

European Perspective of Carbon Free Economy

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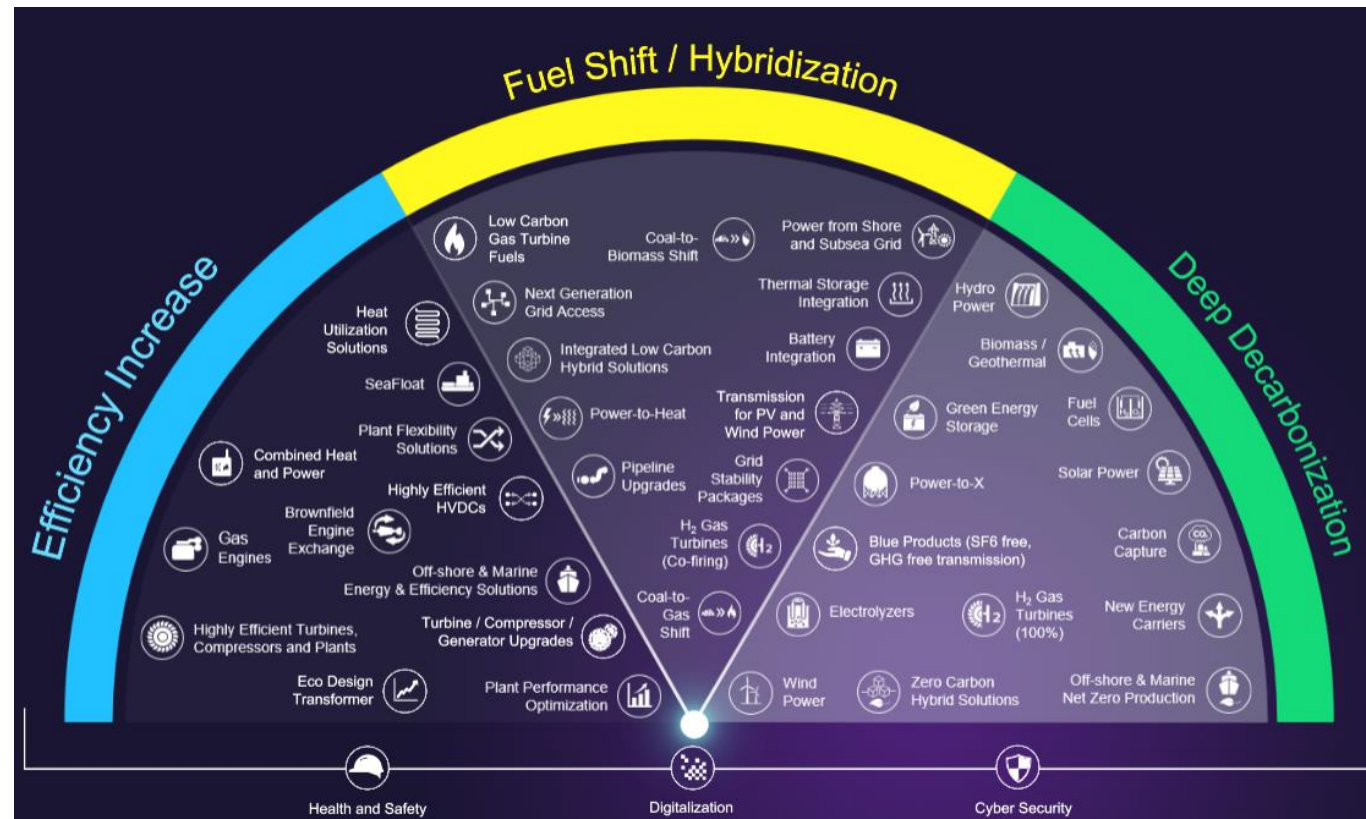
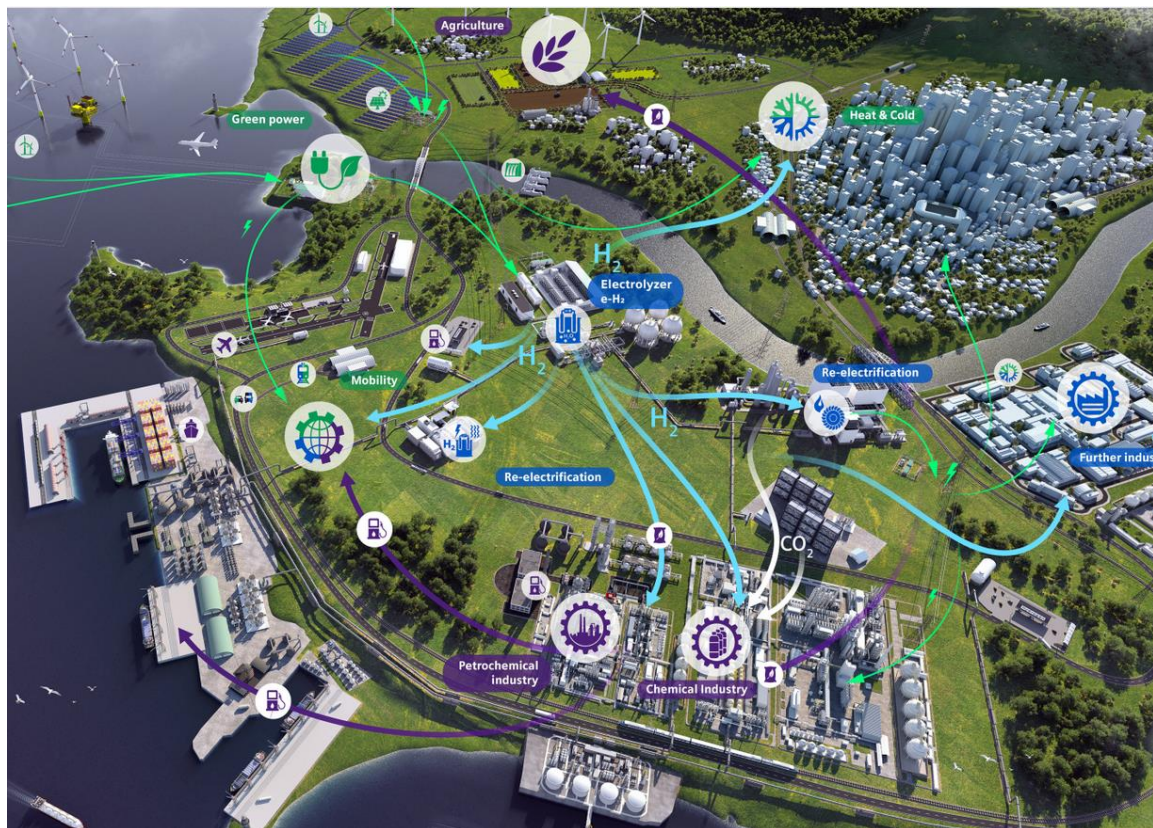


