

Deep Dive on Gas... Hydrogen.

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DCU

"Stranded Assets...."

"Jobs & Livelihoods...."

"The Economy...."



"Unconventional Gas....."

"Emissions CO2"

"Emissions Methane"



"GREEN PARTY promise:

~60% Carbon Cut by 2030

~Fossil subsidy phaseout in one year

*~A ban on new pipelines, coal mining, oil & **gas** drilling or mining*

*~An end to **fossil** fuel within a year...."*

Can Hydrogen save the gas industry....?

And at the same time be a **Climate Hero**....

How do we do it....

Green Hydrogen & **Blue** Hydrogen

?....

Why Hydrogen?

Can be produced carbon free

Can be used to store renewable energy

Can be used to produce heat by burning in air

Can produce electricity directly using a fuel cell

When you react or burns in air it produces pure water

Hydrogen can fuel your transport, cars, buses, ferries, heat your homes, cook your food, supply chemicals to local industry

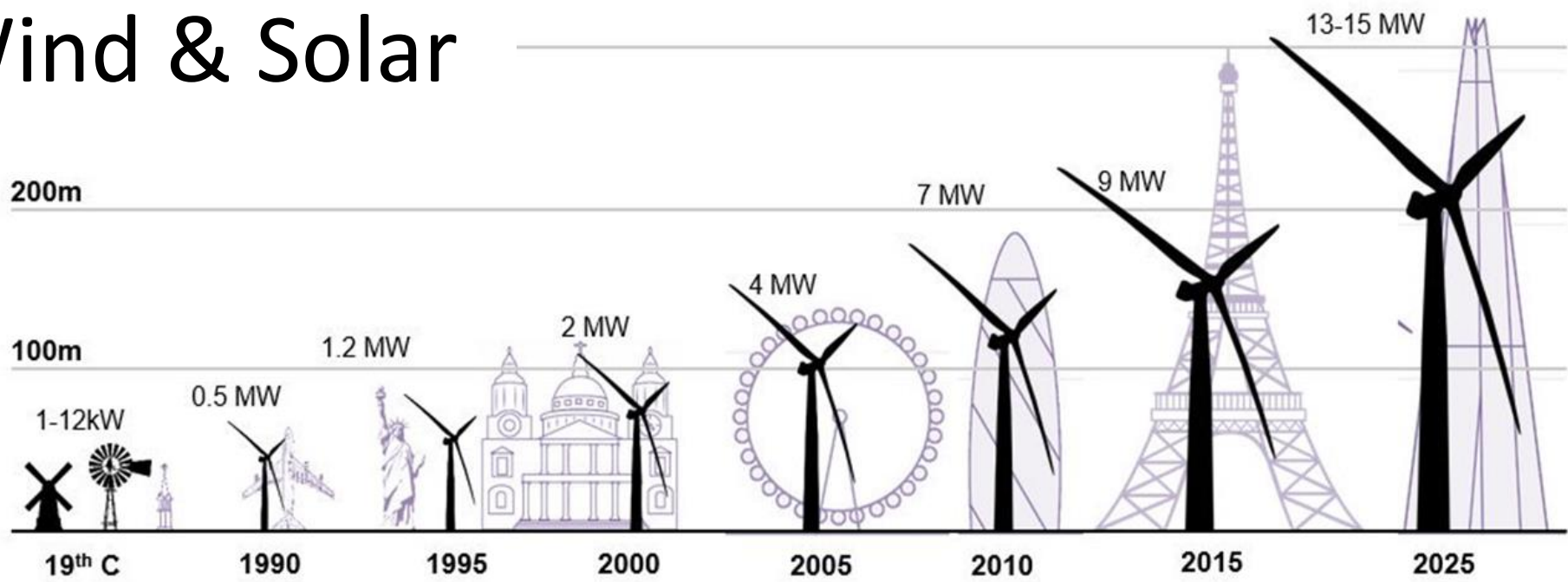
You can produce it yourselves!

