



Hydrogen Europe

Hydrogen: Enabler for the low carbon economy

European Grid Service Markets Symposium 2018

Jorgo Chatzimarkakis – Secretary General

Luzern, 5 July 2018

Today's presentation



Hydrogen Europe

The European low carbon economy

The Role of Hydrogen to enable decarbonisation

System Efficiency & Sectoral Integration

Where to next?



European Union represented by the
European Commission

Research



**A portfolio of clean,
efficient and
competitive
solutions based on
fuel cells and
hydrogen
technologies in
energy and
transport**

Today's presentation



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System Efficiency & Sectoral Integration

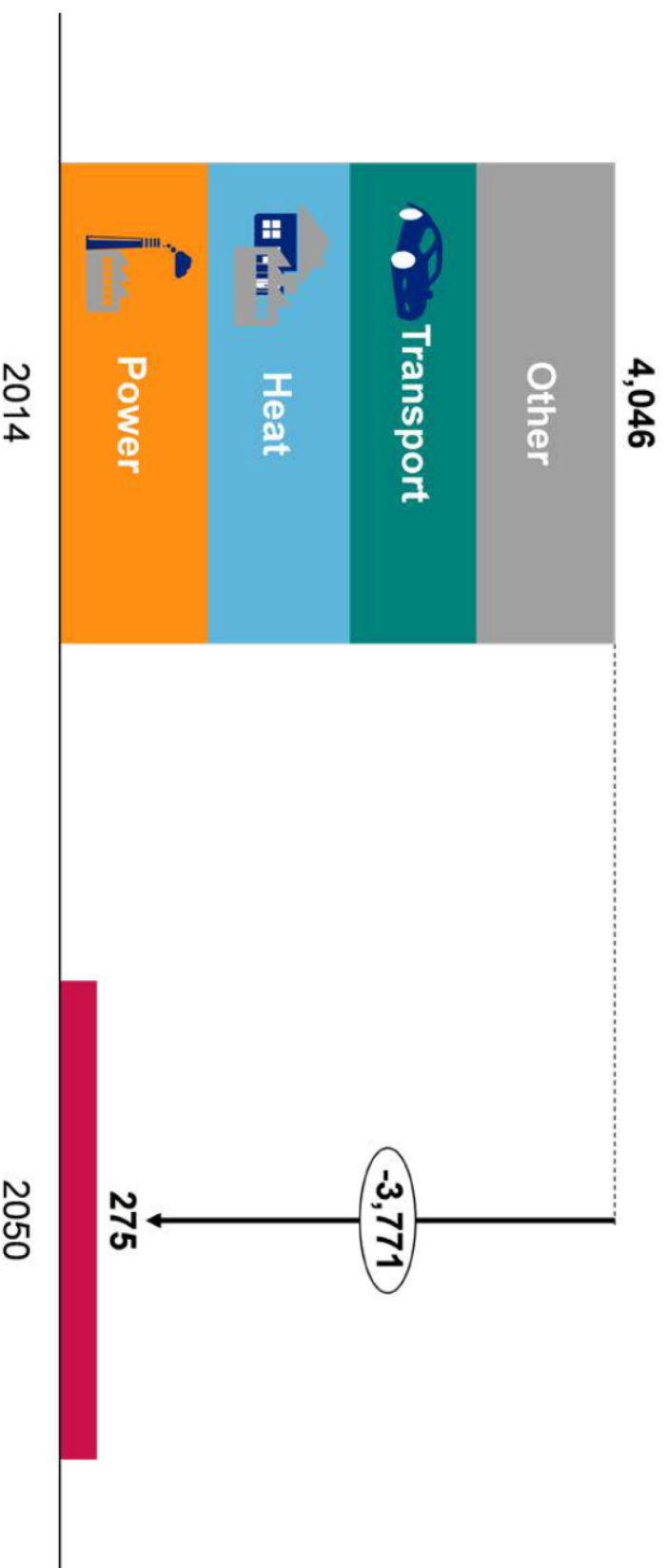
Where to next?

Europe's decarbonised vision & reality



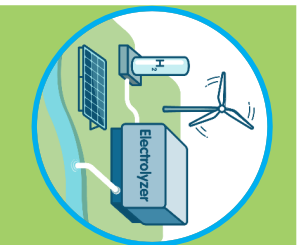
Europe's decarbonised vision & reality

FIGURE 1 – THE SCALE OF EUROPE'S DECARBONISATION PROBLEM (MtCO₂e)



Source: 2016 National Inventory Submissions (Common Reporting Format) for EU, Norway and Switzerland.

Decarbonising Energy Systems

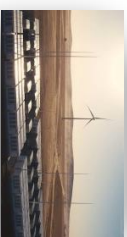


Easy ← complexity to decarbonise → Hard

Transport



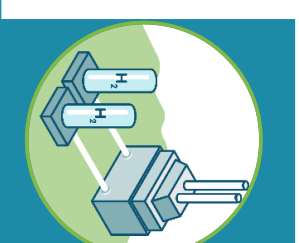
Power



Industry



Heat



Today's presentation



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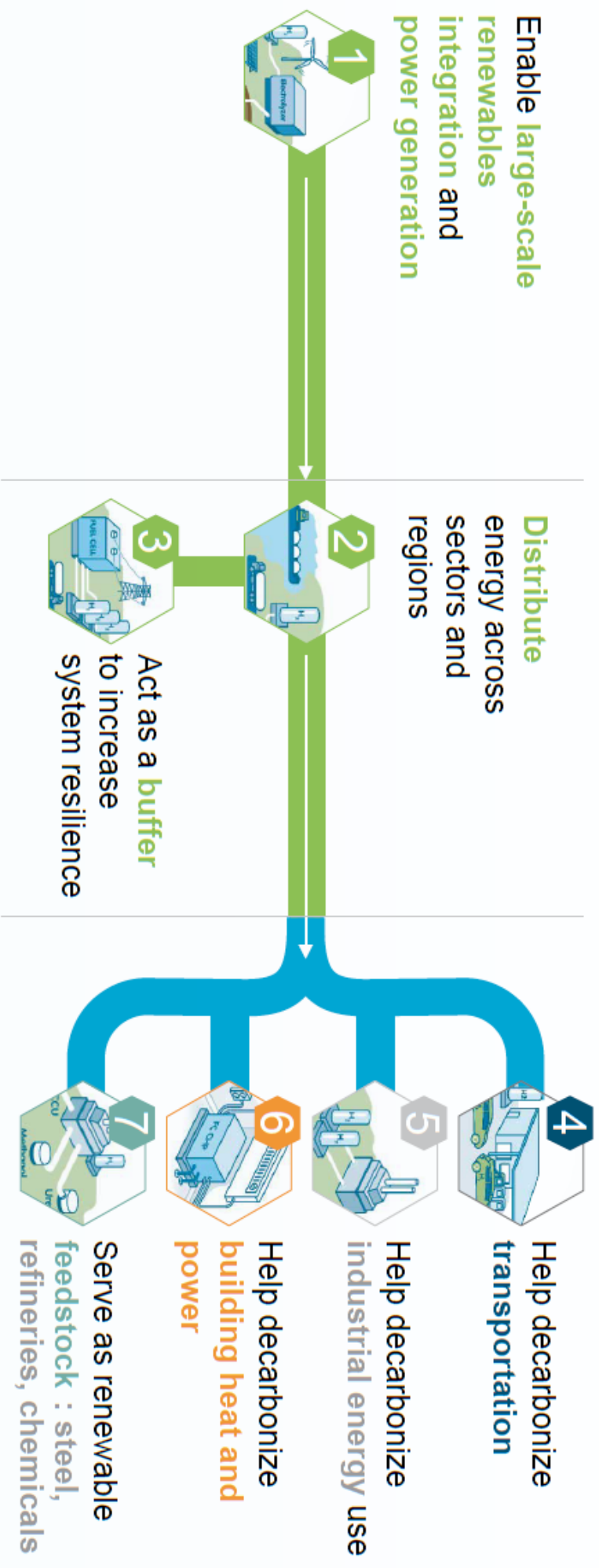
The Role of Hydrogen to enable decarbonisation

System Efficiency & Sectoral Integration

Where to next?