The 6th Low Emission Advanced Power (LEAP) Workshop – Virtual

Hosted by
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THERMOCHEMICAL POWER GROUP
UNIVERSITY OF GENOA (ITALY)
www.tpg.unige.it

Where we go – European Vision 2050



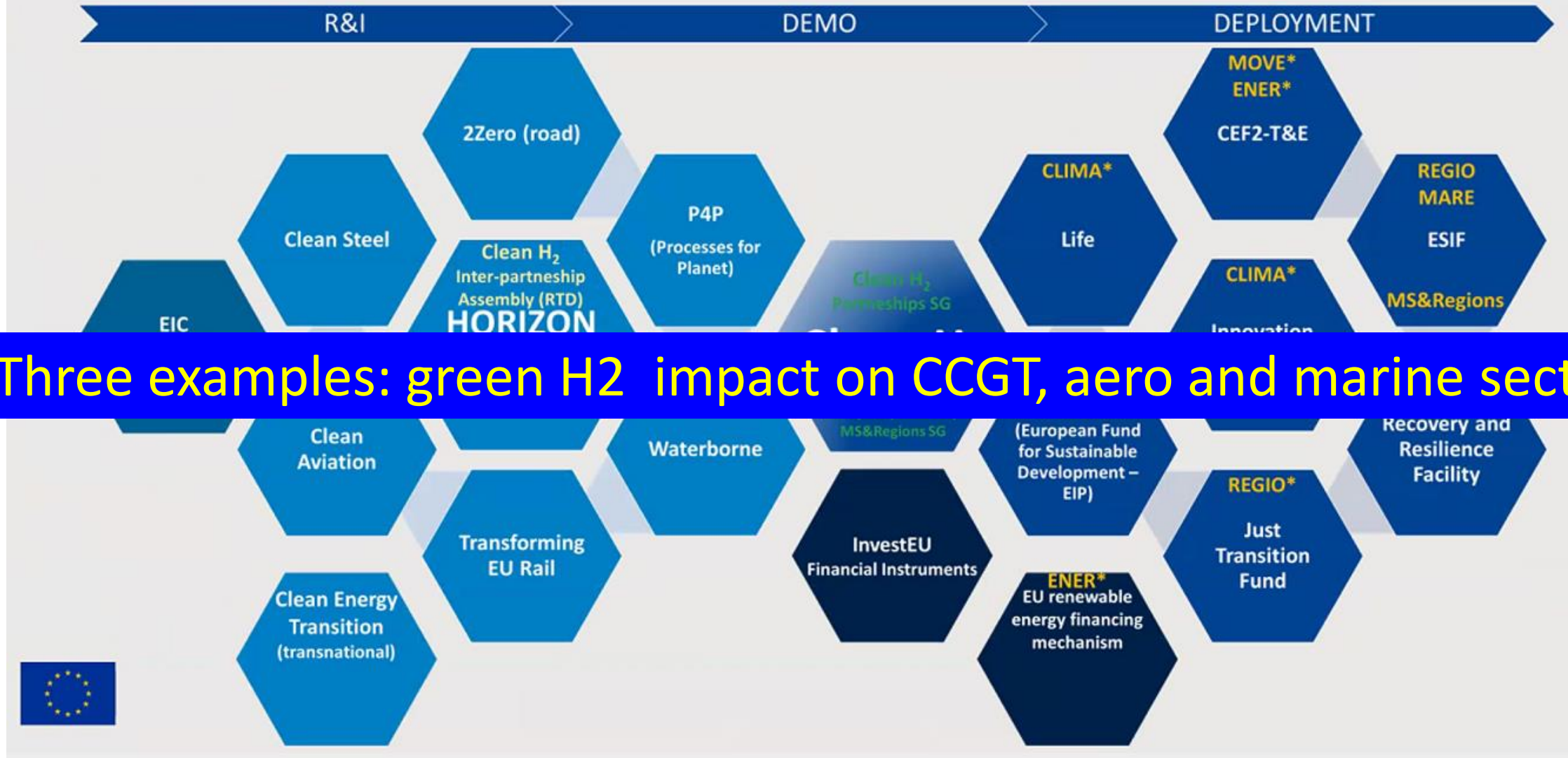
EU Vision 2030

Horizon Europe (work programme 2021-2027)