☐ Wind & Solar

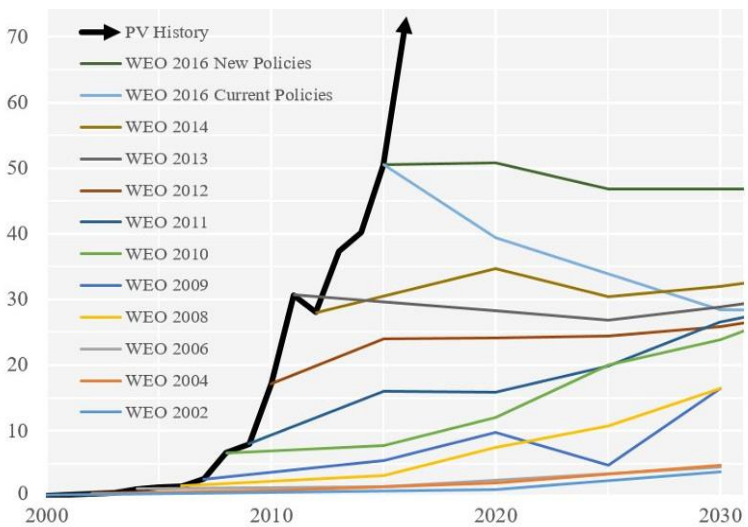




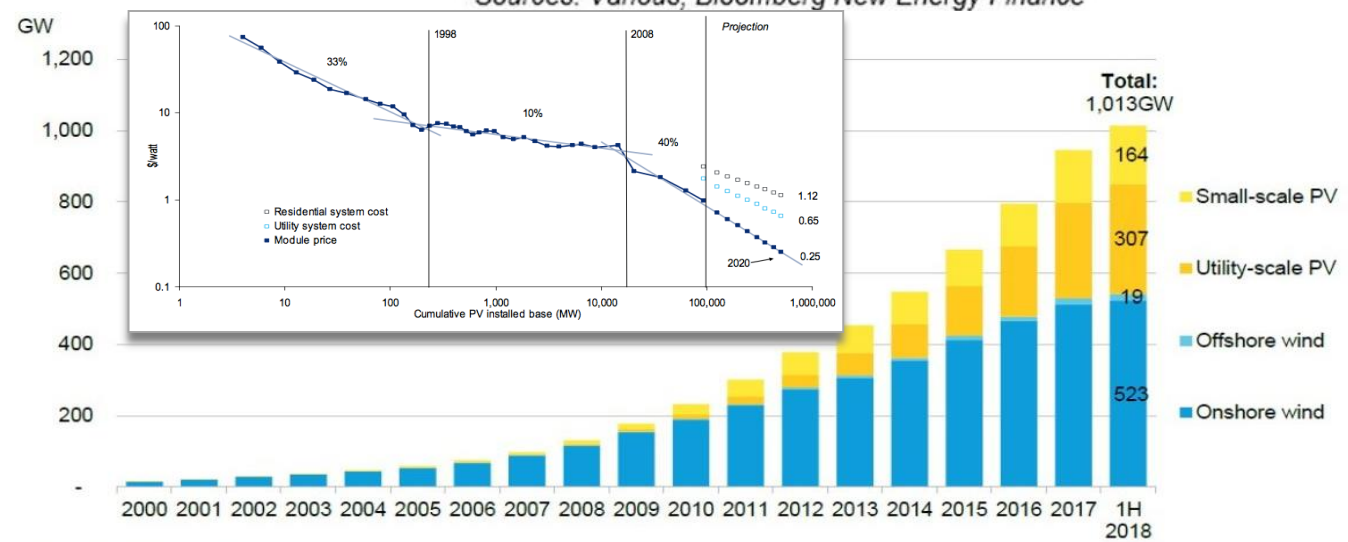
Wind & Solar



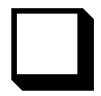
Sources: Various; Bloomberg New Energy Finance