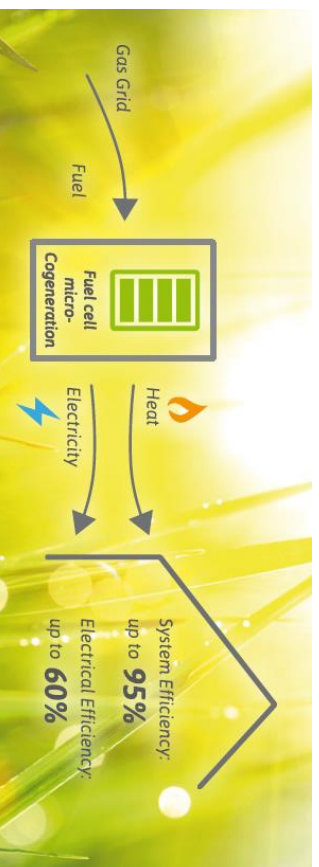
7 roles of hydrogen need to be acknowledged

Enable the renewable energy system —→ Decarbonize end uses

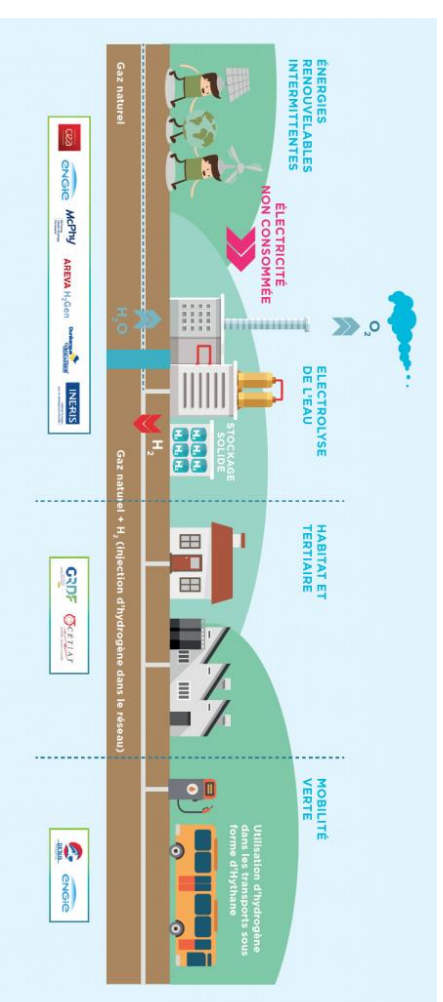


SOURCE: Hydrogen Council

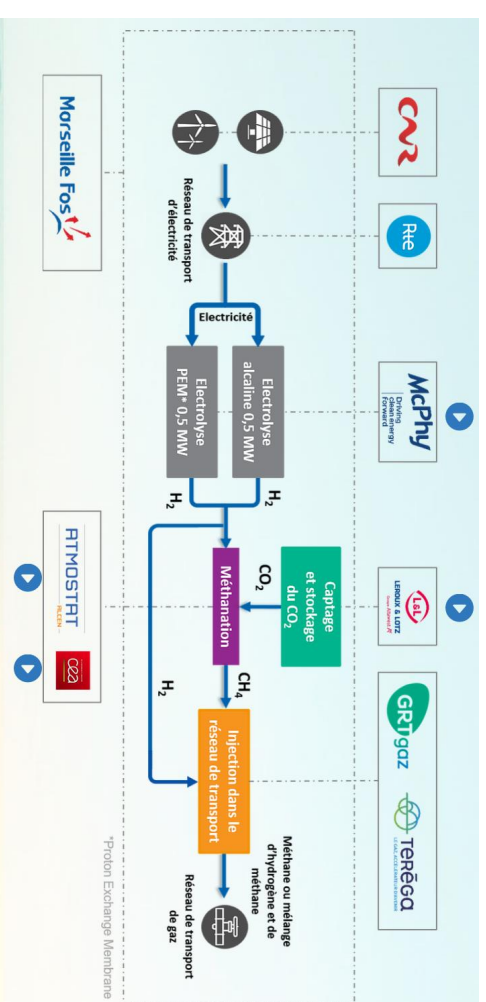
Hydrogen for the Gas sector



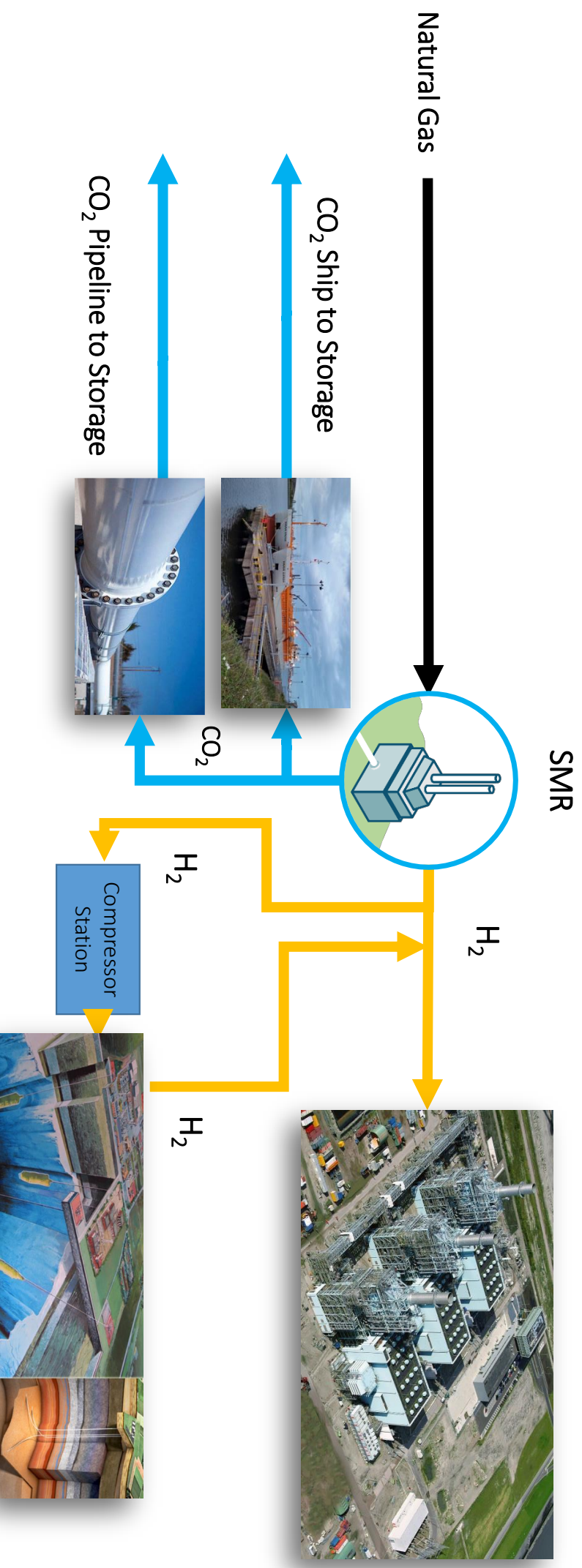
Leeds (UK)
100% H₂ by 2035
85TWh
17-18M tCO₂/yr



