

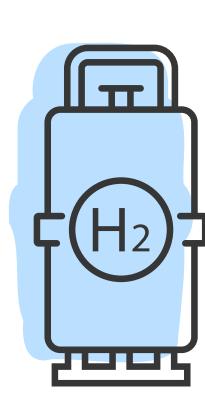
MODULE 2

HYDROGEN TRANSPORTATION ROUTE



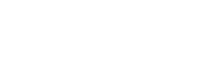
PRODUCTION

Hydrogen is generated through various methods. The most prevalent technique is water electrolysis, in which electricity separates water into hydrogen and oxygen. When the energy source is renewable (such as wind or solar), it is referred to as green hydrogen. Additionally, hydrogen can be derived from fossil fuels (such as natural gas—termed grey or blue hydrogen if CO₂ is captured) or biomass.



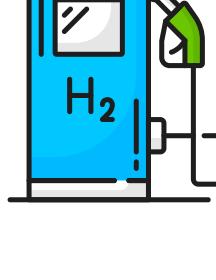
STORAGE

Once produced, hydrogen must be stored to ensure a continuous supply and system stability. It can be stored as a compressed gas at high pressure in specialized tanks or as liquefied hydrogen at extremely low temperatures of -253°C in cryogenic tanks. An alternative method involves storage in metal hydrides, where hydrogen is chemically bonded to a solid. Additionally, substantial quantities of hydrogen can be stored in underground salt caverns.



TRANSPORT

Hydrogen transportation is essential for its distribution to consumers. The most efficient method is via pipelines, akin to natural gas, although this necessitates specialized infrastructure. For shorter distances or in the absence of pipelines, hydrogen is transported in compressed or liquefied form using tanker trucks, railcars, or even ships. The selection of method is contingent upon the quantity, distance, and safety considerations.



RECIPIENT

Hydrogen, recognized as a versatile energy carrier, finds application across various sectors. In transportation, it fuels fuel cell vehicles, including cars, buses, trains, and potentially ships and planes in the future. In industry, it serves as a raw material for the production of ammonia and steel, as well as a fuel source. Moreover, hydrogen is increasingly utilized for electricity and heat generation in the energy sector, contributing to decarbonization efforts.