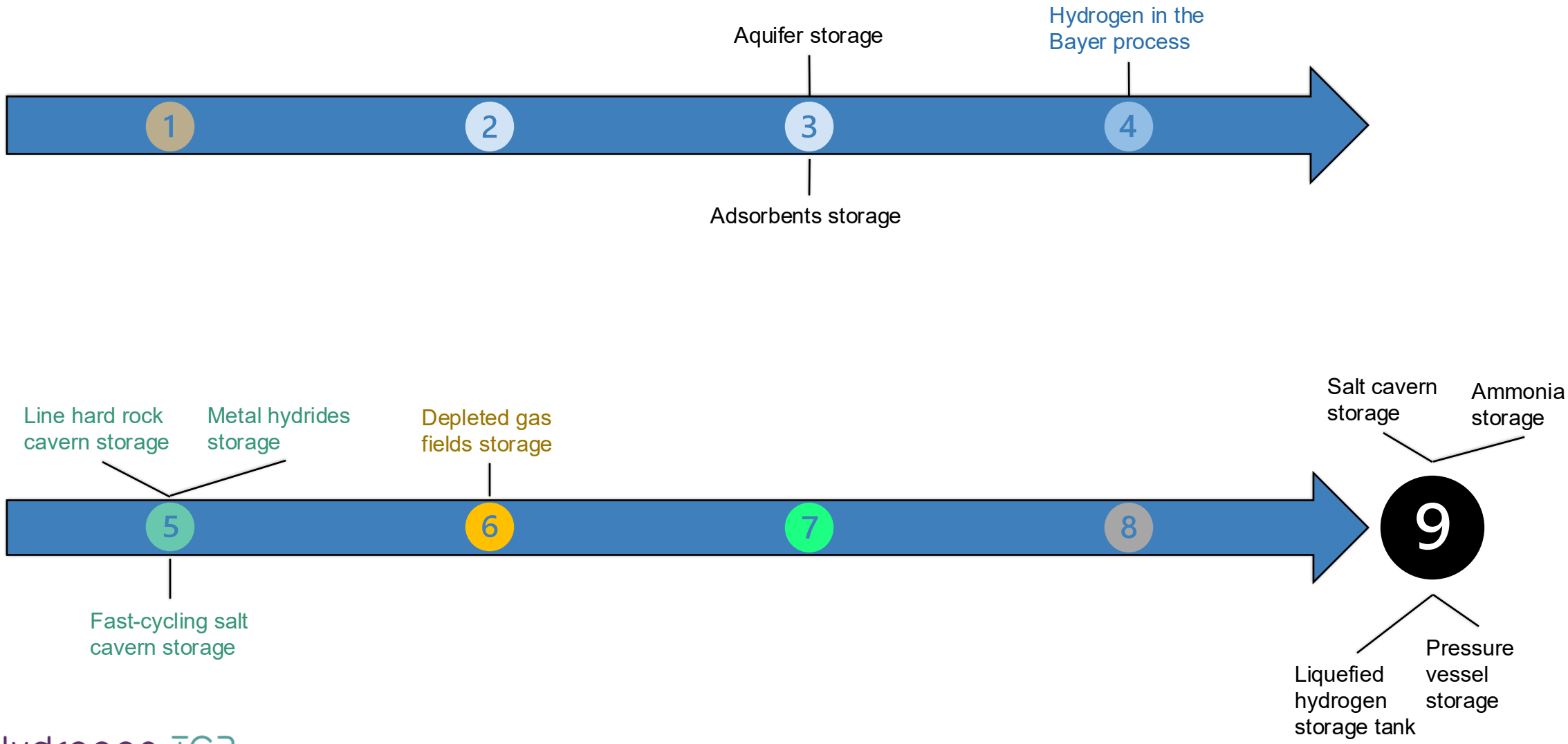
Production


Plasma non-termal decomposition (methane)
Underground reforming with CCUS
Thermochemical wáter splitting
Novel feedstock
Biological splitting
Geologic stimulation
Hydrogen in the Bayer process
1
2
3
4
4
Thermal decomposition (methane)
Photocatalytic water splitting
Chemical looping with CCUS
Aluminium oxidation
Sorption enhanced SMR with CCUS
Electric-power SMR
Partial Oxidation with CCUS
Biomass wazste gassification with CCUS
Biomass waste gassification without CCUS
Methane pyrolysis catalytic decomposition
Natural hydrogen extraction
Autothermal reforming with CCUS
Electrolyser design
5
6
7
8
9
Coal gasification with CCUS (high capture rates)
Biomass waste pyrolysis
Biological methanation
Catalytic methanation
Plasma termal decomposition (methane)
Coal gasification with CCUS (partial capture)

