



SCENARIO MAKING WITHIN THE FRAMEWORK OF GECF GLOBAL GAS OUTLOOK: HYDROGEN SCENARIO

Seyed Mohsen Razavi
The 1st IAEE Online Conference
7th – 9th June 2021



Disclaimer

This presentation is not intended as a substitute for your own judgment or professional advice for your business, investment, finance, or other activity. The analysis and views presented in this presentation are those of the author and do not necessarily reflect the views of GECF Member and Observer Countries.

Except where otherwise stated, the copyright and all other intellectual property rights in the contents of this presentation (including, but not limited to, designs, texts, and layout) are the property of GECF. As such, they may not be reproduced, transmitted, or altered, in any way whatsoever, without the express written permission of the GECF. Where the report contains references to materials from third parties, the GECF Secretariat will not be responsible for any unauthorized use of third party materials.

Table of content



About GECF 4

Introduction and basics 6

Technology status and new updates 13

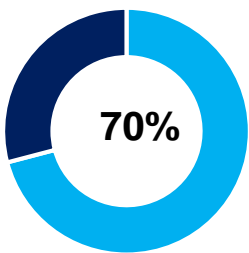
Hydrogen Scenario (2020) 17

Gas Exporting Countries Forum (GECF)



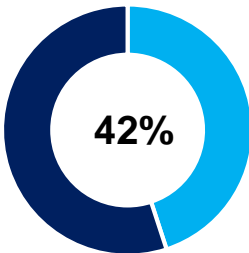
MEMBERS

Proven Natural Gas Reserves



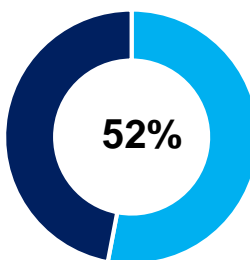
GECF: 144 tcm
World: 205 tcm

Marketed Gas Production



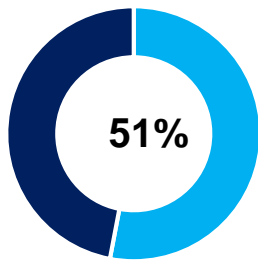
GECF: 1678 bcm
World: 3960 bcm

Pipeline Gas Exports

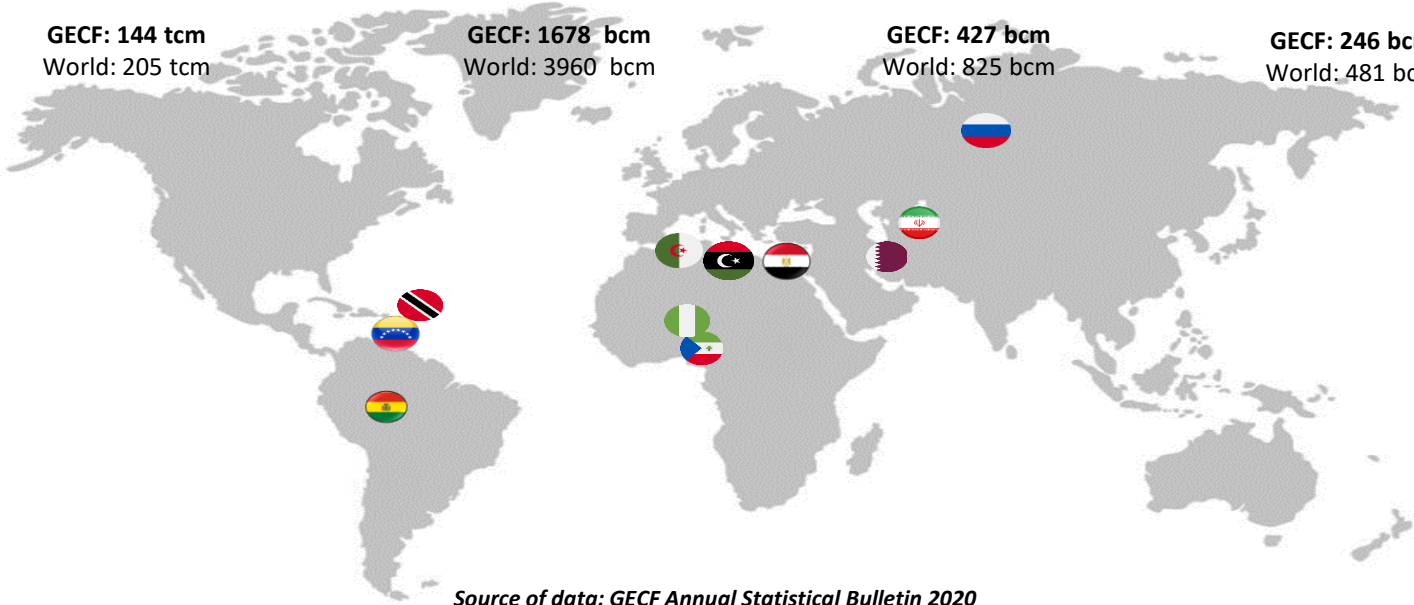


GECF: 427 bcm
World: 825 bcm

LNG Exports



GECF: 246 bcm
World: 481 bcm



Source of data: GECF Annual Statistical Bulletin 2020

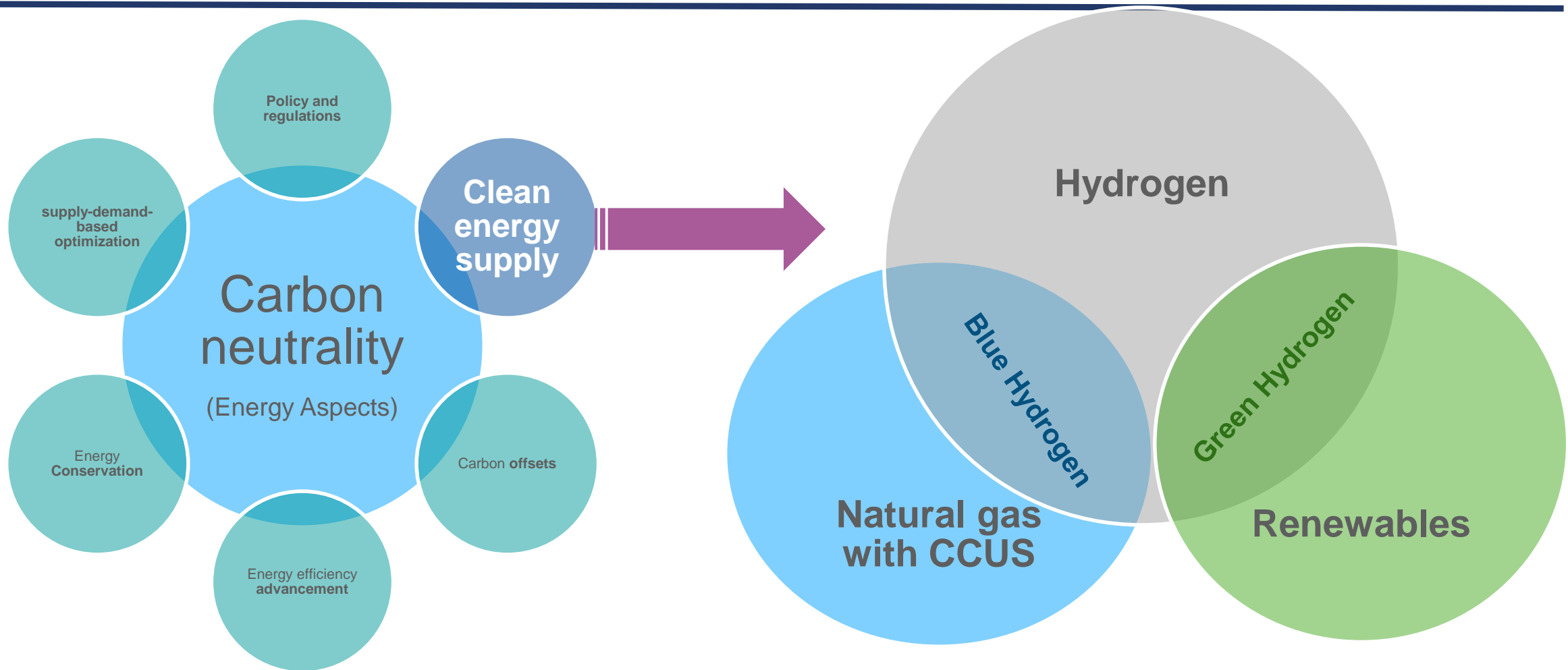
OBSERVERS

- Angola
- Azerbaijan
- Iraq
- Kazakhstan
- Malaysia
- Norway
- Peru
- United Arab Emirates

