The development of hydrogen infrastructure in Europe

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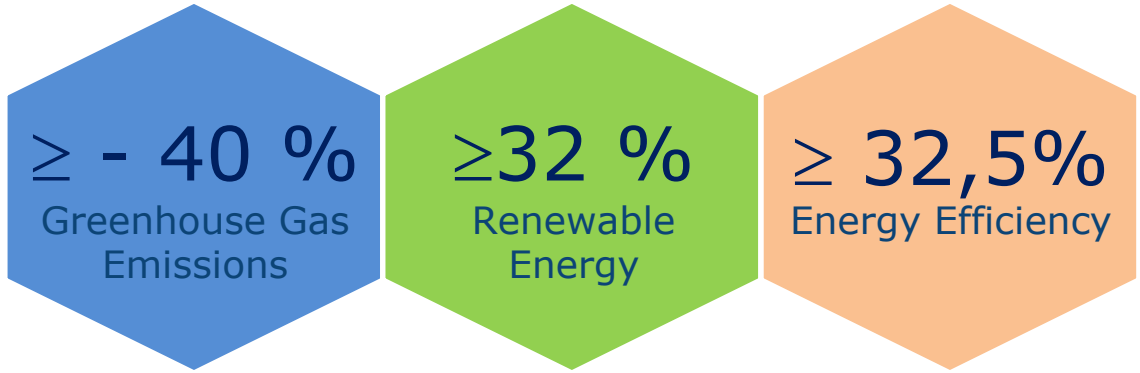
Climate and energy policy

Paris Agreement and recently agreed EU climate and energy targets set the framework for the EU's energy transition

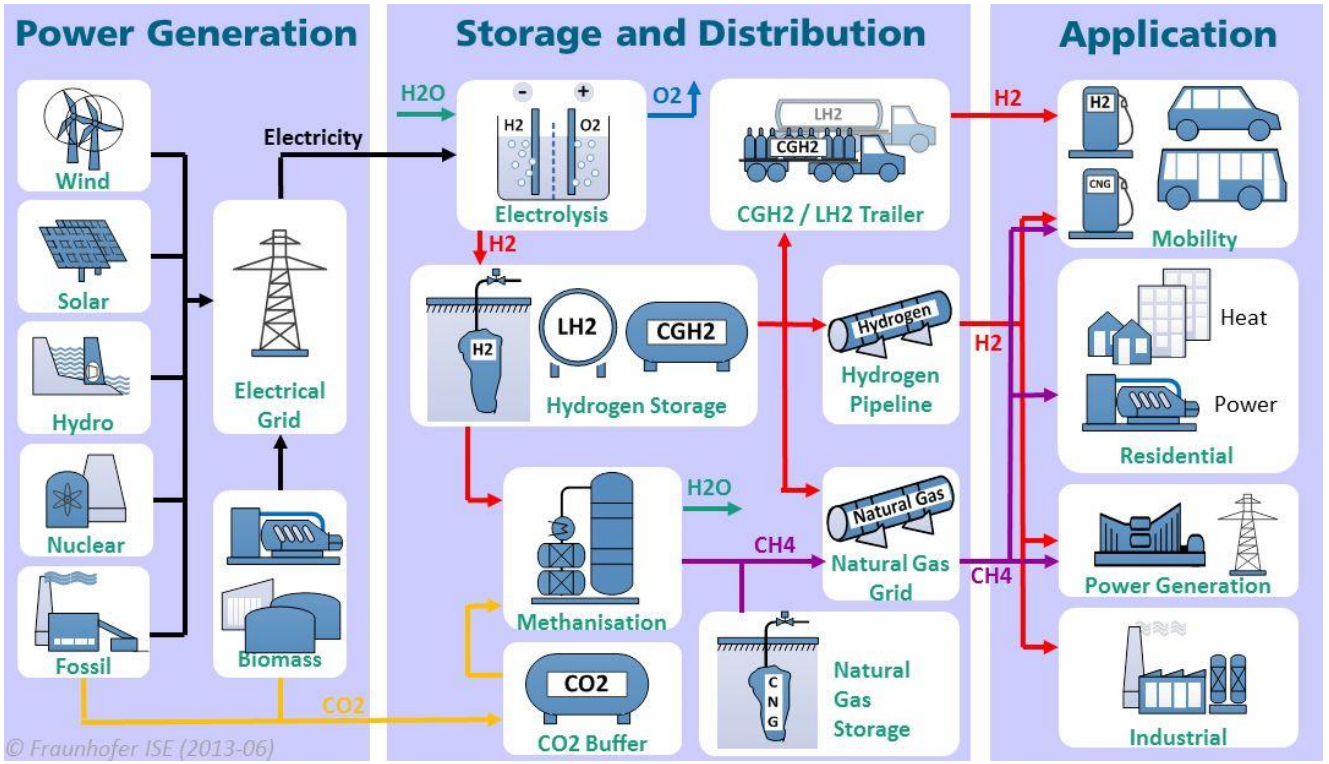
Commission proposal for the EU's long-term GHG emission reduction strategy