2018: Grhyd (FR)
2018: Jupiter1000 (FR)



Hydrogen for the Power sector



Hydrogen for the Refining sector

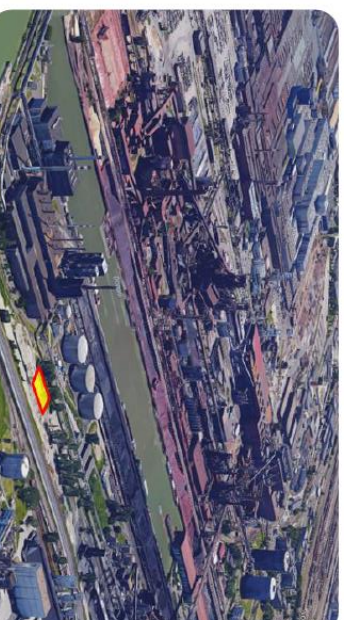
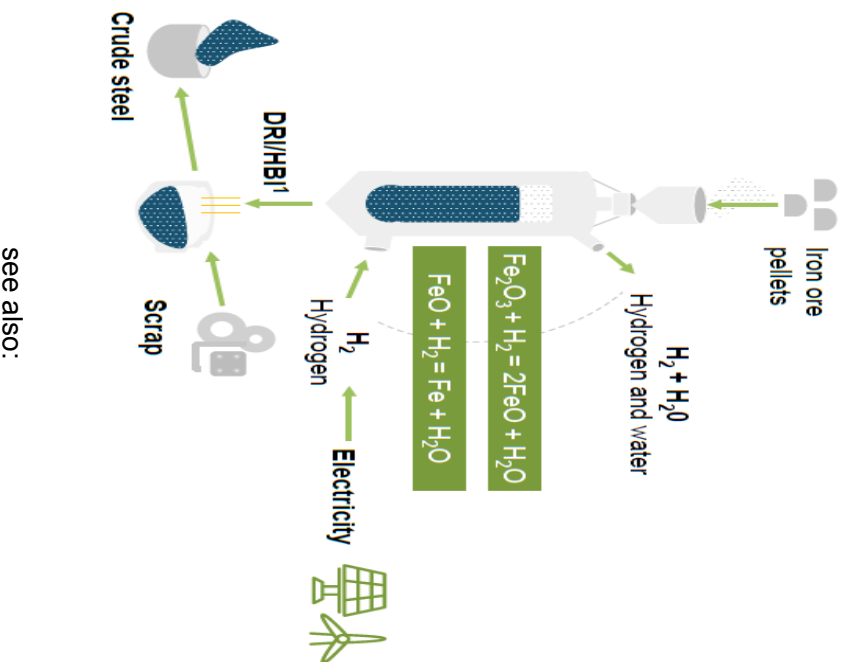


One of the largest hydrogen electrolysis plant at Rhineland refinery, Germany.

4 t H₂/day (1% of demand)

With a peak capacity of 10 megawatts the hydrogen will be used for the processing and upgrading of products at the refinery's Wesseling site as well as testing the technology and exploring application in other sectors.

Hydrogen for the Steel sector

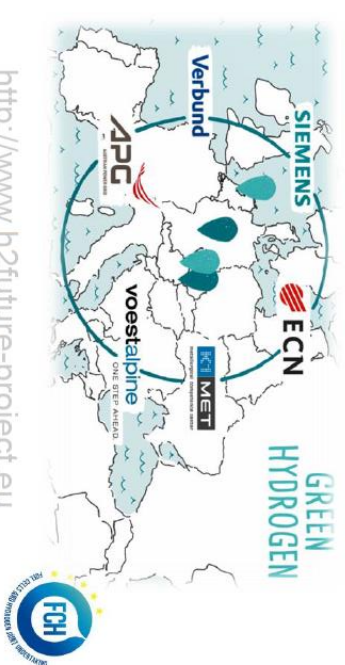


- 6 MW Siemens PEM electrolyser system at the voestalpine steel plant in Linz, Austria
- Industrial integration of renewable hydrogen production in the steelmaking process
- 26-month demonstration of the electrolyser system, in particular
 - Prequalification for power reserve markets (primary, secondary and tertiary control)
 - Integration of the electrolyser system into the steelworks operation
 - Commercial operation on the power reserve and spot markets
 - Quasi-commercial operation with revenue streams from both hydrogen and power
- Accompanying analysis of different operation modes, impact in the steel and fertilizer industries