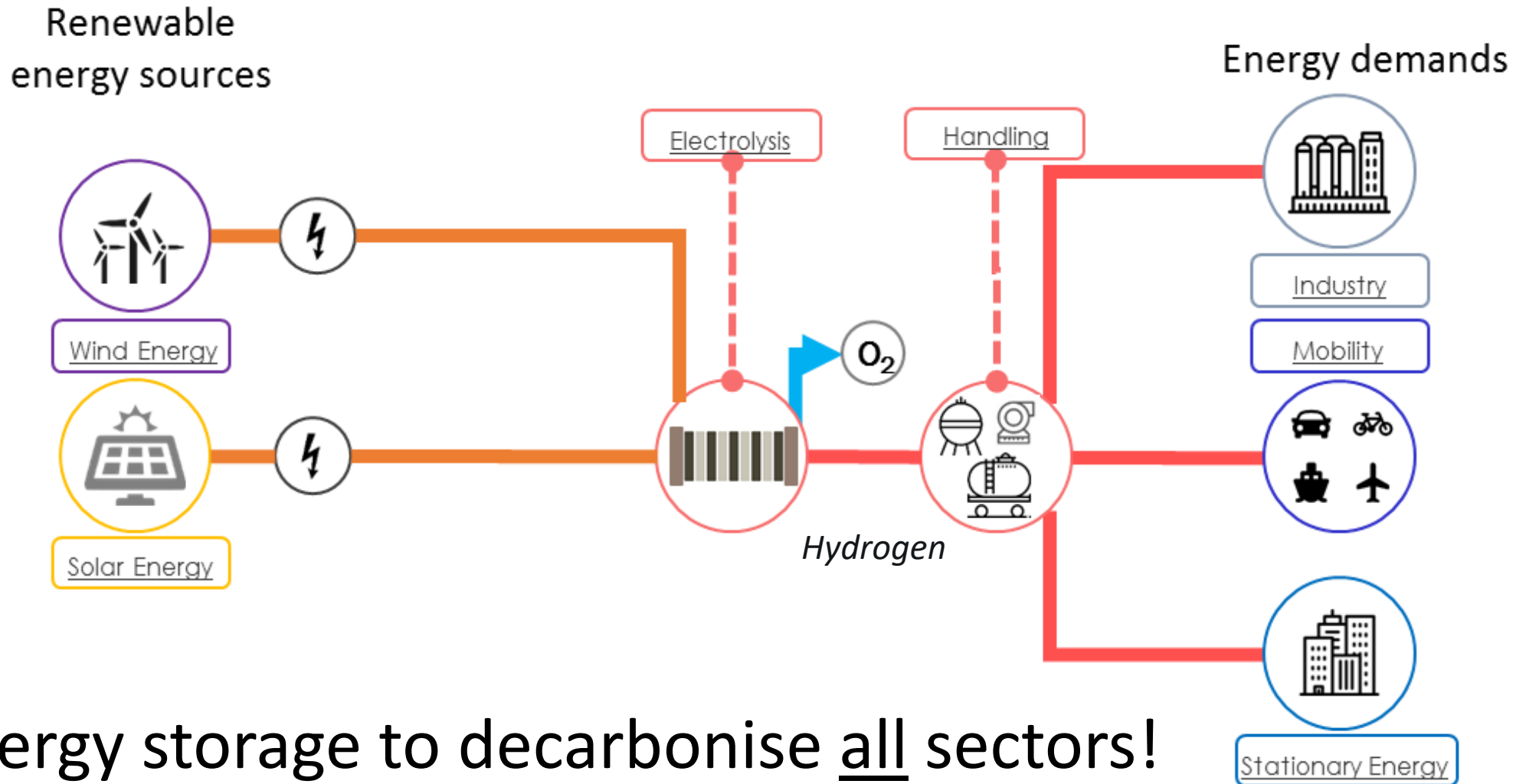
Source: Bloomberg New Energy Finance, Citi Research



Source: Bloomberg NEF



Power-to-X

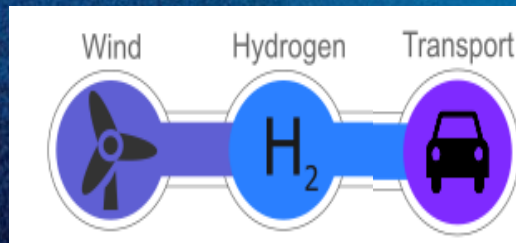


Energy storage to decarbonise all sectors!