EU 2030 targets



Potential role of hydrogen in the energy transition

Hydrogen can enable the integration of the energy and other sectors (transport, heat, industry production) contributing to their decarbonisation.



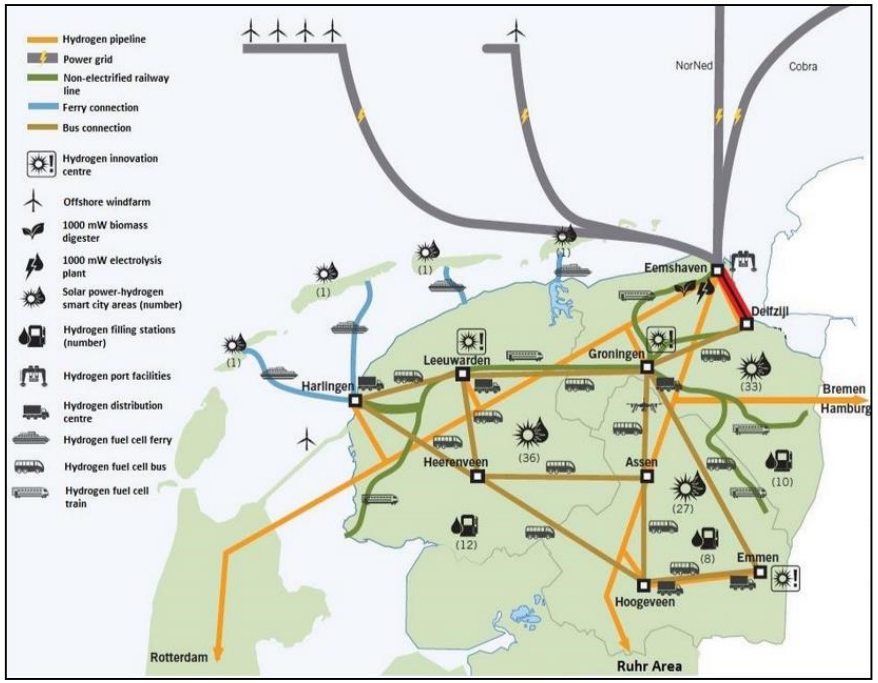
Infrastructure:

- **Production ideally located close to demand (e.g. industry)**
- **Infrastructure for short distances**
- **Potential need for dedicated new infrastructure**

Potential role of hydrogen in the energy transition

Sector coupling:

Hydrogen – via power-to-gas technology – is the link between the electricity and gas sectors