11

8

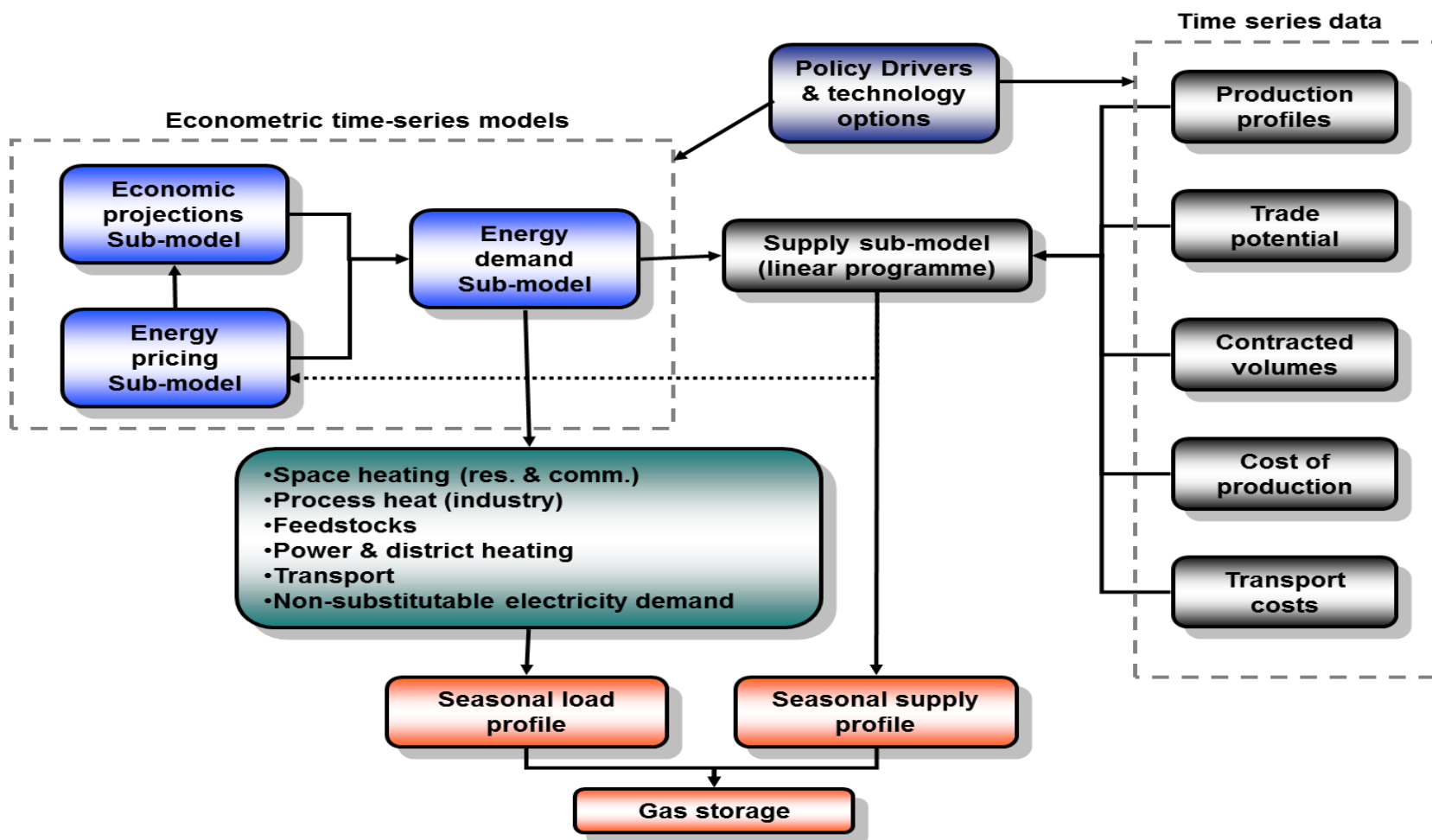
Carbon neutrality and the hydrogen role



Introduction and basics

GECF Reference Technology Map and the Hydrogen production spectrum

Model Architecture

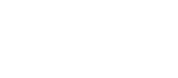


Source: IHS Markit

The GGM provide energy projections on 34 energy sectors



- Final Sectors
 - Industry
 - Iron & Steel
 - Chemical
 - Construction
 - Mining & Quarrying
 - Non-Ferrous Metals
 - Non-Metallic Minerals
 - Other Manufacturing
 - Feedstocks
 - Domestic
 - Residential
 - Commercial
 - Agricultural, Forestry and Fishing
 - Transport
 - Motorbikes
 - Passenger Cars
 - Light Commercial Vehicles
 - Heavy Goods Vehicles
 - Rail
 - Aviation
 - International Aviation
 - Domestic Aviation



- Shipping
 - International Bunkers
 - Inland and Inshore Bunkers
- Other (incl. pipelines)
- Transformation Sectors
 - Power
 - Central Generation
 - CHP
 - District Heating/Cooling
 - Refineries
 - Conventional Refineries
 - Condensate Splitters
 - Gas-to-Liquids
 - Coal-to-Liquids
 - Biofuel Refining
 - Energy
 - Own-Use
 - Transmission & Distribution Losses
 - Gas Works Gas
 - Non-Energy
 - Other Uses

The GGM provide energy projections of 35 fuels



- Electricity
- Natural Gas
- Coal
 - Steam Coal
 - Lignite/Brown Coal
 - Coking Coal



- Crude
 - Crude Oil
 - Condensate
 - NGL



- Natural Gasoline



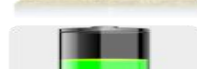
- Oil Products
 - Gasoline
 - Aviation Gasoline



- Gasoil
 - Diesel
 - Heating Oil
- Fuel Oil



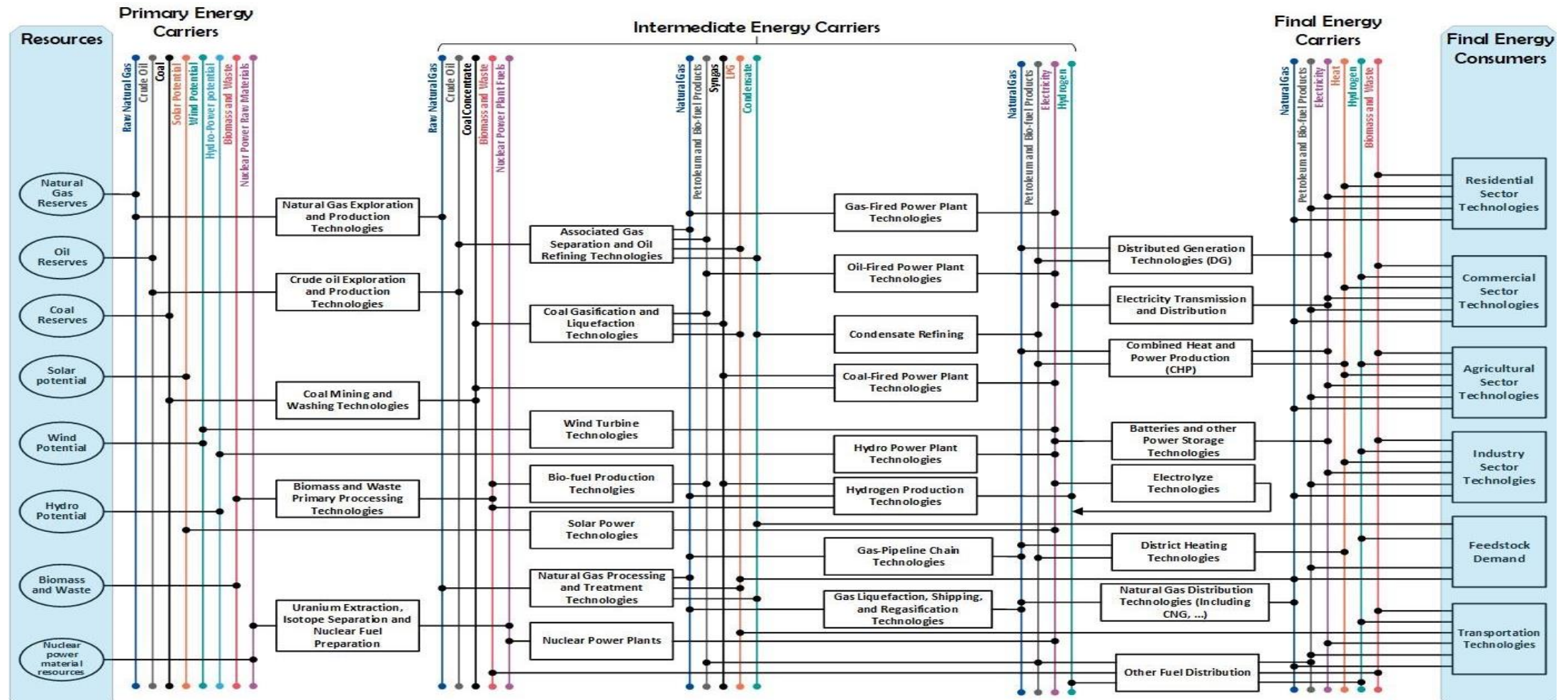
- LPG
- Naphtha
- Jet
- Kerosene
- Other Liquids



