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POWERBOX - Mastering Power
A Cosel Group Company

The European Hydrogen Initiative
Can Blue Power be Green?

APEC 2021
PSMA – ENERGY STORAGE - INDUSTRY SESSION 10.2
PATRICK LE FÈVRE – POWERBOX (PRBX) CMO/CCO

The EU H_2 Initiative - Can Blue Power be Green?
Presenter: Patrick Le Fèvre

- → 1982 Started my career in power electronics at Micro-Gisco in France
- → 1986 Developed highly integrated thick-film hybrid PWM DC/DC converter for defense application
- → 1996 Joined Ericsson Power Modules and PRBX in 2015
- → One of the pioneers of the Ericsson Digital Power project
- → Presenting several papers on power electronics
- → PSMA Energy Management, Reliability and Energy Storage committee's member
- → High engagement in sustainability and PRBX representative at the United Nations Global Compact (UNGC)

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The EU H_2 Initiative - Can Blue Power be Green?
Overview

→ The European Green Deal

→ A hydrogen strategy for a climate-neutral Europe

→ European Clean Hydrogen Alliance

→ Challenges

→ From Micro-Grid to Airplane

→ Conclusions

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The EU H_2 Initiative - Can Blue Power be Green?
The European Green Deal

→ Europe to become the first climate neutral continent by 2050
- Energy security, solidarity and trust
- A fully-integrated internal energy market
- Energy efficiency contributing to moderation of demand
- Decarbonizing the economy
- Research, innovation and competitiveness

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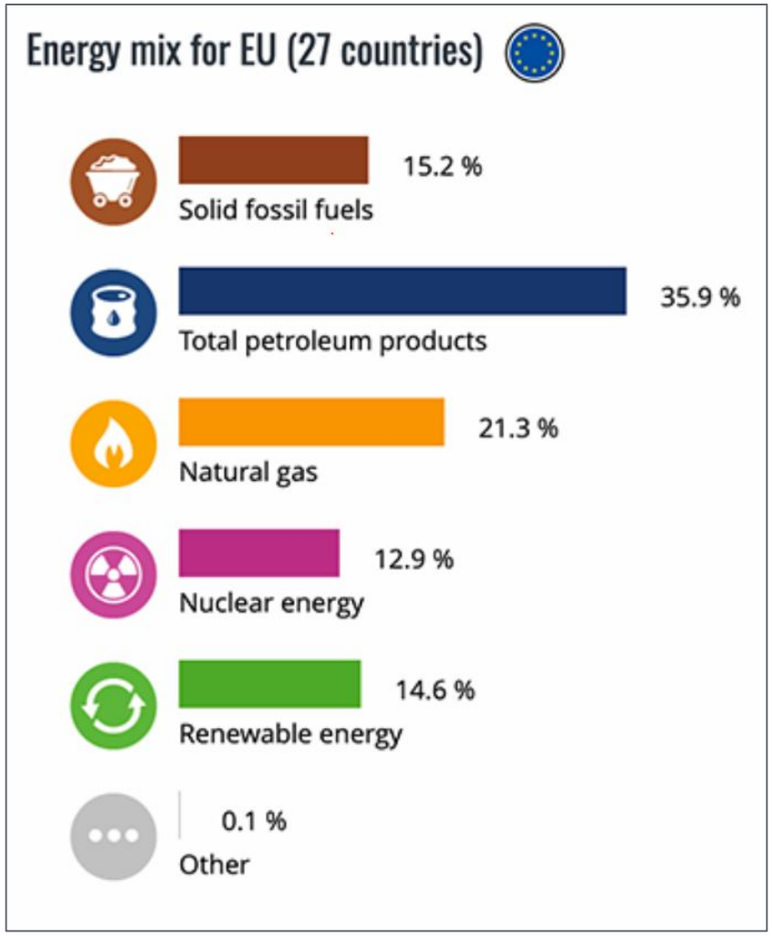
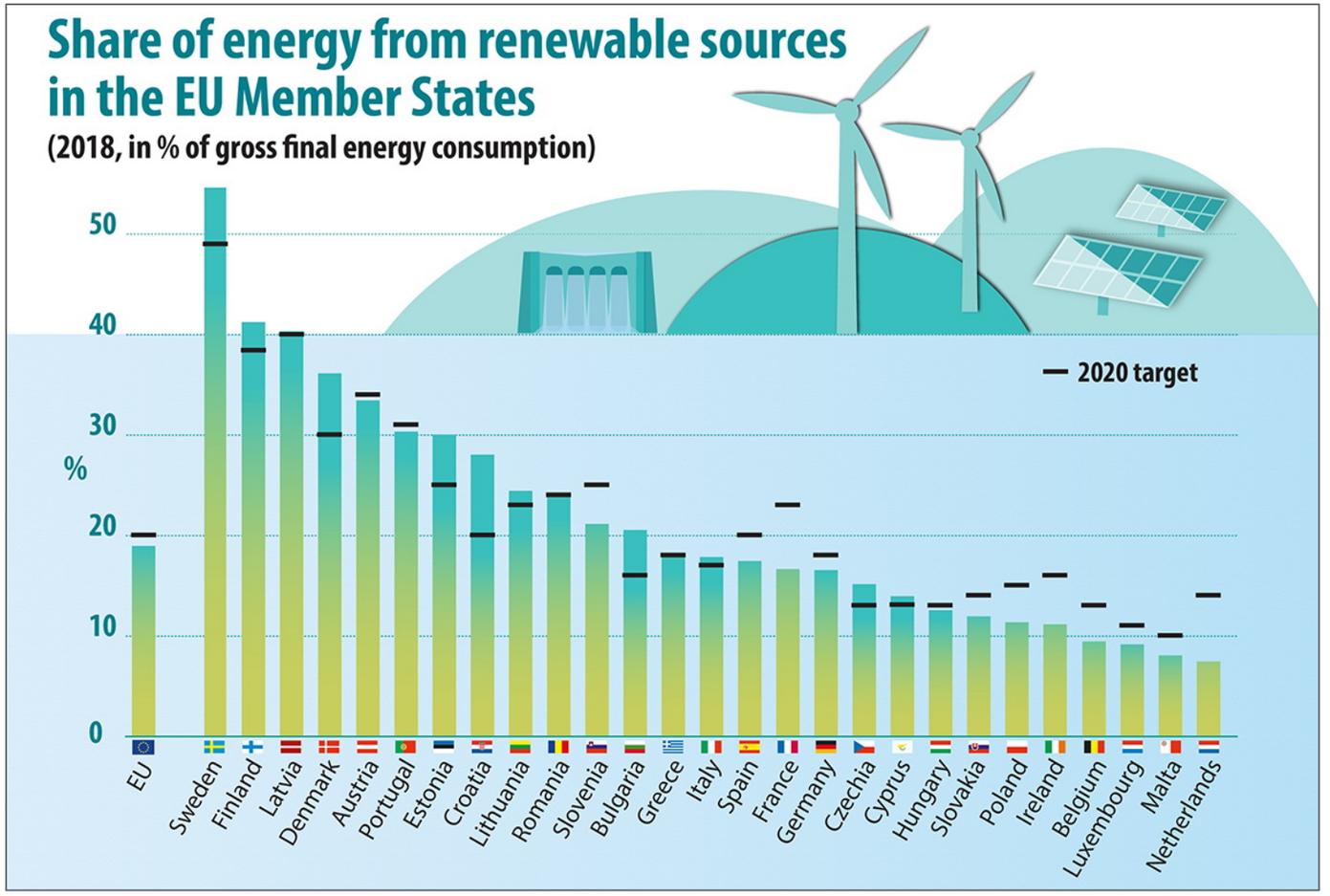
The EU H_2 Initiative - Can Blue Power be Green?
Share of Energy Sources