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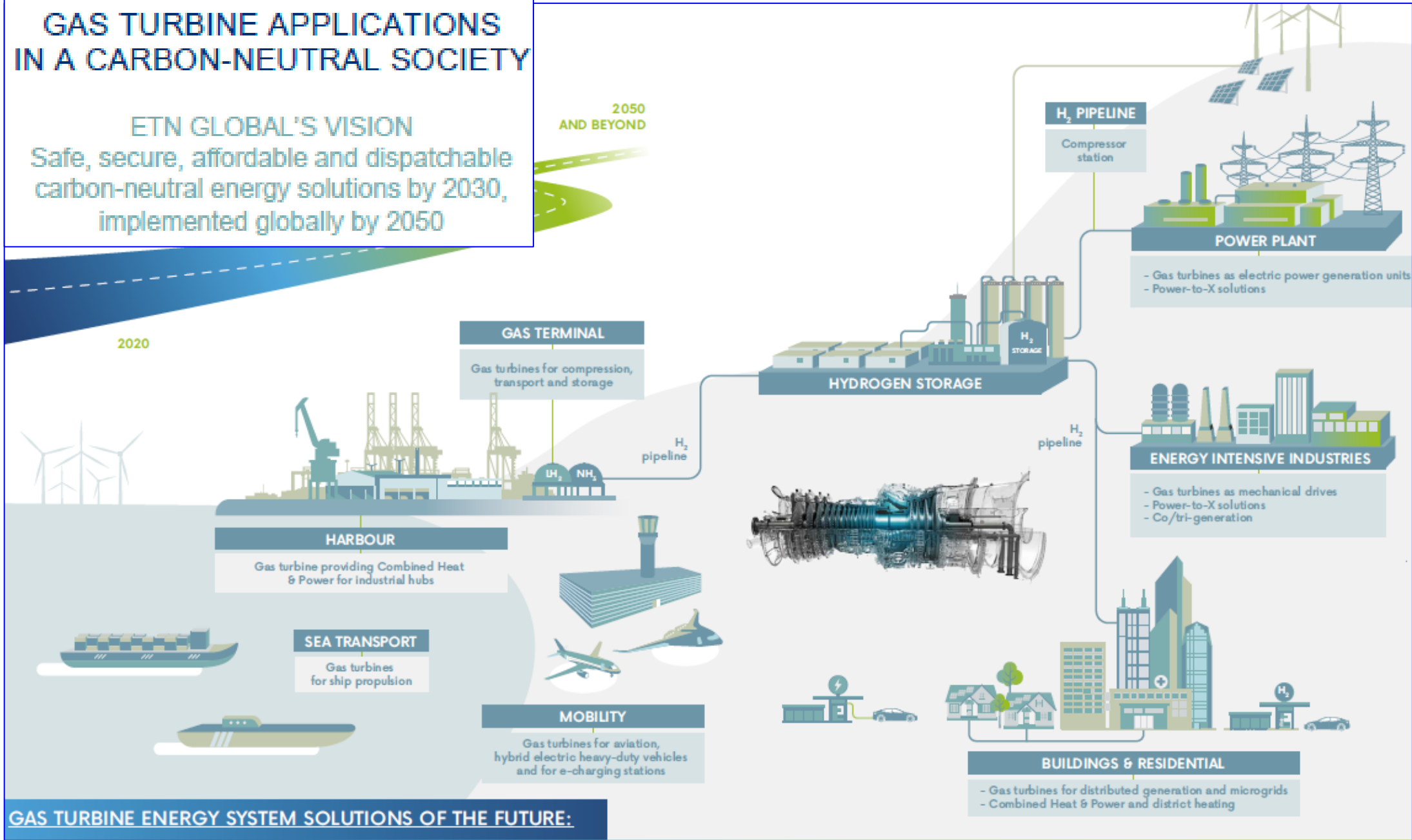


Three examples: green H2 impact on CCGT, aero and marine sectors

GAS TURBINE APPLICATIONS IN A CARBON-NEUTRAL SOCIETY

ETN GLOBAL'S VISION

Safe, secure, affordable and dispatchable
carbon-neutral energy solutions by 2030,
implemented globally by 2050