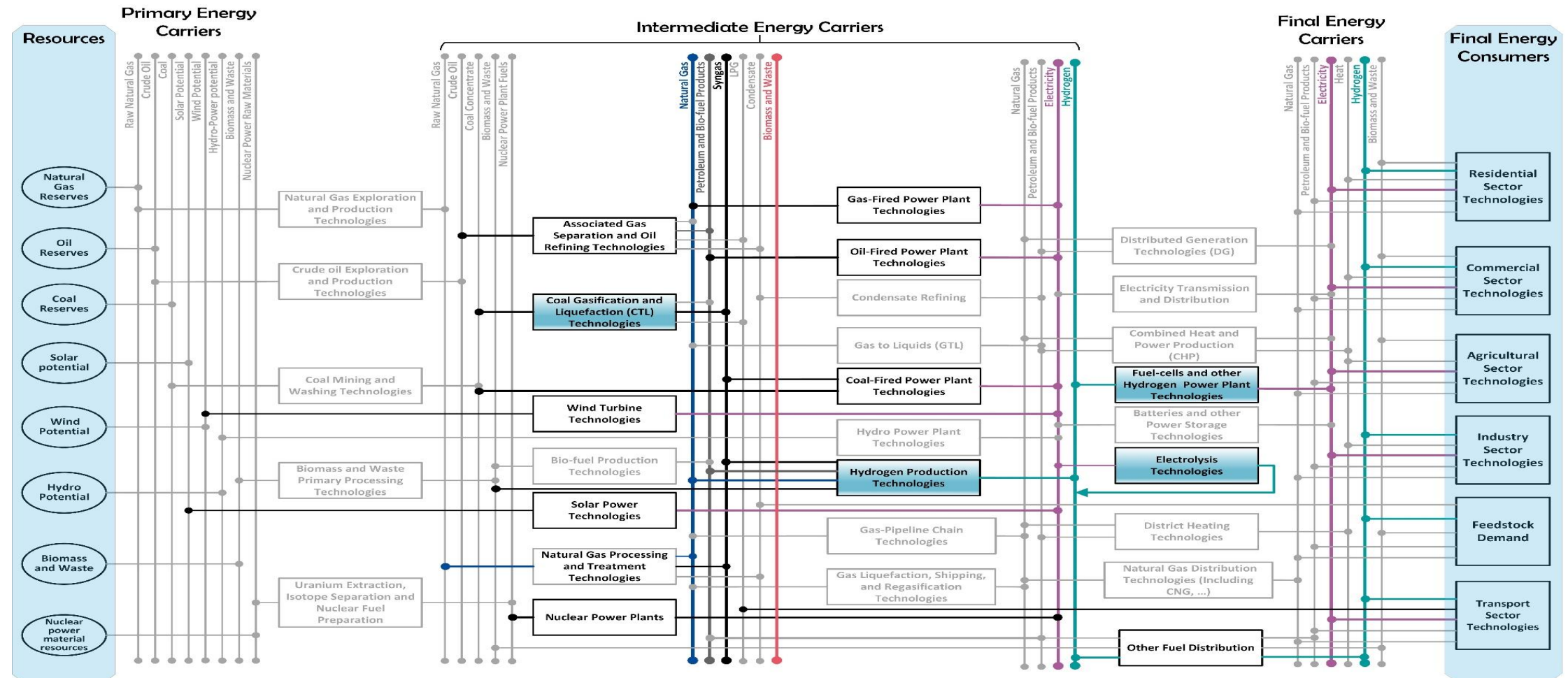
- Thermal Renewables
- Primary Electricity
 - Nuclear
 - Hydro
 - Geothermal
 - Tidal
 - Solar
 - Photovoltaic
 - Concentrated Solar Power
 - Wind
 - Onshore
 - Offshore
- Secondary Electricity
 - Pump Storage
 - Batteries
- Biomass & Waste
 - Ethanol/Biogasoline
 - Biodiesel
 - Biojet
 - Other Biomass