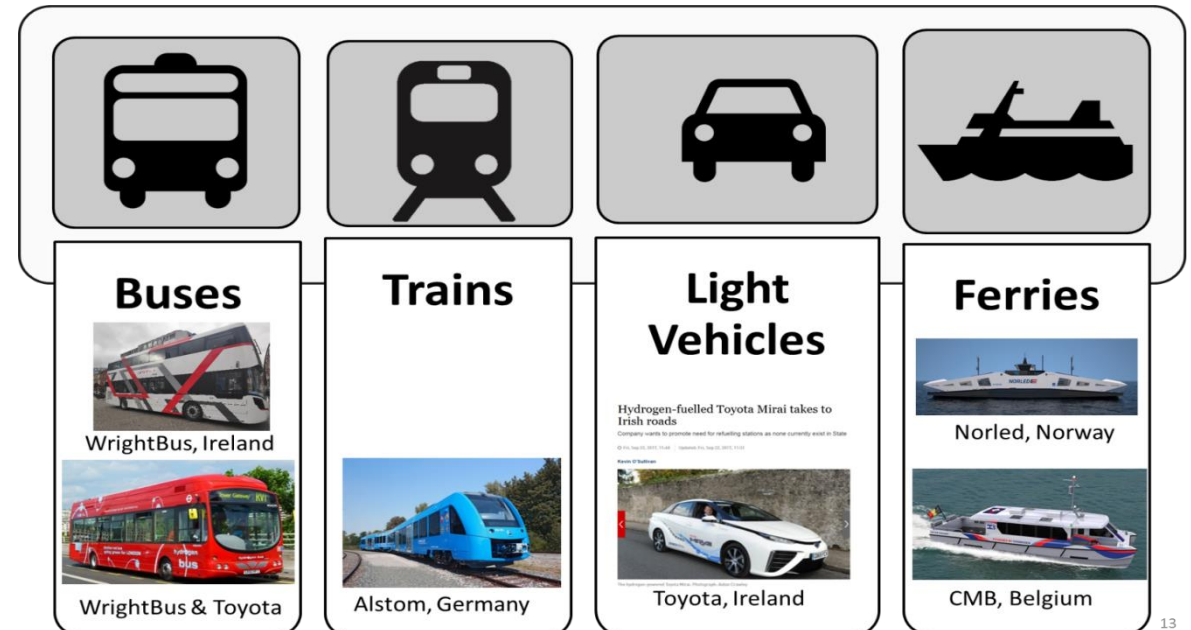
– Industry Stakeholder group

Hydrogen Mobility Ireland

Report: A Hydrogen Mobility Strategy for Ireland
Date: September 2019



This report aims to give the reader a clear vision of what hydrogen mobility can achieve in Ireland over the next ten years and to demonstrate that this vision is clearly achievable at levels of commitment that industry and government can support.