Zero-Carbon
Fuels for Gas
Turbines

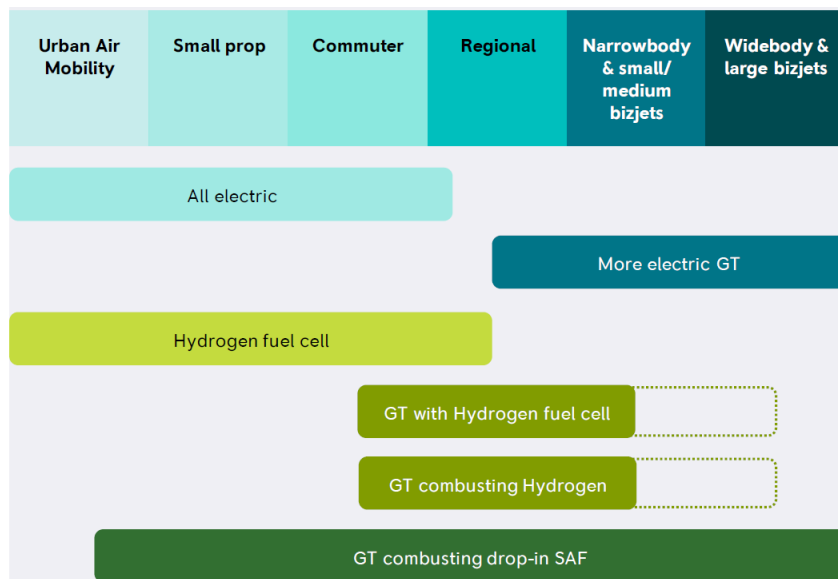
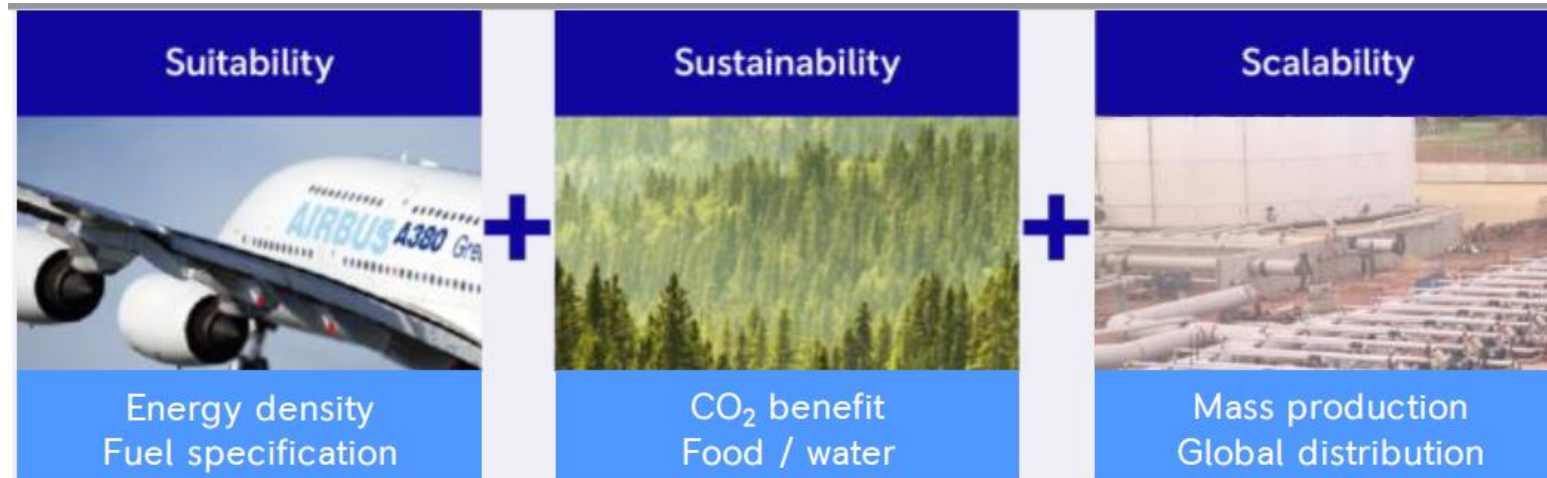
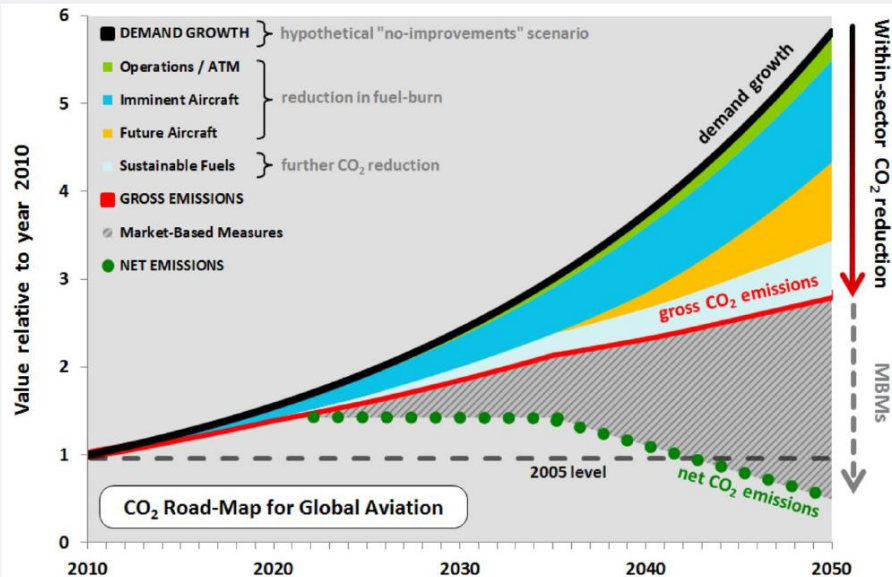
“There’s not
much hydrogen
in hydrogen”