• **Hydrogen**

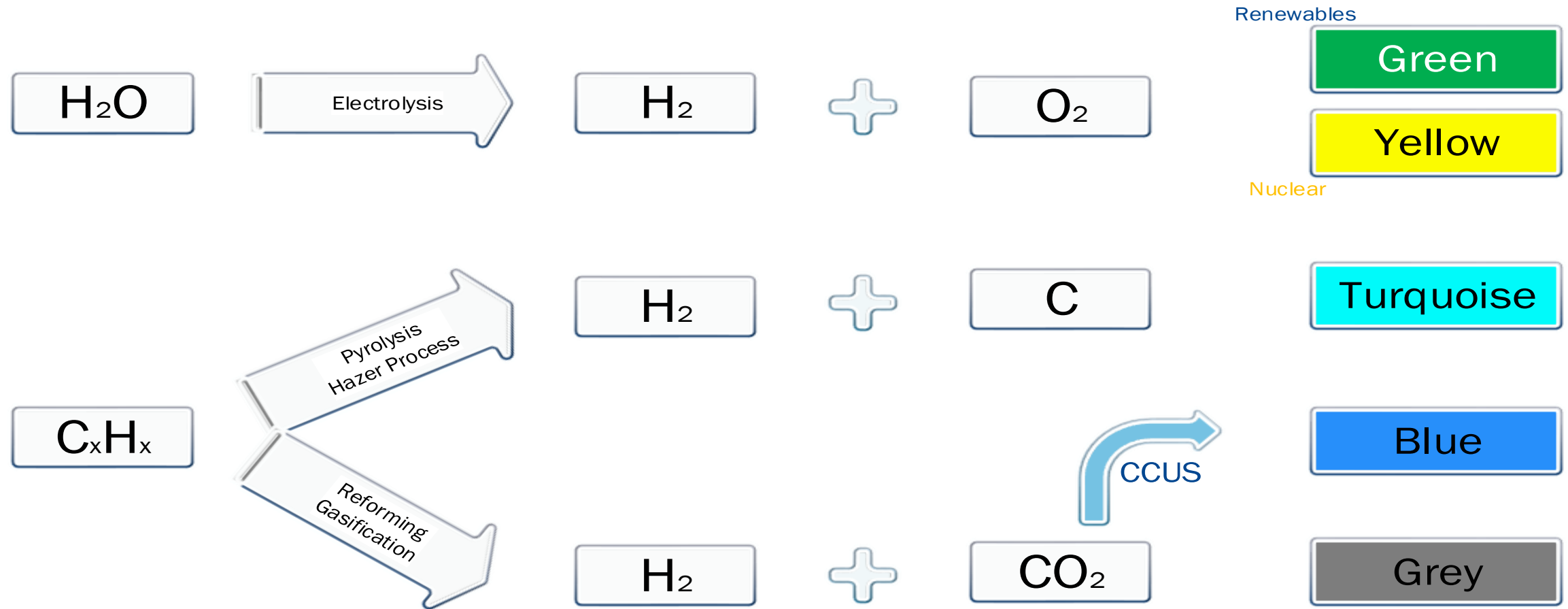
GECF Reference Technology Map



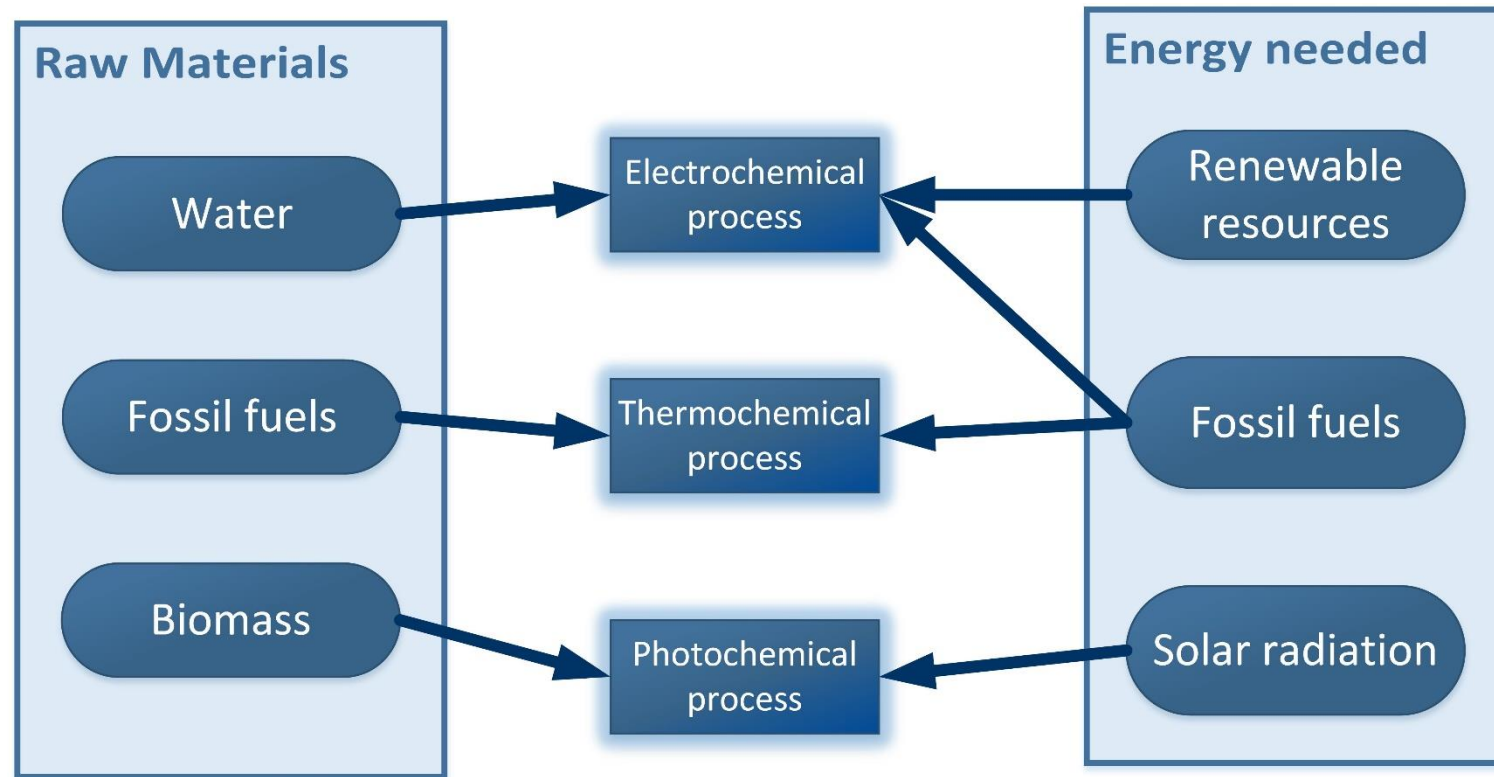
GECF Reference Technology Map



Hydrogen production spectrum

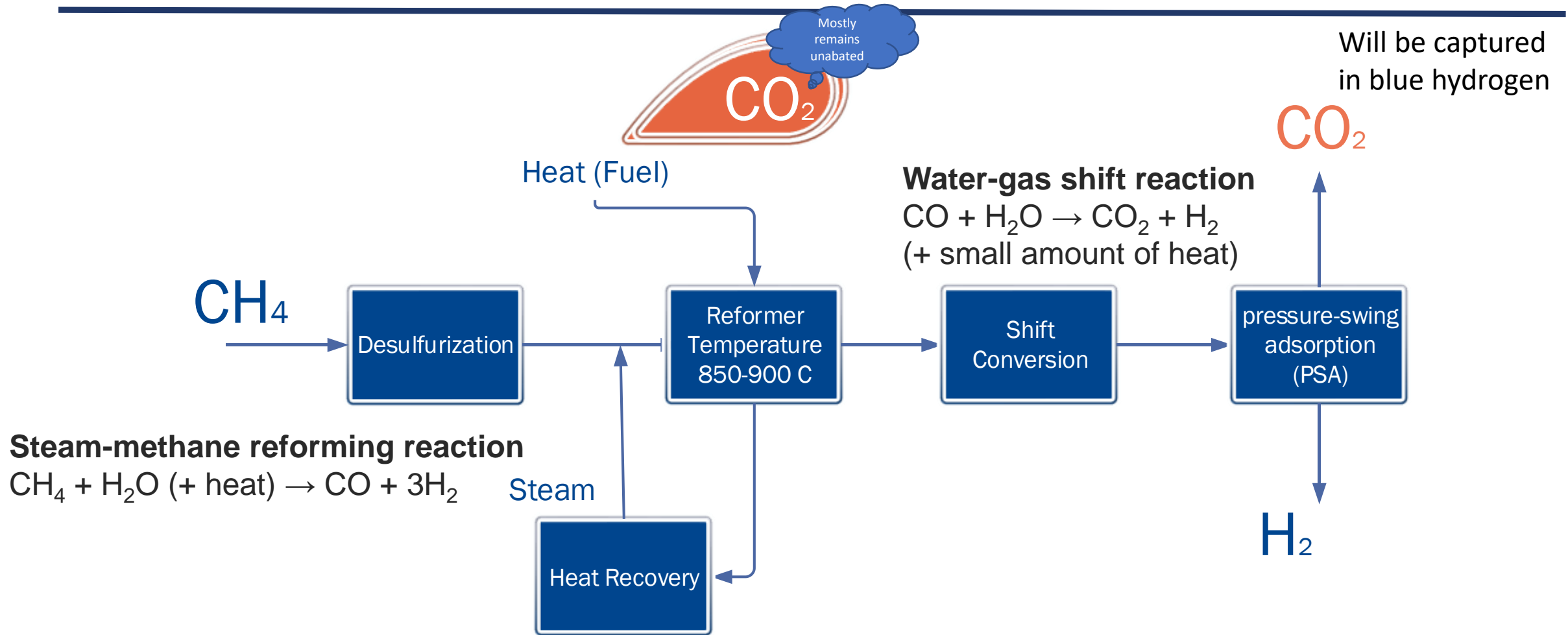


Hydrogen source map