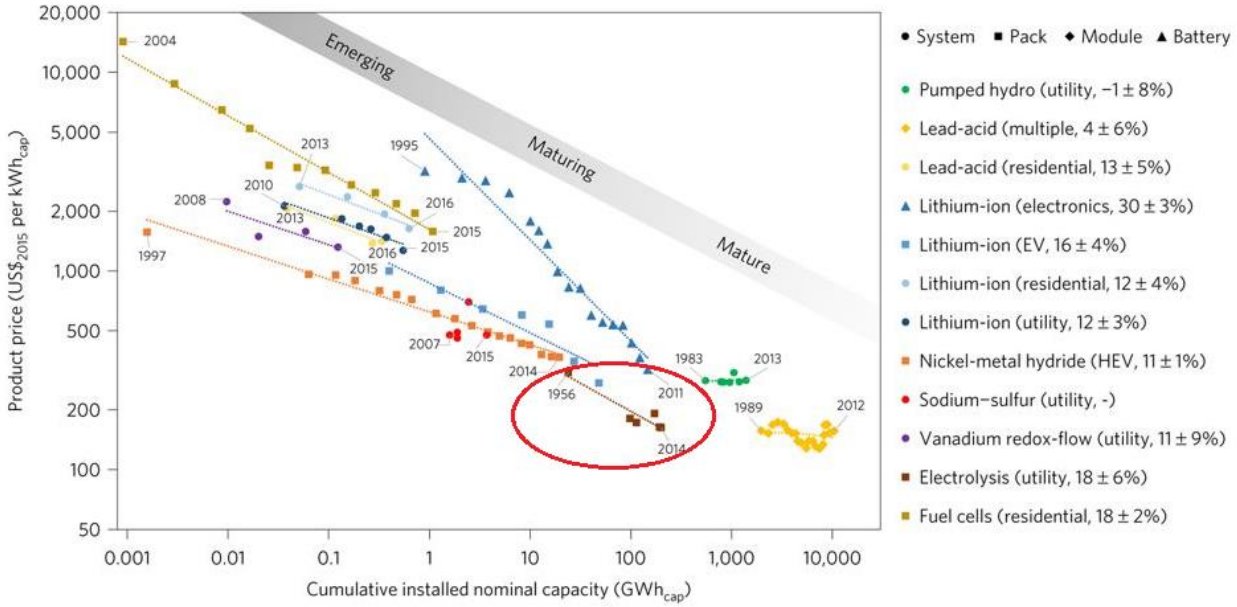
Infrastructure:

- **Production to be ideally located to make best use of renewable electricity sources for long operating hours and of existing gas infrastructure**
- **Blending of hydrogen enables the use of existing gas infrastructure and appliances**
- **Possibly dedicated infrastructure for hydrogen by converting existing natural gas pipelines**
- **Energy storage: (seasonal) storage of surplus renewable electricity by using gas storages**

Future Green Hydrogen Economy in the Northern Netherlands, Northern Innovation Board, 2017

Costs and system benefits

- Costs for decarbonisation are route dependent
  - **Large and varied mix of technologies may be more cost efficient**
- Consideration of system value



With an increase of P2H installed capacity, the P2H unit price decreased between 1956 and 2014.

Source: Schmidt et al. 2017, Nature Energy 2, 17110

Regulatory framework

Aim to develop an enabling regulatory framework:

- **Gas Infrastructure 2050 study** *(finalised)*
  - **forward-looking exercise to assess the role of TEN-E gas infrastructure in the light of the EU's long-term decarbonisation commitments**
- **Sector coupling study** *(ongoing)*
  - **looking at the potential of linking the EU electricity and gas sectors to identify potential regulatory barriers/gaps limiting sector coupling and the deployment of renewable and low-carbon gases**
- **Biomethane/hydrogen infrastructure study** *(upcoming)*
  - **assess the impact of increasing use of biomethane and hydrogen on the gas infrastructure**
  - **identify potential**

31st Madrid Forum

Building blocks and priorities for further work, including:

- Balanced mix of cost-efficient energy sources
- Significant role of renewable and low-carbon gases (incl. hydrogen)
  - **potential of domestic production, cross-border trade, import and integration**
- Unified terminology
- Support for technology development, innovation and deployment
- Reduction of fugitive methane emissions prerequisite
  - **develop common measurement methodology, life-cycle based reporting**
- Develop cross-sectoral flexibility market
- Gas infrastructure should contribute to decarbonisation
  - **further couple gas and electricity networks for mutual optimisation**
- Coordinated and integrated network planning
  - **to be strengthened and supported by regulation;**
- Avoid unintended interactions between the regulated and contestable activities
  - **assess potential role of regulated entities**

Thank you!

For more information:

https://ec.europa.eu/info/events/madrid-forum-2018-oct-17_en

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Active development

- Hydrogen initiative
  - **Linz September 2018**
- Important contributions of FCH
  - **227 projects**
  - **FP7 -> H2020**
  - **843 m€ financial contribution**
  - CertifHy
    - **Development of unified definition of green hydrogen**
    - **Development and launch of guarantee of origin framework**

Source: https://www.fch.europa.eu/