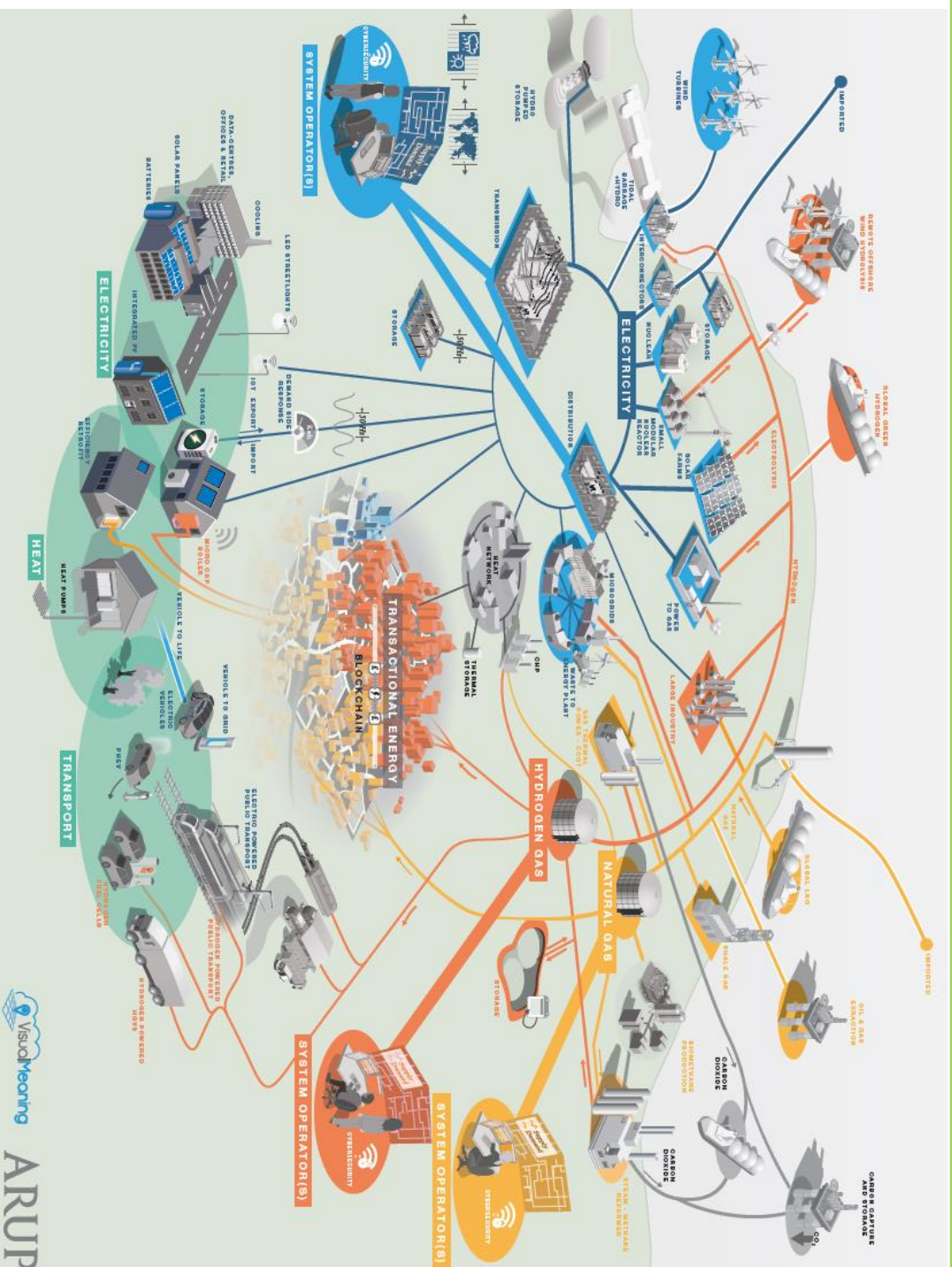
see also:

[HYBRIT](#): SSAB & others (Sweden)

[SALCOS](#): Salzgitter & others (Germany)



Sectoral Integration = System Efficiency



Future of the (stationary) Fuel Cell Industry



Hydrogen Europe

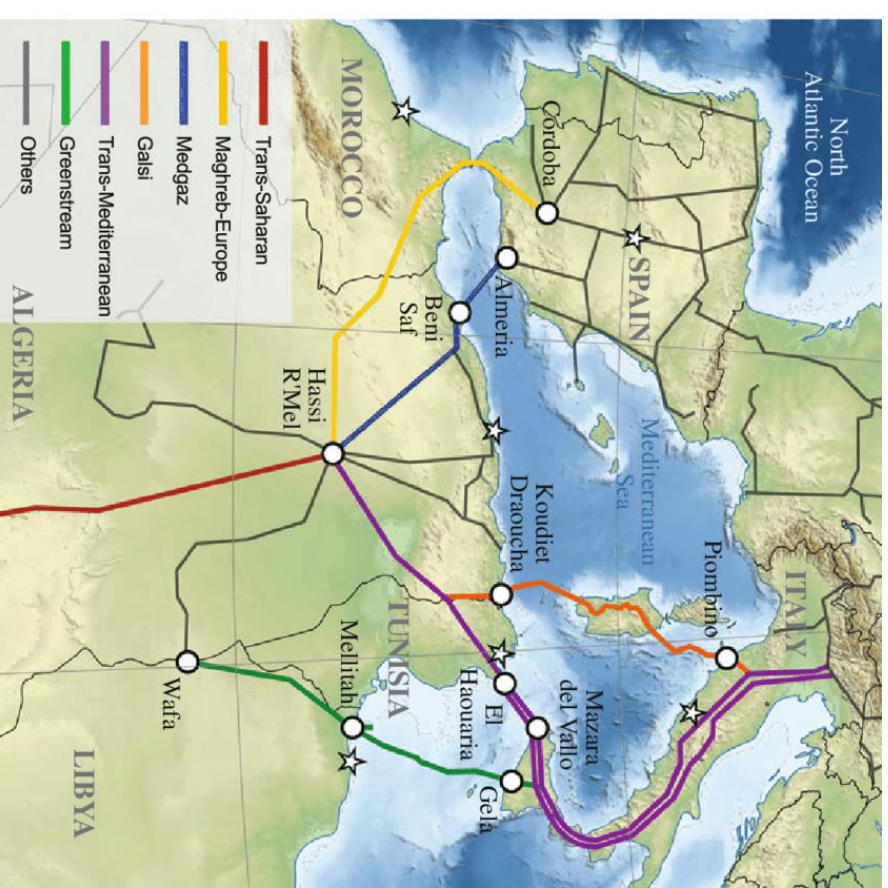
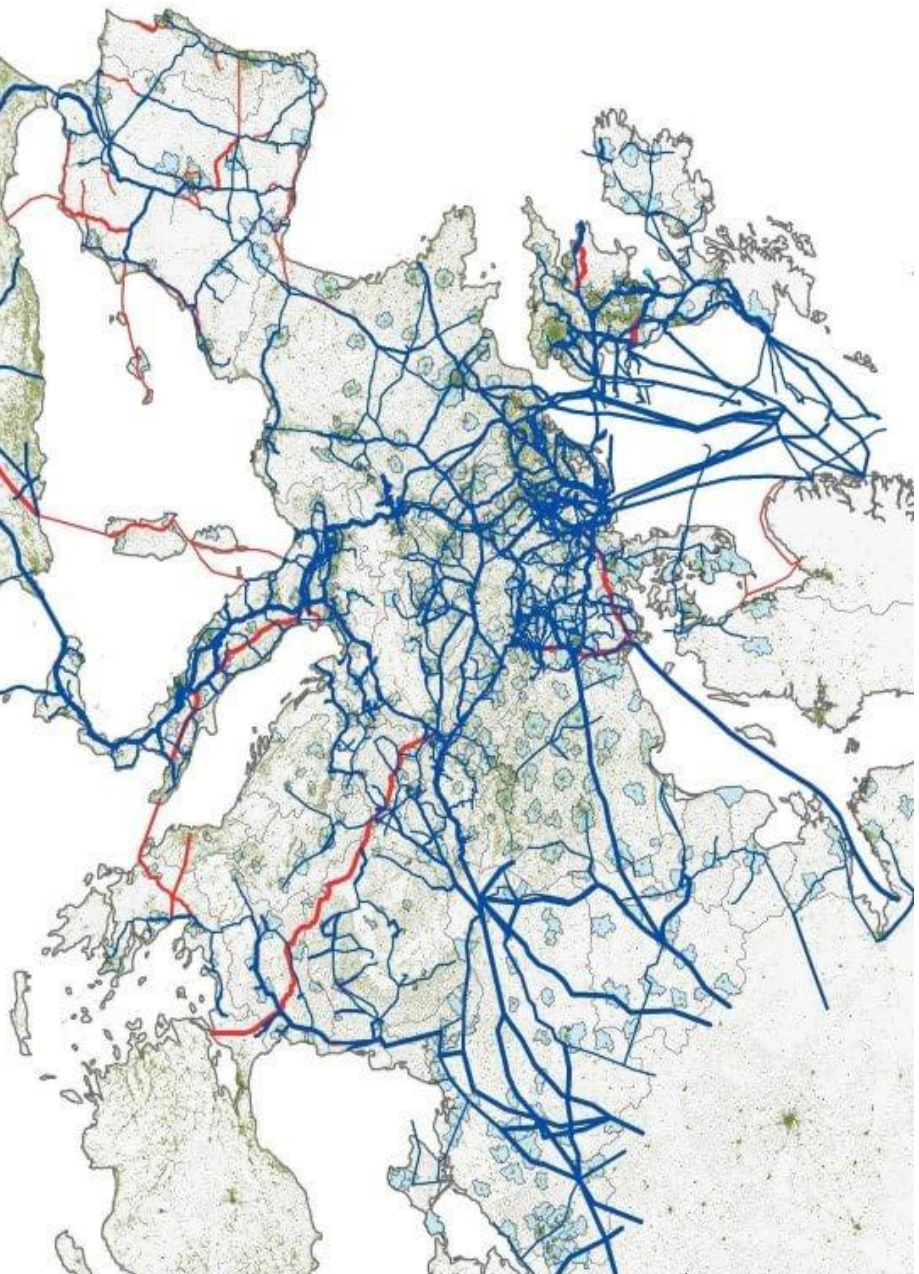
The European low carbon economy