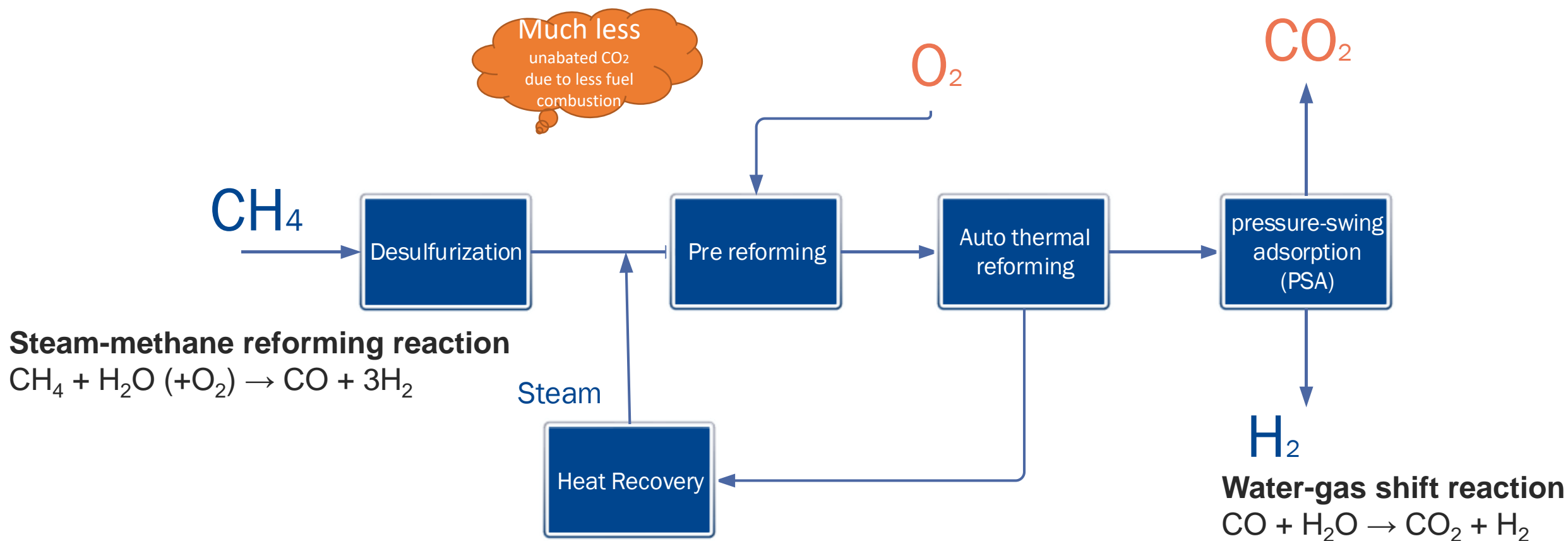


Technology Status

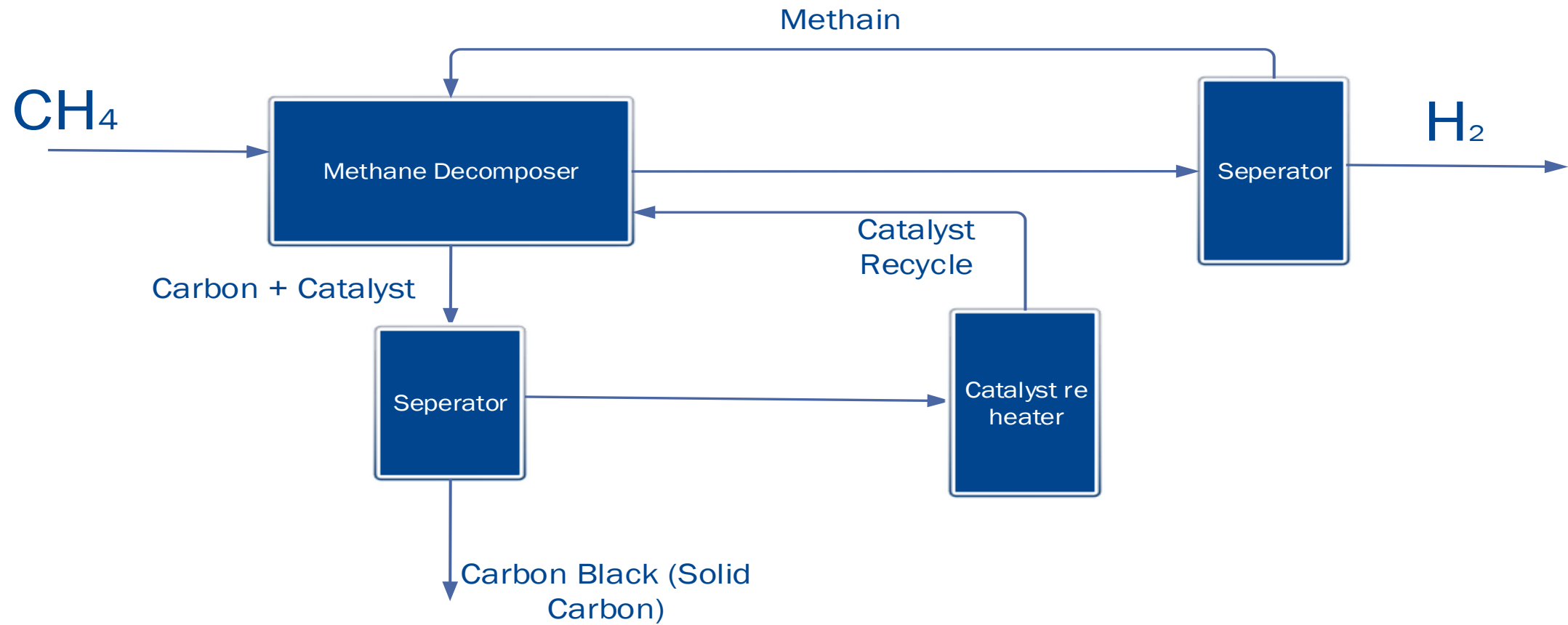
Steam Methane Reforming



Autothermal reforming

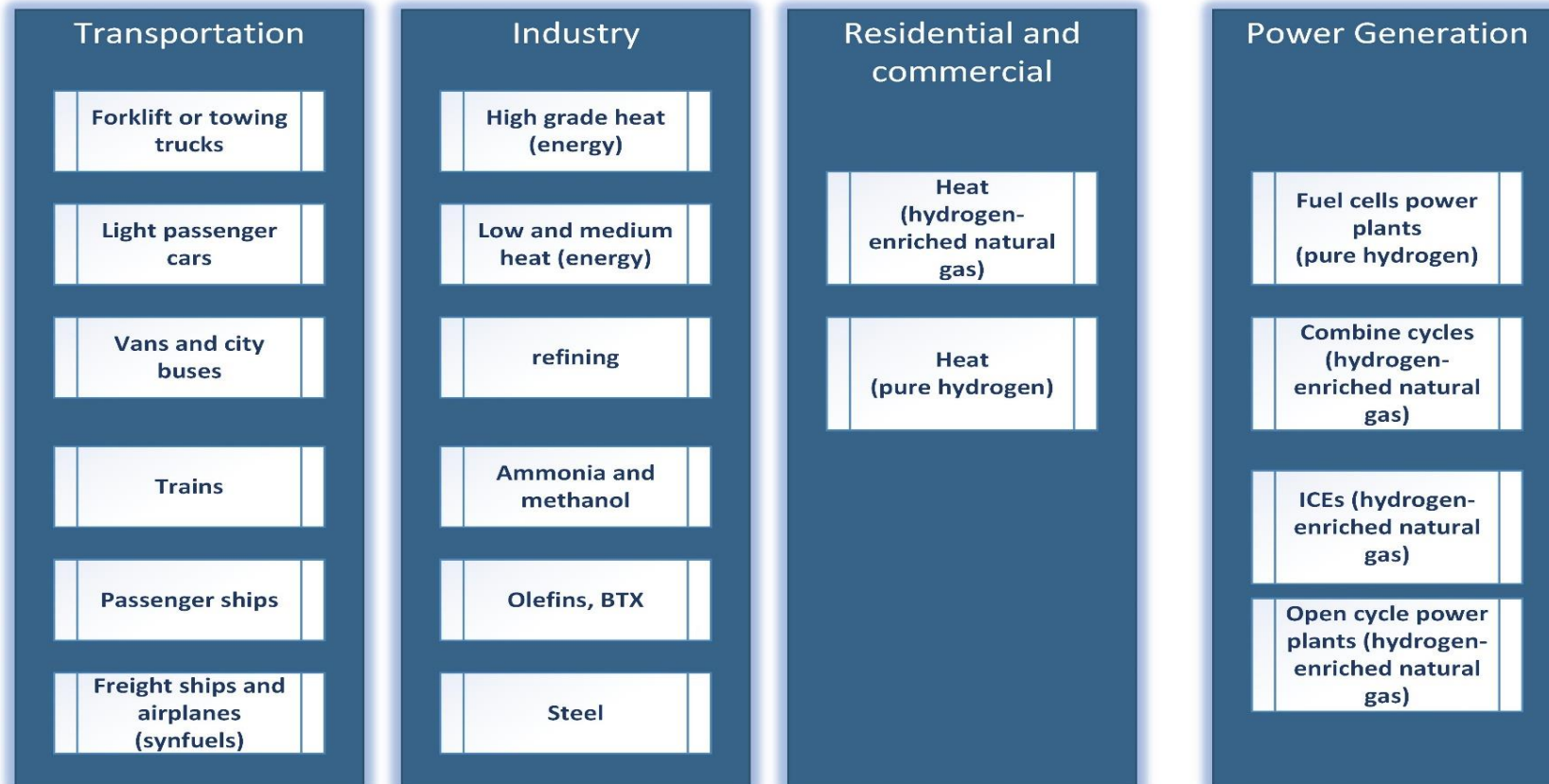


Pyrolysis



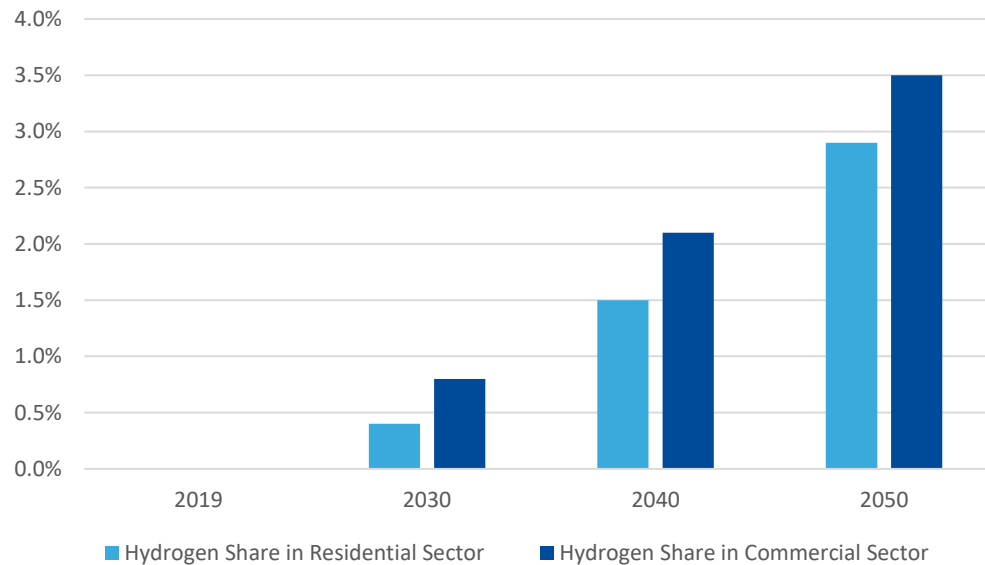
Hydrogen Scenario (2020)