This makes
ammonia a
possible H₂
storage media

Decarbonisation in aviation

Fuel Cell Systems
University Technology Centre

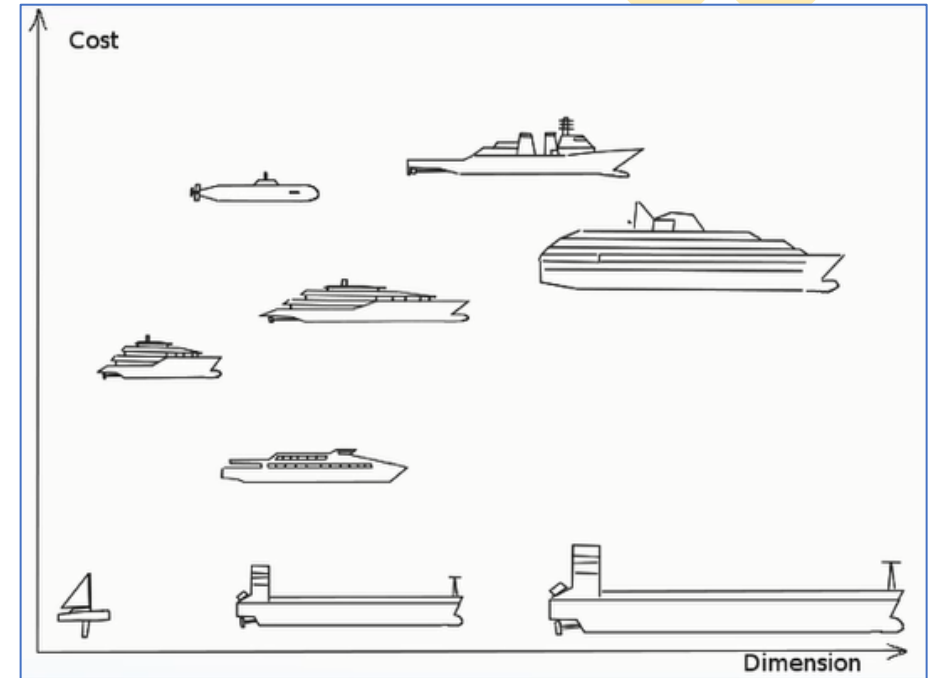
Università degli Studi di Genova
Thermotechnical Power Group
Rolls-Royce



Decarbonisation in marine

Zero-Net Carbon Methane for Electrifying Large Vehicles

- ✓ P2G and CO₂ from biomass (SNG)
- ✓ fully compatible with natural gas (NG) grid infrastructure
- ✓ compatible with NG/LNG trend for HDV, shipping etc.
- ✓ zero-fossil-carbon fuel with considerable reductions in CO, NO_x, SO₂, particle, and noise emissions even in ICE
- ✓ global zero emission scenario when used in fuel cells



FINCANTIERI
The sea ahead

Genova HI-SEA

Hydrogen Initiative for Sustainable Energy Applications



University of
Genova

FINCANTIERI
The sea
ahead



UNIVERSITÀ DEGLI STUDI
DI GENOVA

Decarbonisation in marine: some questions

- 1) Do we have the technologies to make the maritime industry clean and sustainable in the fixed time scale ?
- 2) Do we have the right people to make it happen ?
- 3) Who pays the bill for the green maritime revolution ?
- 4) What could be the best synergy with power generation field ?



Sinergy opportunities: offshore renewable energies

Offshore Wind Supply Chain

*The **strong growth of the off shore wind sector is a great opportunity** that underlies challenges that should not be underestimated.*

*The **ecosystem that satisfies this demand** is complex and heterogeneous. It includes not only the wind energy companies from wind turbines manufactures to electric power generation and distribution players, but also the **shipbuilding** together with the **full supply chain of maritime systems and equipment producers**.*