The Role of Hydrogen to enable decarbonisation

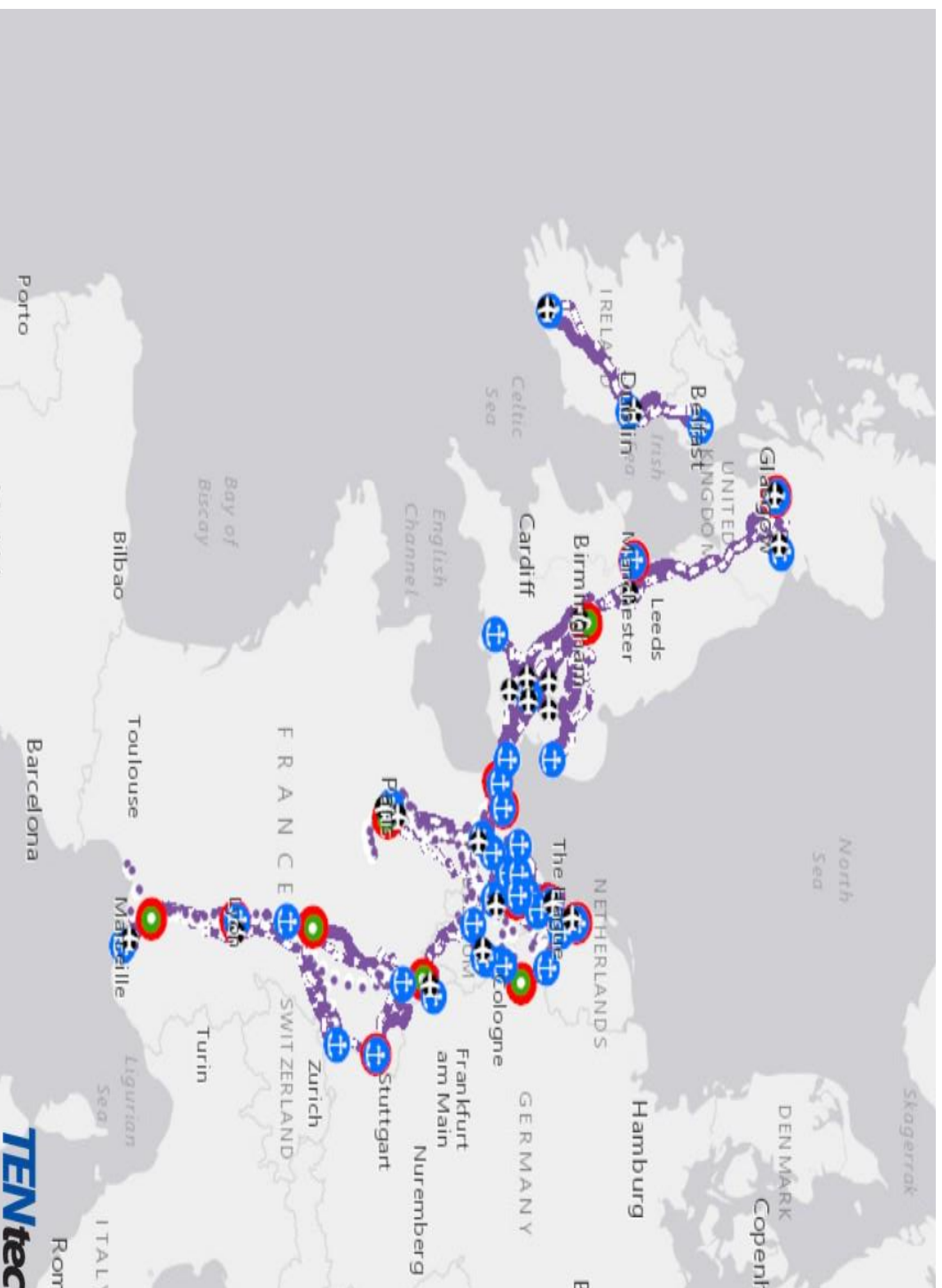
System Efficiency & Sectoral Integration

Where to next?

The European Gas Grid – cheap transport of H₂



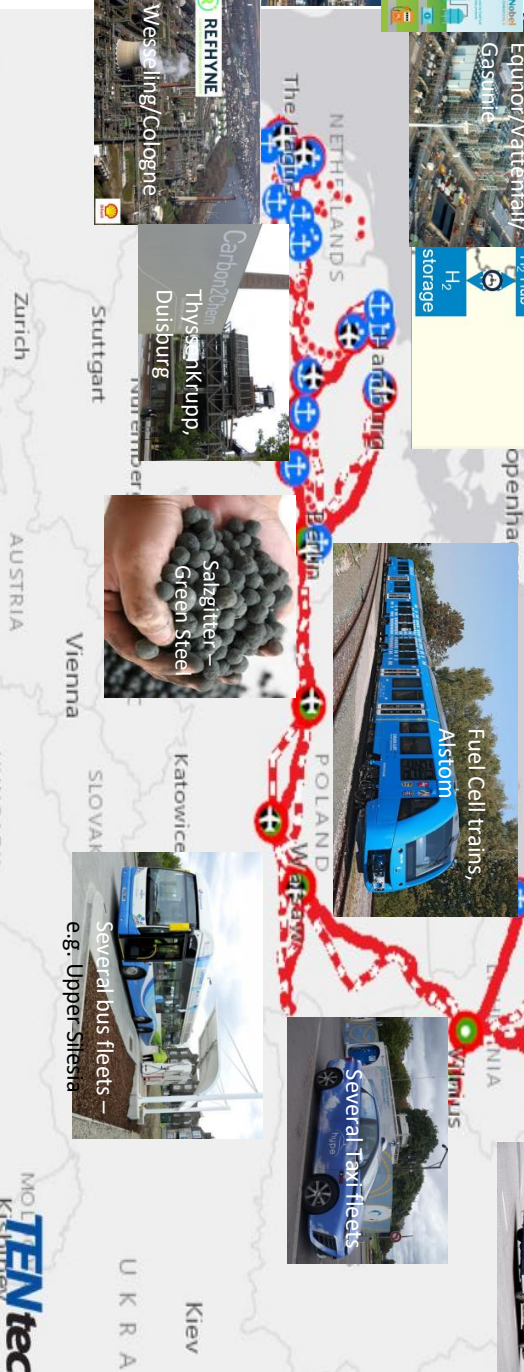
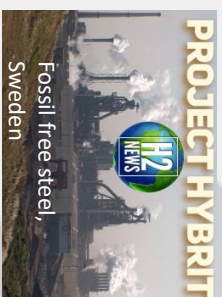
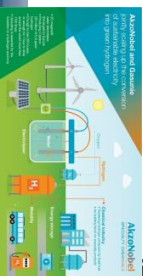
Ten-T Corridor North Sea-Mediterranean