Hydrogen consumer sectors (potential and existing)

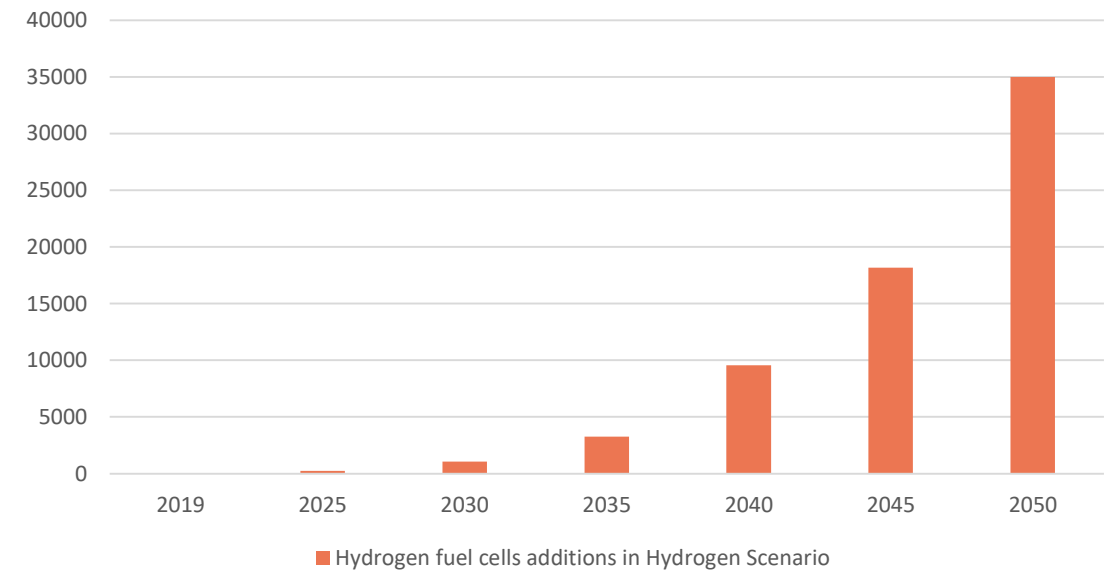


Building and Power sectors

Hydrogen share in building sector

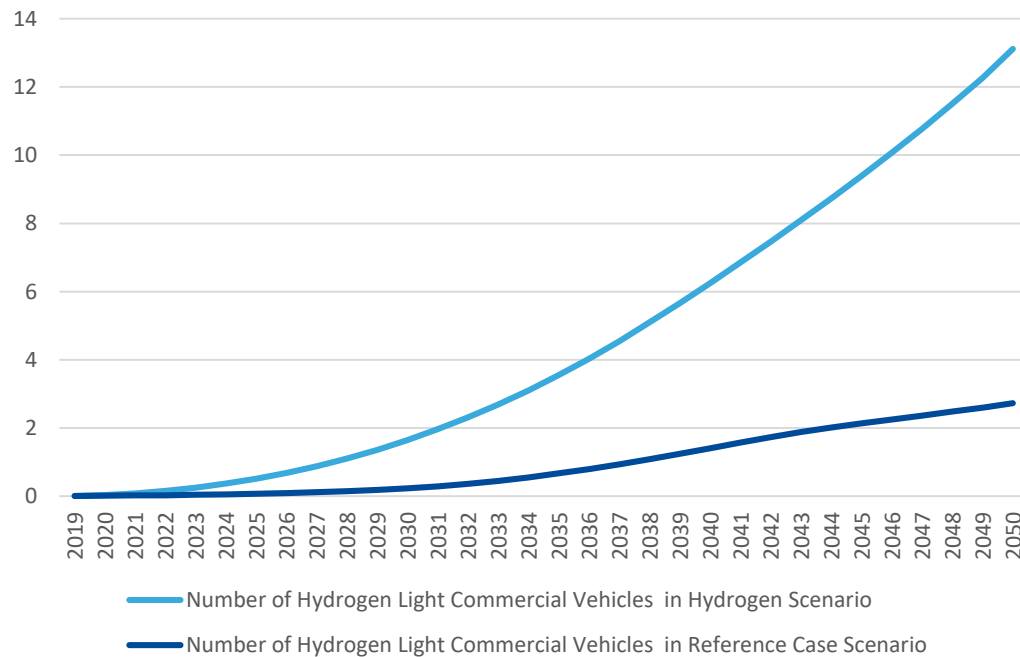


Hydrogen fuel cells power in Hydrogen Scenario (MW)