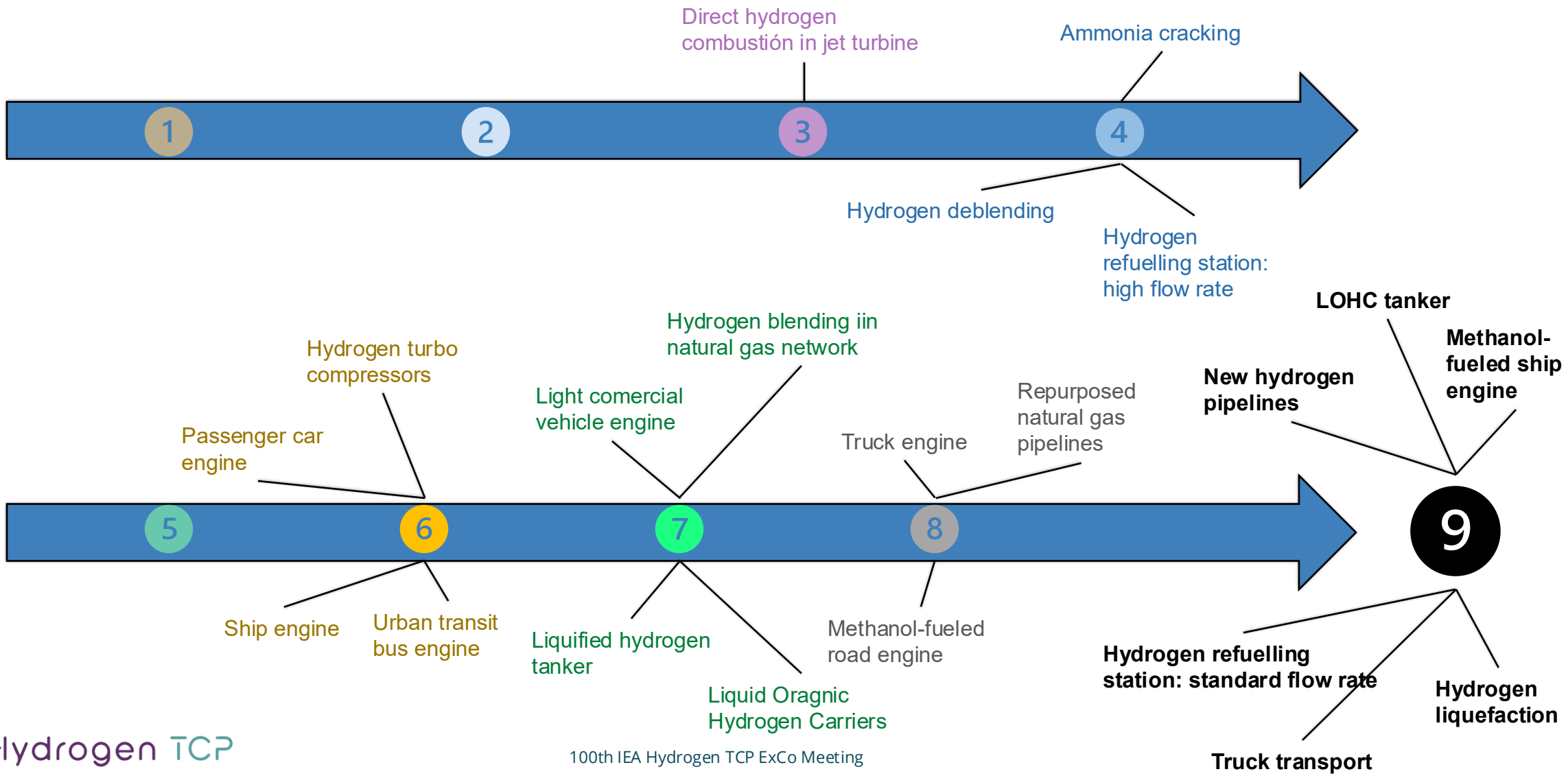
Industrial applications



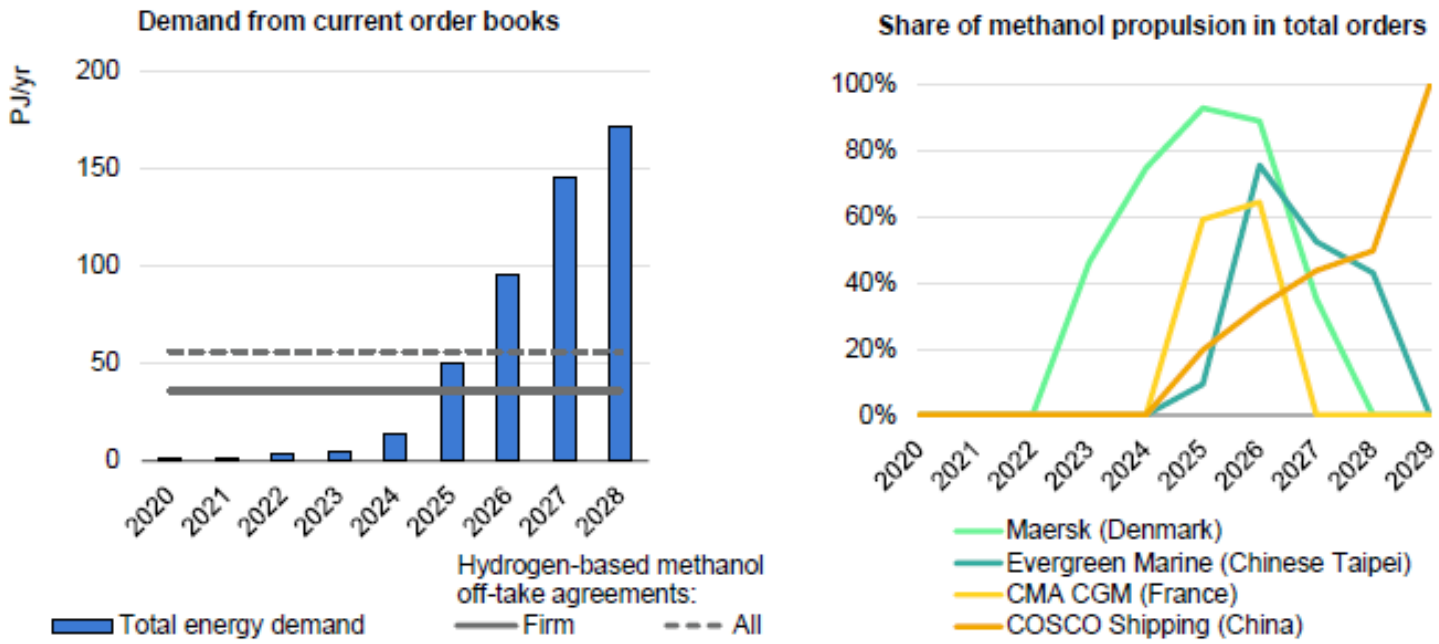
Storage


Aquifer storage
Hydrogen in the Bayer process
1
2
3
4
Adsorbents storage
Line hard rock cavern storage
Metal hydrides storage
Depleted gas fields storage
Salt cavern storage
Ammonia storage
5
6
7
8
9
Fast-cycling salt cavern storage
Liquefied hydrogen storage tank
Pressure vessel storage

Transport, distribution and refuelling



Energy demand from methanol-propulsion ships on order books, and share of methanol in order books for selected shipping companies, 2020-2028



Notes: Energy demand of dual-fuel methanol ships can be met with hydrogen-based methanol, biomethanol or oil. Only the offtake agreements for hydrogen-based methanol are shown on the figure. The supply for offtake agreements includes all known announcements, irrespective of their start-up date. Agreements are considered firm if they contain a contractual commitment. Shares of methanol in total orders are calculated based on gross tonnage.

Orders for methanol ships are slowing down amidst concerns around supply of low-emissions fuels.

“Marine applications for FC are at the first-of-a-kind comercial stage” – GHR 2025

Direct use of hydrogen is another alternative for decarbonising the shipping sector, but due to its lower volumetric energy density, hydrogen propulsion is not suited to long voyages

However, there are several applications where FC systems could play a significant role

Ammonia-fuelled vessels

Maiden voyages of ammonia-fuelled vessels using FC with onboard ammonia cracking (e.g. NH3 Kraken)

Source: Amogy

Short-range ferries

Fixed and repetitive routs suit hydrogen and FC (e.g. MF Hydra, Norway)

Source: Norled

Harbour and supply vessels

Tugboats and offshore supply vessels can integrate FC (e.g. ShipFC)

Source: ShipFC