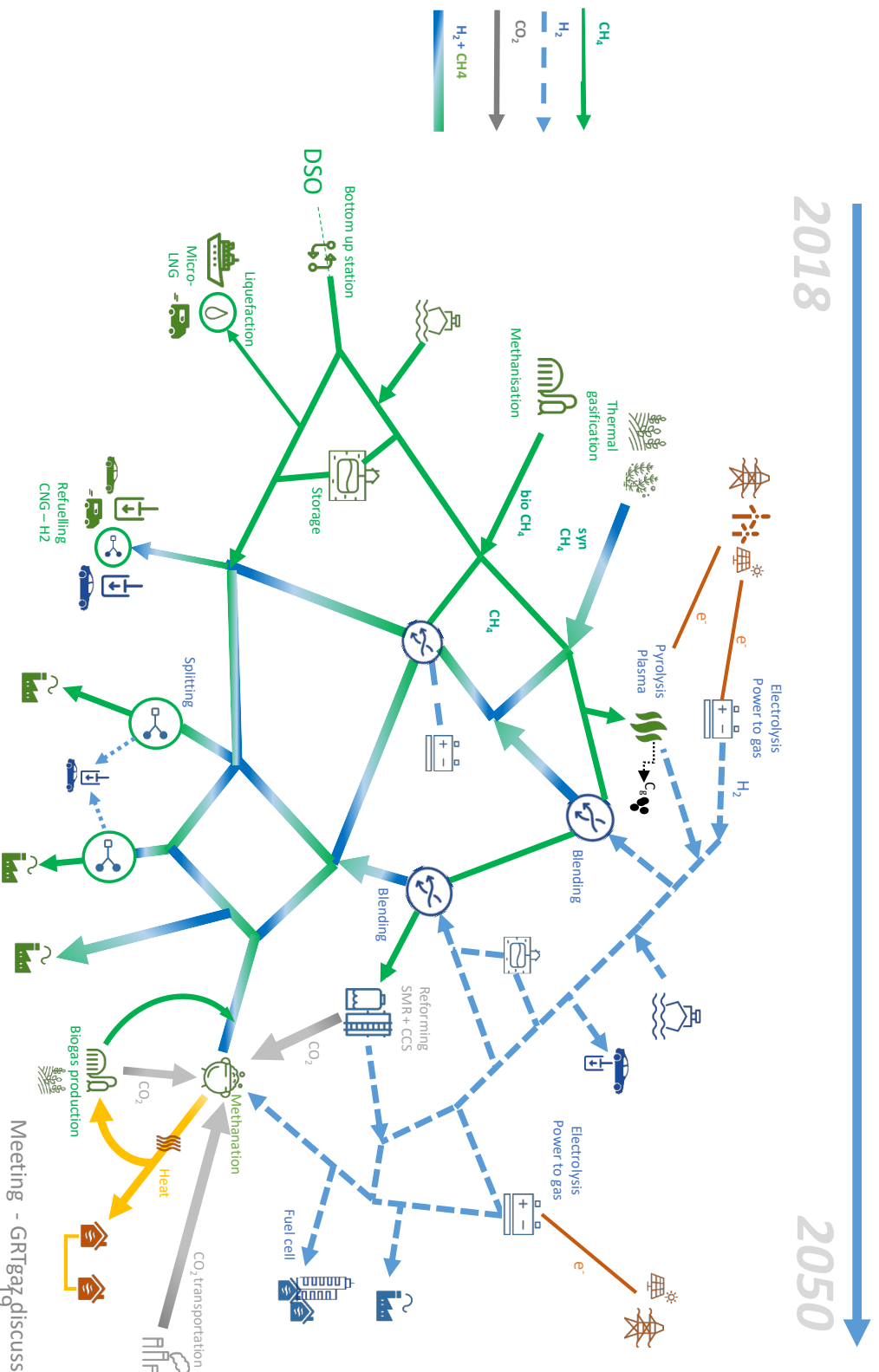


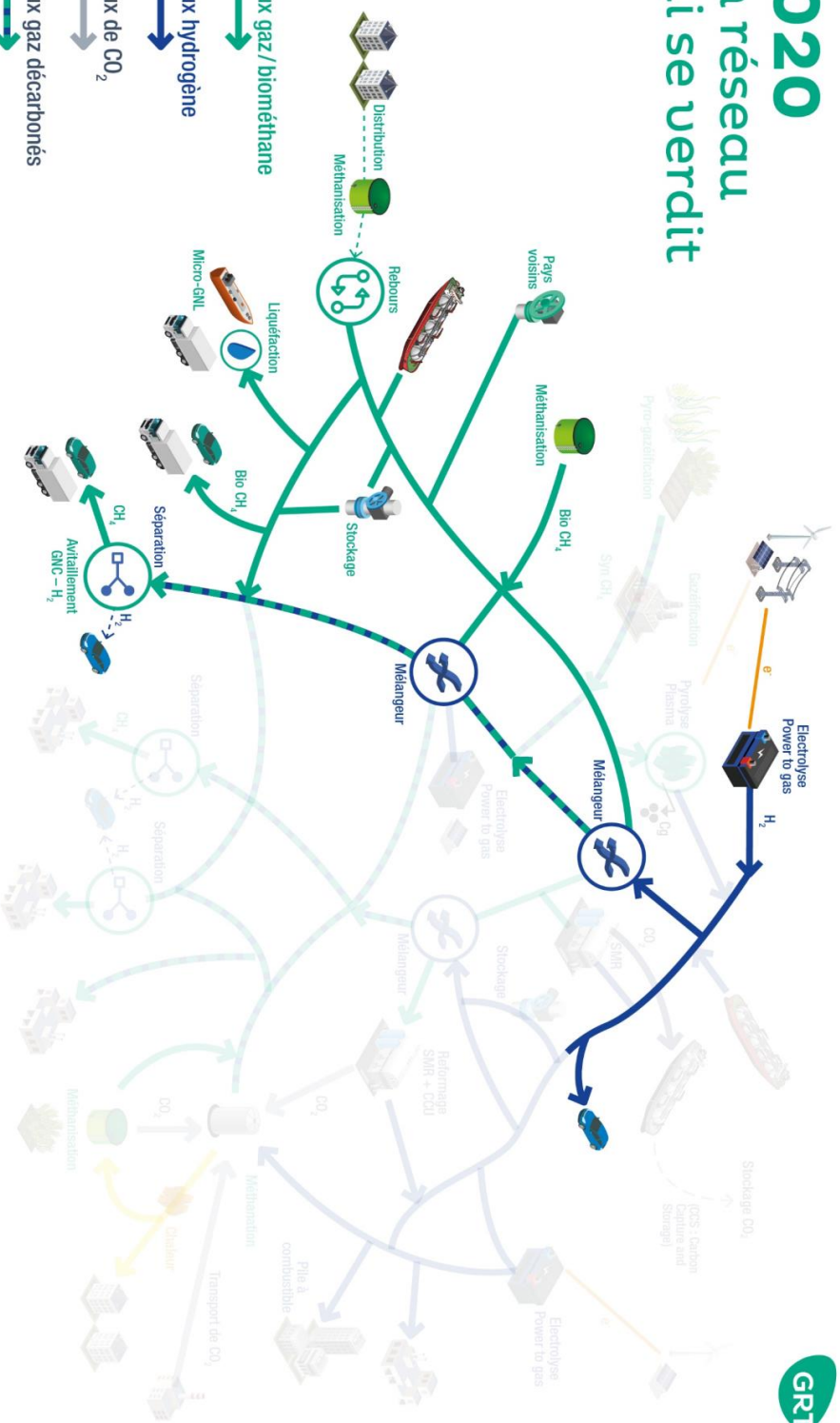
Ten-T Corridor North Sea-Baltic: “H2-backbone”