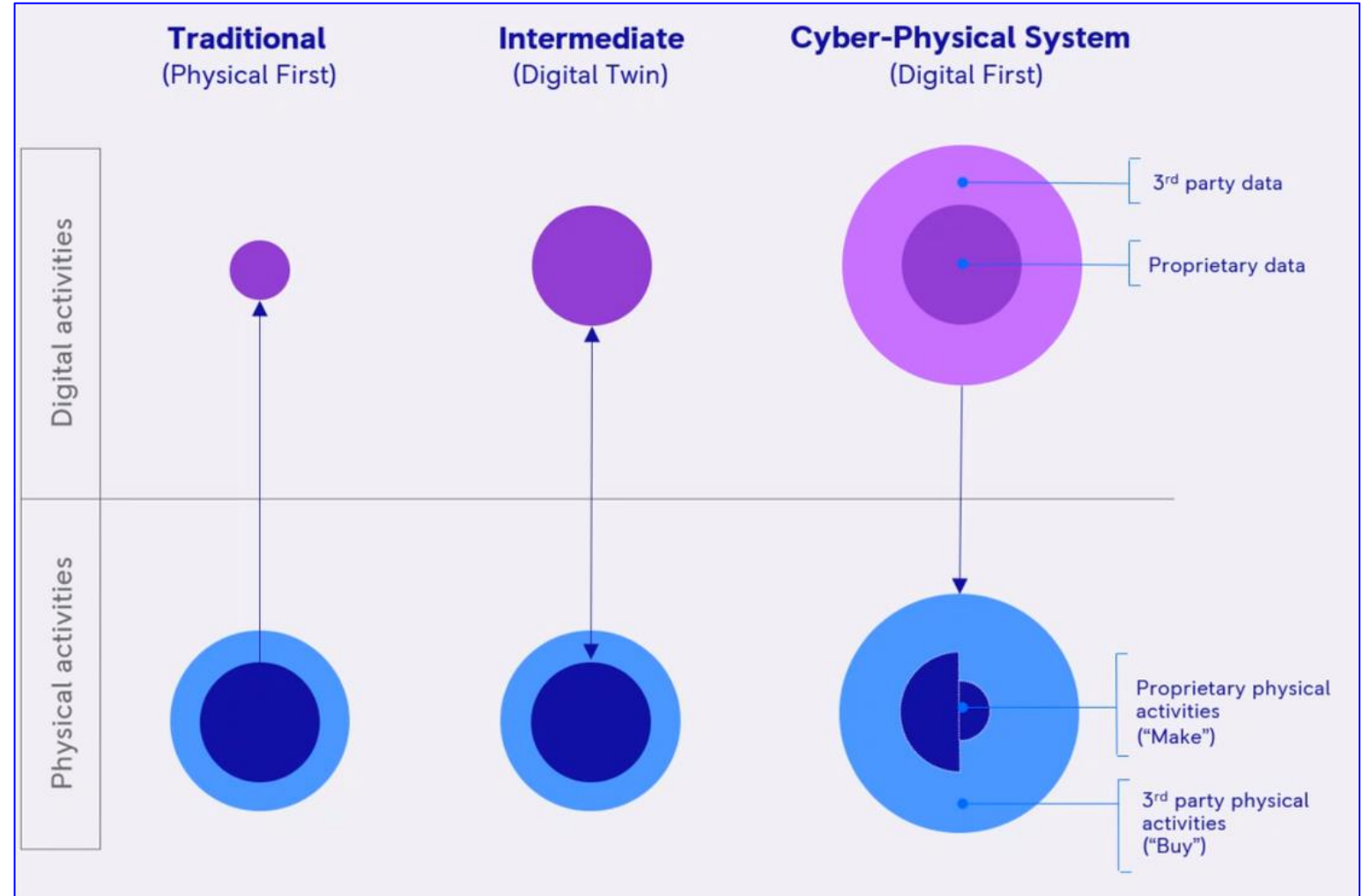
Development and project management		Turbine supply		Balance of plant		Installation and commissioning		Operation, maintenance and service	
1	Surveys, site investigations and development services	2	Turbine components manufacture and assembly	3	Foundation supply	6	Turbine and foundation installation	8	Wind farm operations
				4	Cable supply			9	Turbine maintenance
				5	Substation supply			10	Inspection and repair services
								11	Offshore logistics

We need new approaches i.e. cyber physical systems

Traditionally in the energy field companies have focused on physical manufacturing and services activities.

Digital first organisations focus on growing their digital activities, increasingly making physicality an option.

The full integration of physical and digital activities is referred to as a CPS Cyber-Physical System.



A young boy in a grey sweater and blue jeans stands in a museum, holding a smartphone to take a photo of a large painting. The painting is 'The Night Watch' by Rembrandt, depicting a group of men in 17th-century attire. A small dog is visible in the lower left of the painting. The boy is standing on a wooden floor, and a black railing is in front of him. A large, semi-transparent white circle is overlaid on the left side of the image, containing text.

FINAL MESSAGE

***Drive horizontal value:
Redefine our perspectives***

***To realise our full potential in
the decarbonitation transition
we need both attention to detail
and a broader perspective***

***Young admirer of
The Night Watch by Rembrandt
Rijksmuseum Amsterdam***