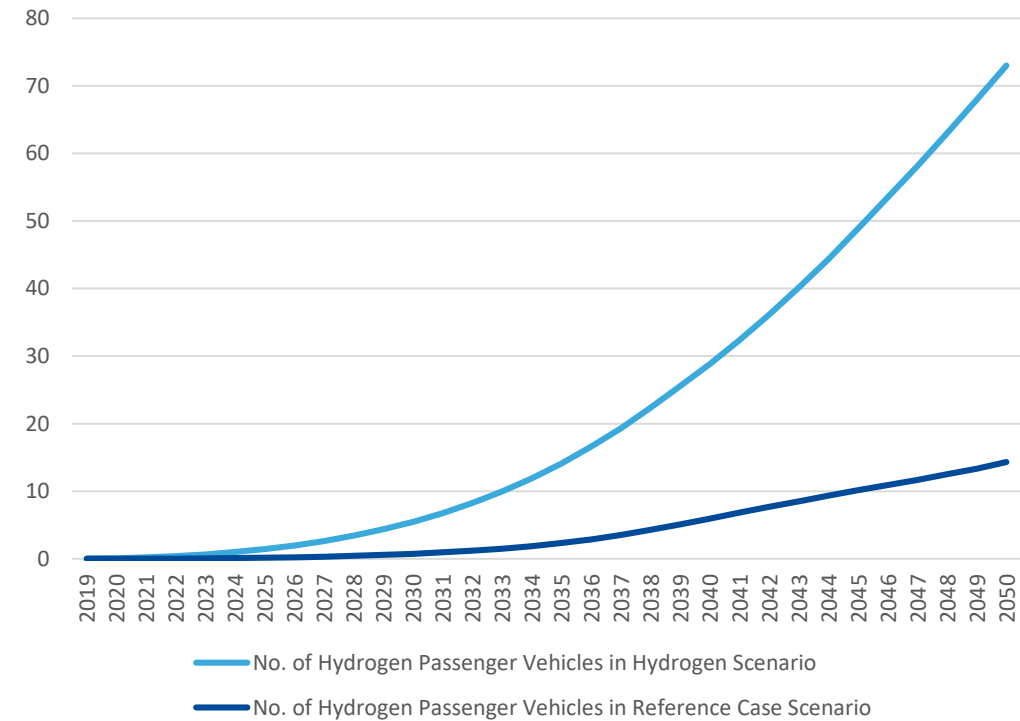


Transport Sector

Number of Hydrogen Light Commercial Vehicles
(Million)

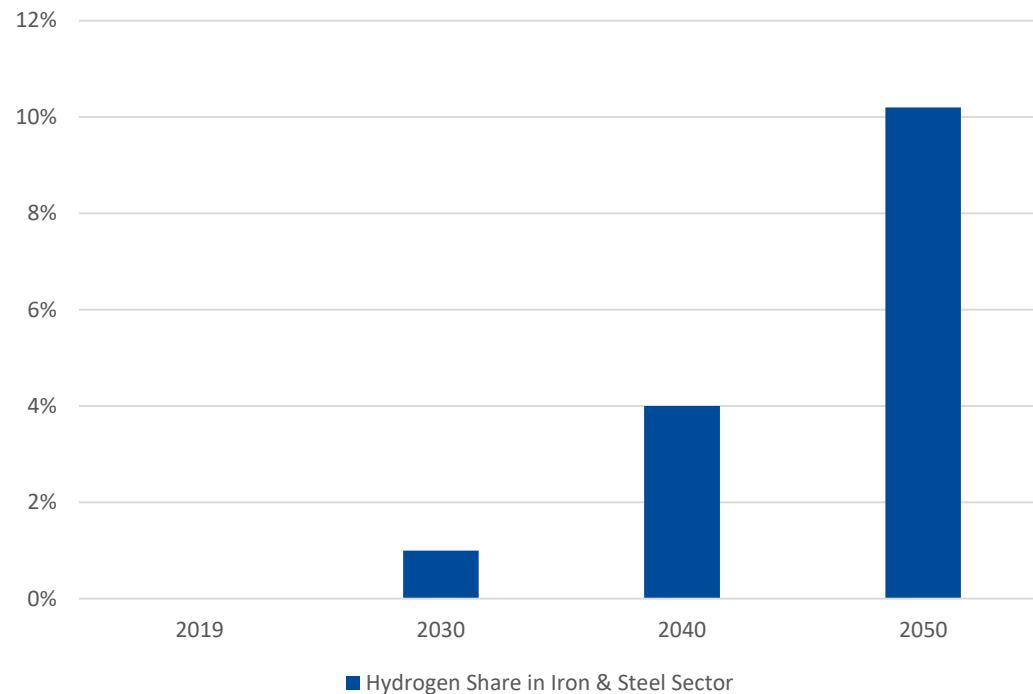


Number of Hydrogen Passenger Vehicles (Million)

