Decarbonising EU Economies: A Hydrogen Strategy for the Green Deal

Cédric Philibert, associate fellow, 22 April 2020
Clean hydrogen, enabling the decarbonisation

Hydrogen can help overcome many difficult challenges:

- **Integrate more renewables**, including by enhancing storage options and “exporting sunshine & wind” from places with abundant resources
- **Decarbonize “hard to abate” sectors** - steel, chemicals, trucks, ships & planes
- **Boost energy security** by diversifying the fuel mix & providing flexibility to balance grids

But there are challenges: **costs** need to fall; **infrastructure** needs to be developed; **cleaner hydrogen** is needed; and **regulatory barriers** persist
Hydrogen today is produced from fossil fuels and mostly used in refineries, chemical and fertiliser industries.
Main options for clean hydrogen

➢ Electrolysis of water from low carbon electricity
  ➢ How low?

➢ Steam methane reforming with carbon capture and storage
  ➢ How much carbon can/should be captured?

➢ Methane pyrolysis
  ➢ What will it cost?
Hydrogen strategies around

- Korea: an industrial strategy focussed on FCEVs
- Japan: a broad strategy with FCEVs, LNG reform & FC in buildings, use of NH$_3$ in coal and gas plants, industrial furnaces, imports of green and blue H$_2$, NH$_3$
- US, California: production of low-C H$_2$ for mobility
- China: adding FCEVs to strong BEV shift; industrial interest in electrolysers
- Australia, Chile, Morocco, M-East: interested to export green or blue H$_2$
- UK: testing gas change in Northern England
- NL, Germany: industry, mobility, H$_2$ prod. & imports
- Fr: Decarb. of current H$_2$ uses, R&D & pilot projects for other applications
Perspectives for a European hydrogen strategy

➢ Progressively and cost-effectively deploy low carbon H$_2$ where it is the sole or preferred decarbonisation solution:
   ➢ Feedstock uses: NH$_3$, MeOH, iron & steel
   ➢ Fuel use for deep-sea shipping (as NH$_3$)
   ➢ Some storage use in islanded power systems

➢ Support R&D and pilot projects & design safety regulations/standards where H$_2$ may prove to be the preferred options, or will be in the future
   ➢ Fuel use for aviation (as synthetic liquid fuels)
   ➢ Fuel use for long distance heavy duty (trucks & coaches)
   ➢ Some uses in building to complement electrification
   ➢ Storage use in the continental power system after 2035
Ifri Centre for Energy

27, rue de la Procession, 75740 PARIS CEDEX 15
Tél. +33 (0) 1 40 61 60 00 • Fax : +33 (0) 1 40 61 60 60
www.ifri.org