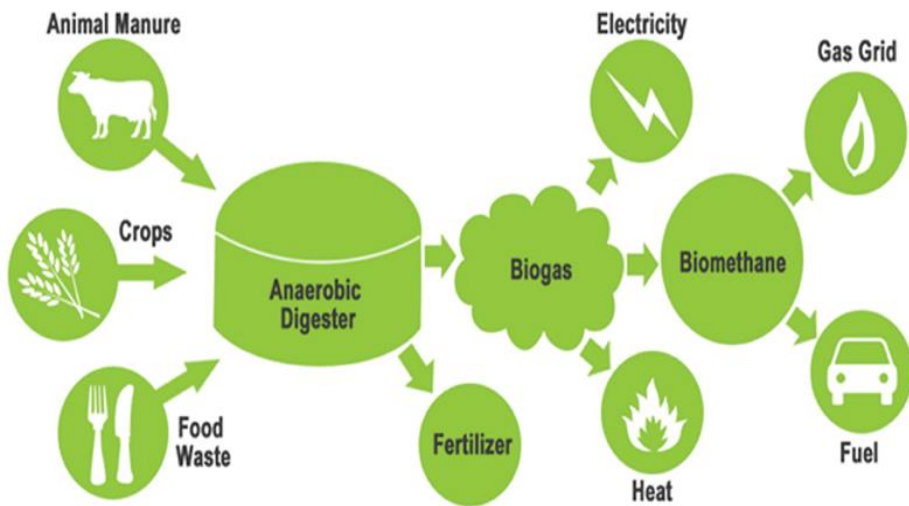
❏ Carbon Capture & Storage

- CCS has been demonstrated in the oil industry for a number of years in 17 sites globally (most sites utilise the CO₂ for enhanced oil recovery)
- 4 sites under construction and 15 planned
- These 21 projects able to capture 40 million tonnes of CO₂ annually (0.1% of global CO₂ emissions)

[The Global Status of CCS: 2017, Global CCS Institute 2017, <https://www.carbonbrief.org/around-the-world-in-22-carbon-capture-projects>]

Gas Grids Internationally....

Alternative Fuel - Bio-CNG/Bio-Methane



Hydrogen Injection / Blending / Testing

GNI/European associations

- Marcogaz, Network and use readiness evaluation
- CEN, Transmission pipeline readiness, quality
- ENTSG, Strategy, blend increase
- GIE, Strategy, Pyrolysis (solid carbon by product), P2G is energy conversion and not end use.

UK

- Hy4Heat, BEIS funded domestic use evaluation.
- National Grid, HyNTS, Transmission role evaluation
- ENA, Pathways project – common roadmap GDNs/NG
- SGN, H100, Project Cavendish (London)
- Cadent, HyNet – North West hydrogen transmission, HyDeploy – 20% blend
- NGN, H21 NoE, HSE Buxton test facility, Spadeadam

Europe

- Germany
 - Zukunft ERDGAS Pathways evaluation
 - EON plan for 20% blend distribution trial
- Netherlands
 - €2.8bn Hydrogen Valley plan for two provinces

Global

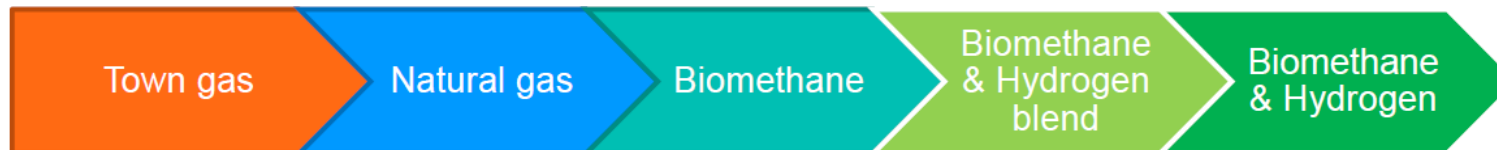
- China has committed \$17bn to hydrogen fuel cell vehicle development.

Hydrogen activity in Europe



hydrogeneurope.eu,

Hydrogen Europe is the European Hydrogen and Fuel Cell Association. It currently represents more than 100 industry companies, more than 68 research organizations as well as 13 National Associations. The and



How do we do it....

Green Hydrogen:



Wind & Solar



Power-to-X

Blue Hydrogen:



Carbon Capture & Storage

Blending Hydrogen:



Global Evaluations & Trials

Thoughts...

- Hydrogen to Decarbonise All Sectors ?
- Renewables & Hydrogen = Power-to-X ?
- Green & Blue Hydrogen ?
- Technology Barriers ?
- Skills & Labour ?
- Can we just do it? What are the barriers?