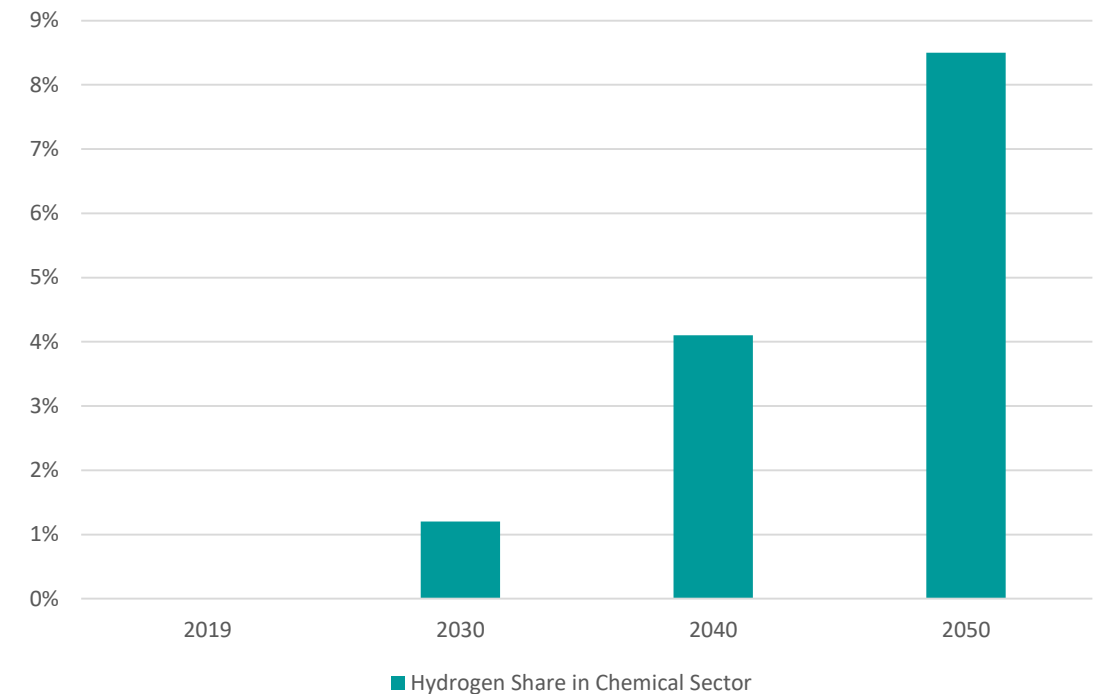


Industry Sector

Hydrogen Share in Iron & Steel Sector

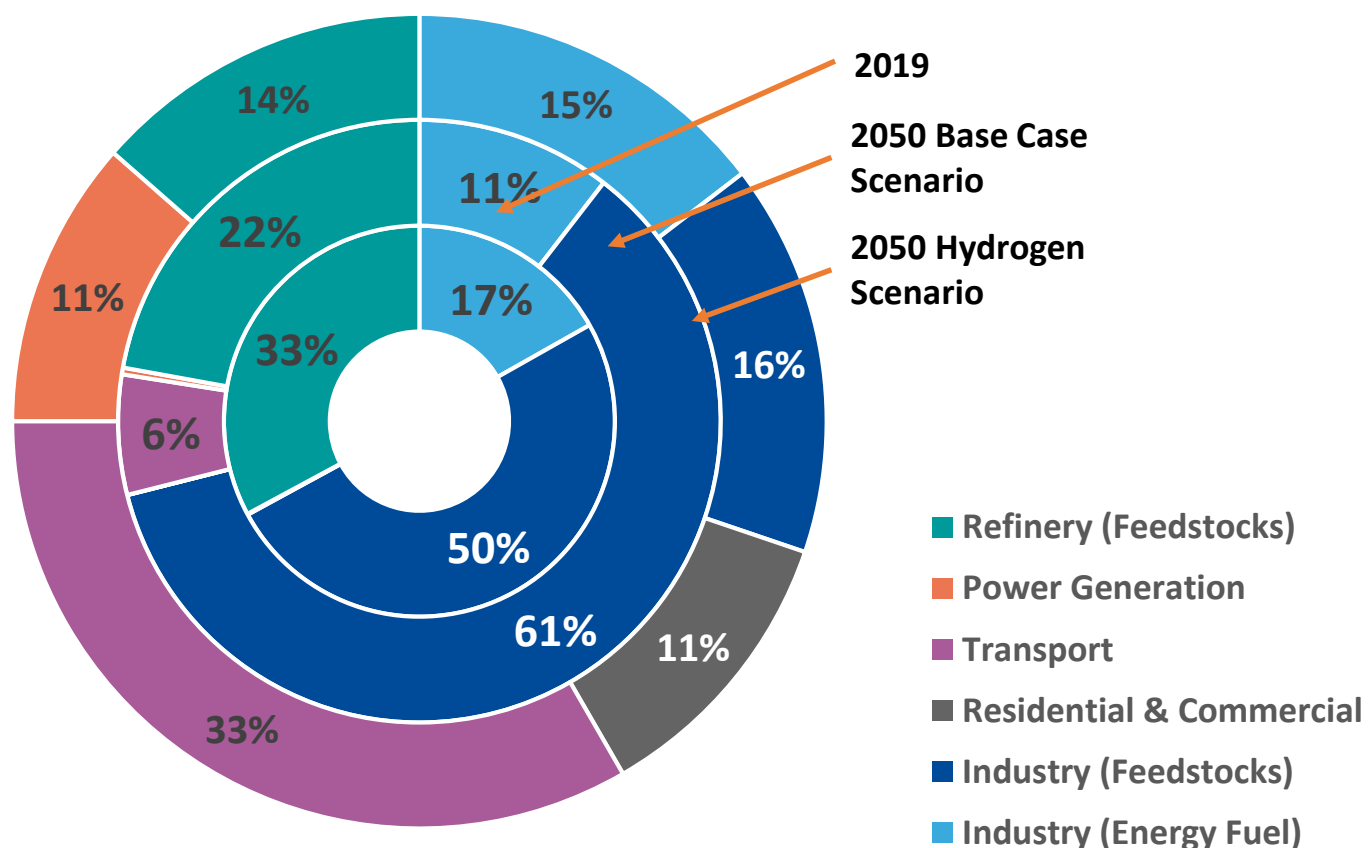


Hydrogen Share in Chemical Sector

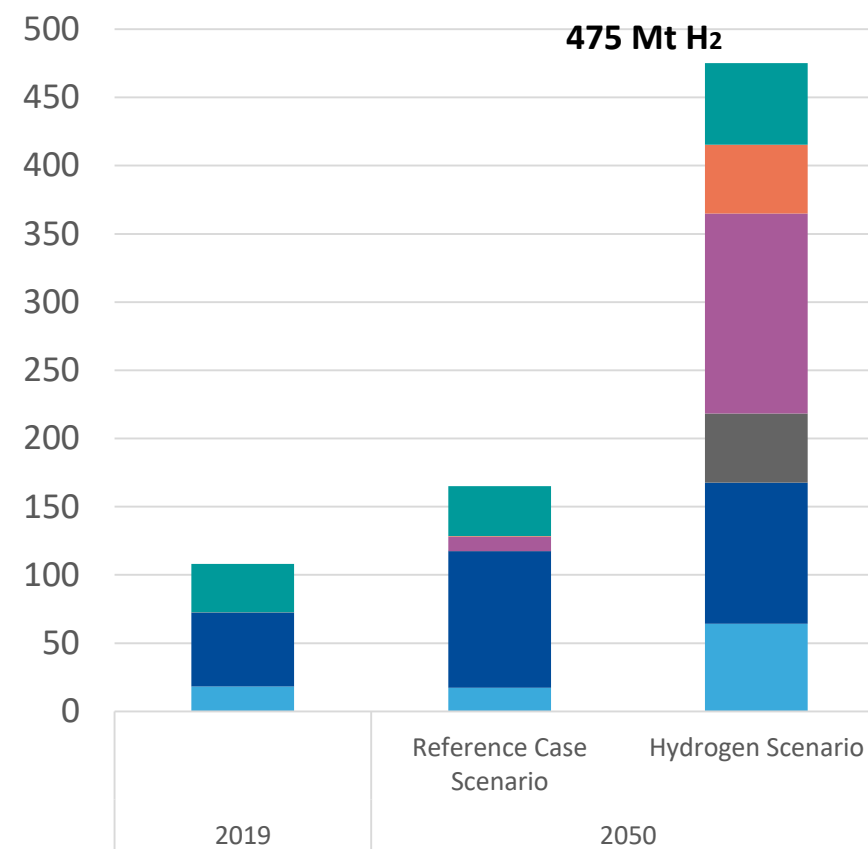


Results (1)

Sectorial share for hydrogen demand

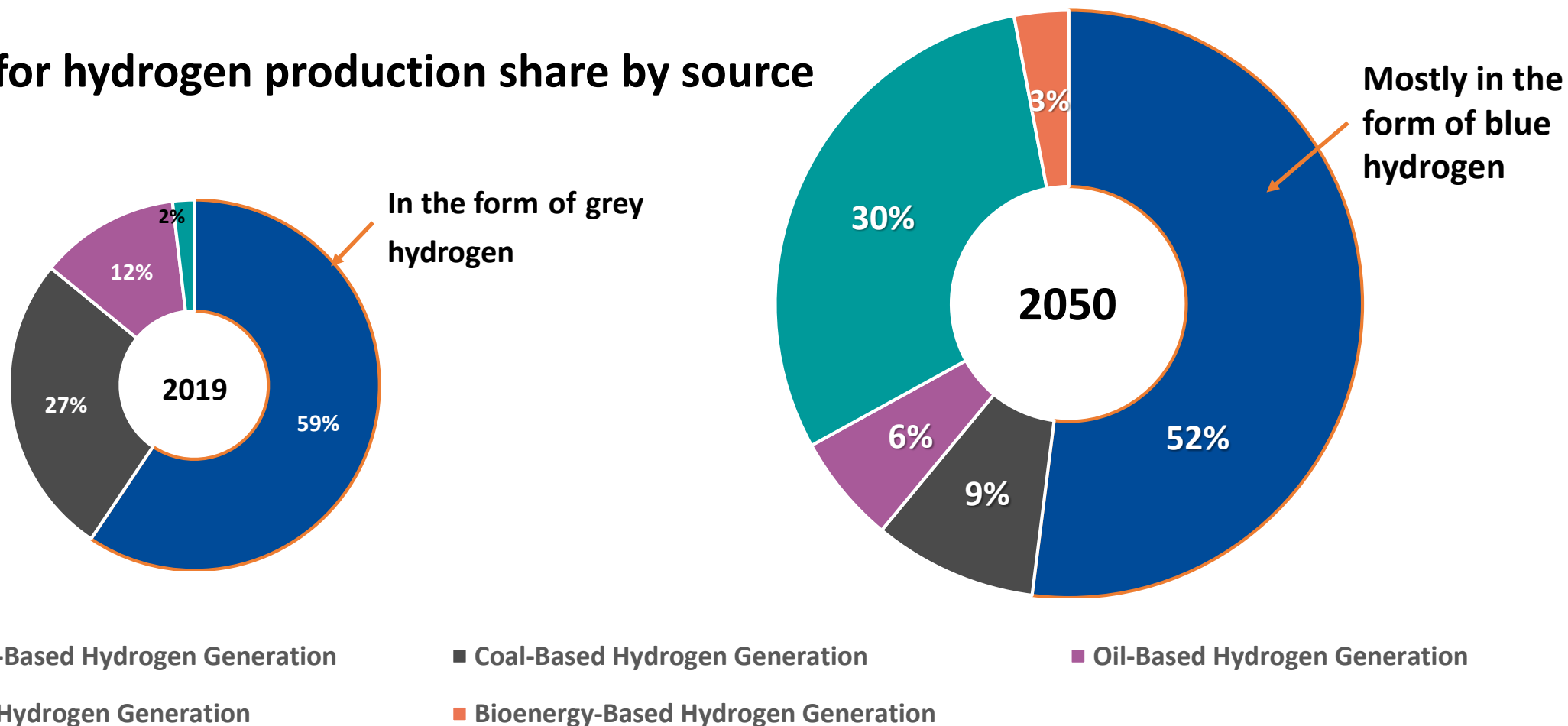


Hydrogen demand outlook by sector (Mt of H₂)



Results (2)

Outlook for hydrogen production share by source



Results (3)

Outlook for CO₂ emission (Mt CO₂)