Fertilizer, Delfzijl NL, Akzo/Gasunie

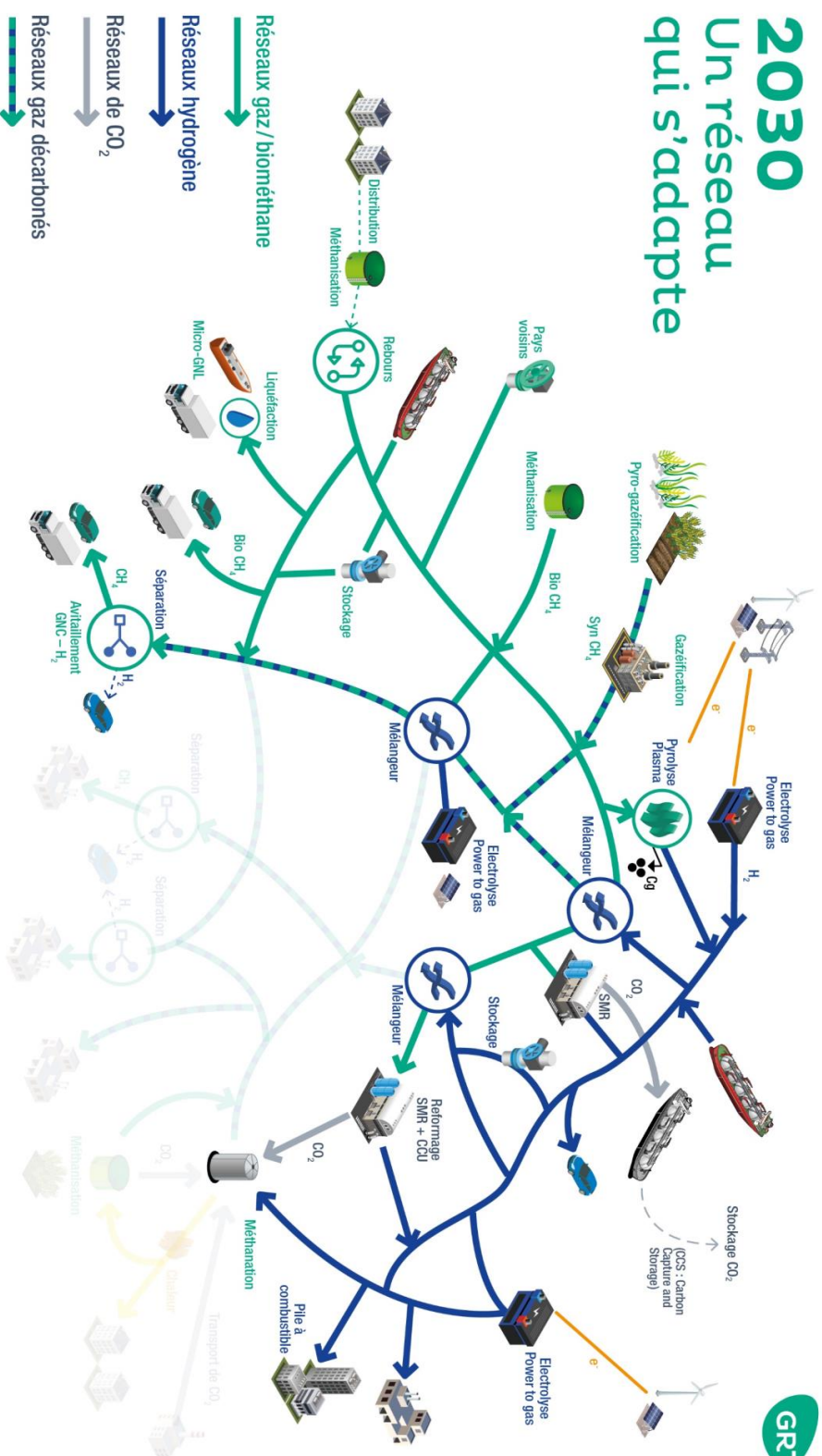




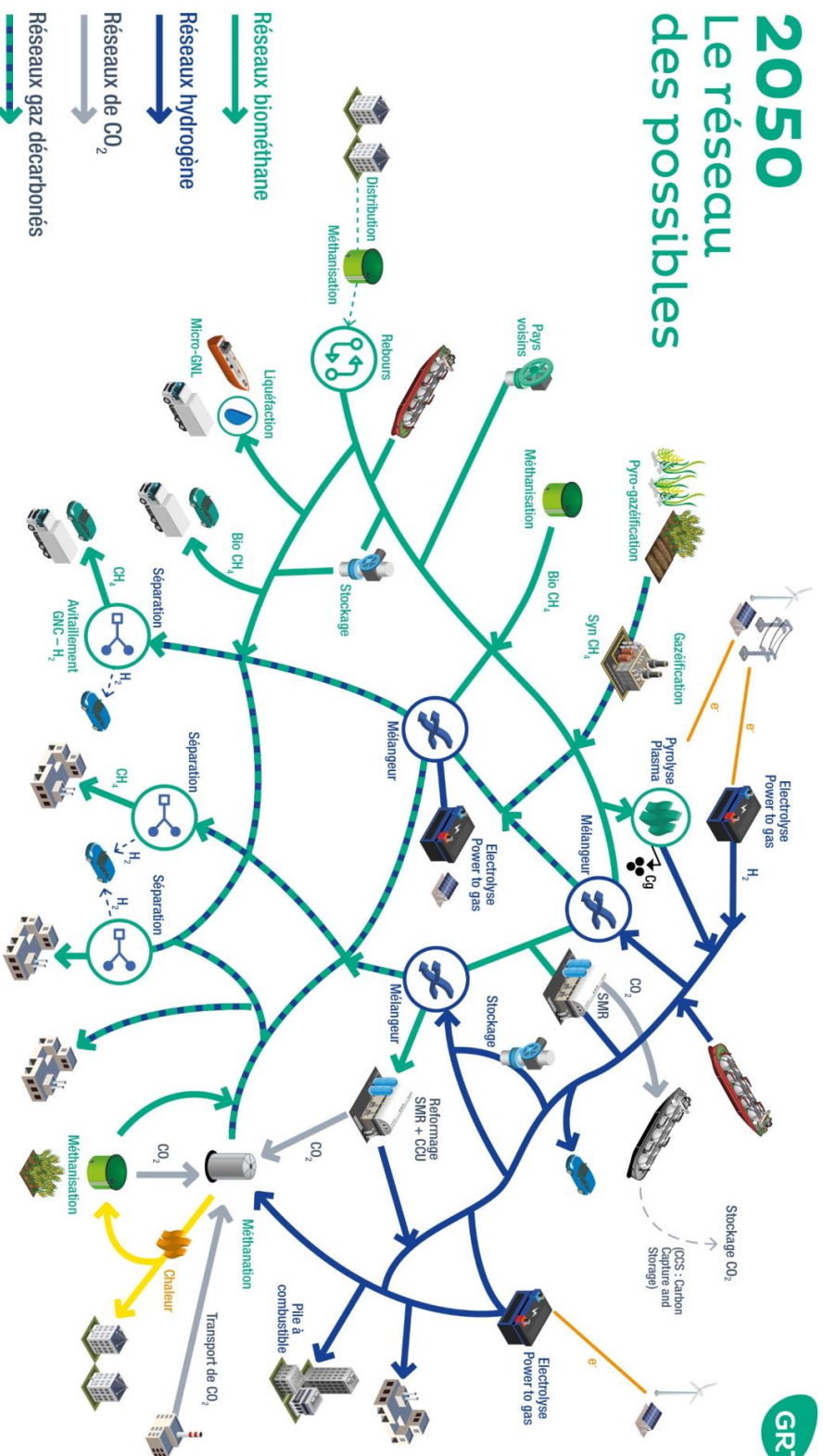


2030

Un réseau qui s'adapte



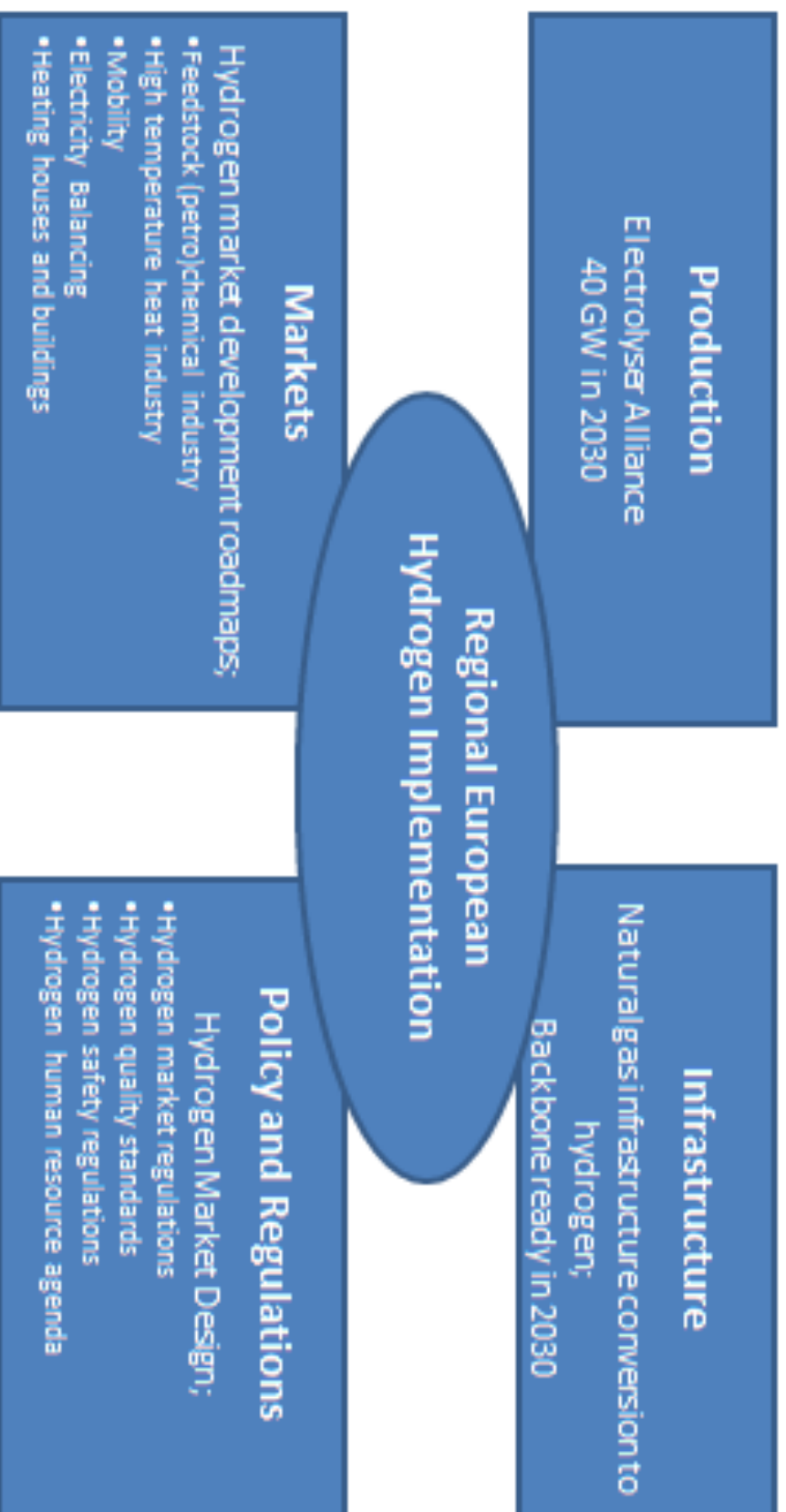
2050 Le réseau des possibles



40 GW Electrolyser Alliance



European Green Hydrogen Action



Want to know more?



Europe's Deep
Decarbonisation:
Solar+Hydrogen

10.07.2018

White Atrium
av. de la Toison d'Or 56-60
BE-1060 Brussels



2018 EUROPEAN
ZERO EMISSION BUS
CONFERENCE

Cologne • November 27 & 28th

HYDROGEN EUROPE
OFFICE OPENING
10th JULY 2018
**COME FOR THE
HYDROGEN,
STAY FOR THE
PARTY!**