Source EC.EUROPA.EU/eurostat

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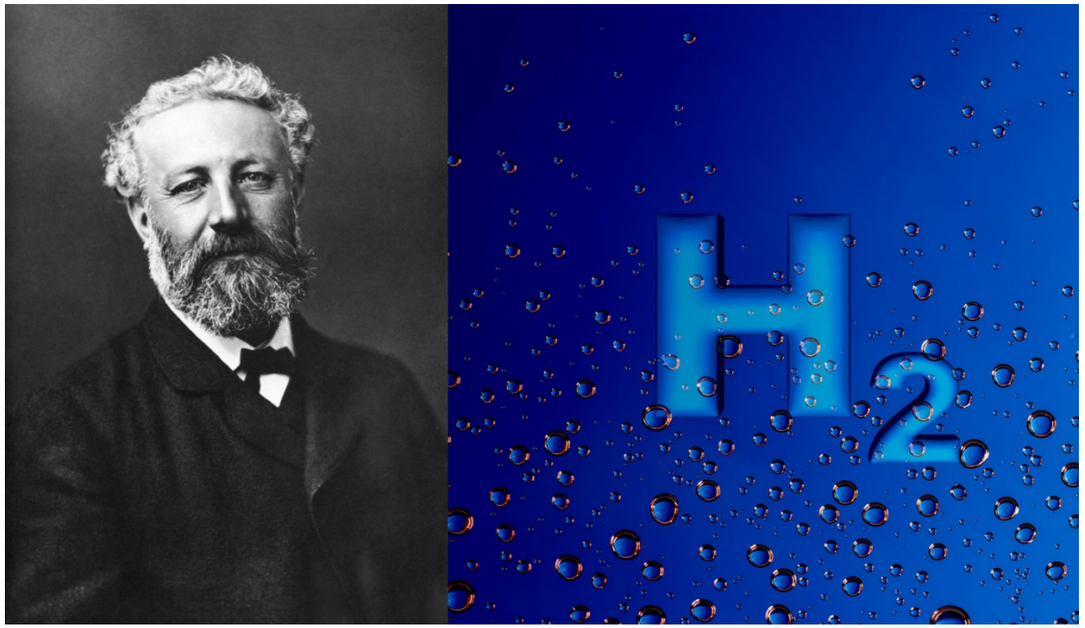
The EU H_2 Initiative - Can Blue Power be Green? Back on time!



→ In 1874, science fiction author Jules Verne set out a prescient vision that has inspired governments and entrepreneurs in the 147 years since.

→ In his book “The Mysterious Island”, Verne wrote of a world where:

> “Water will one day be employed as fuel, that hydrogen and oxygen which constitute it, used singly or together, will furnish an inexhaustible source of heat and light, of an intensity of which coal is not capable”.

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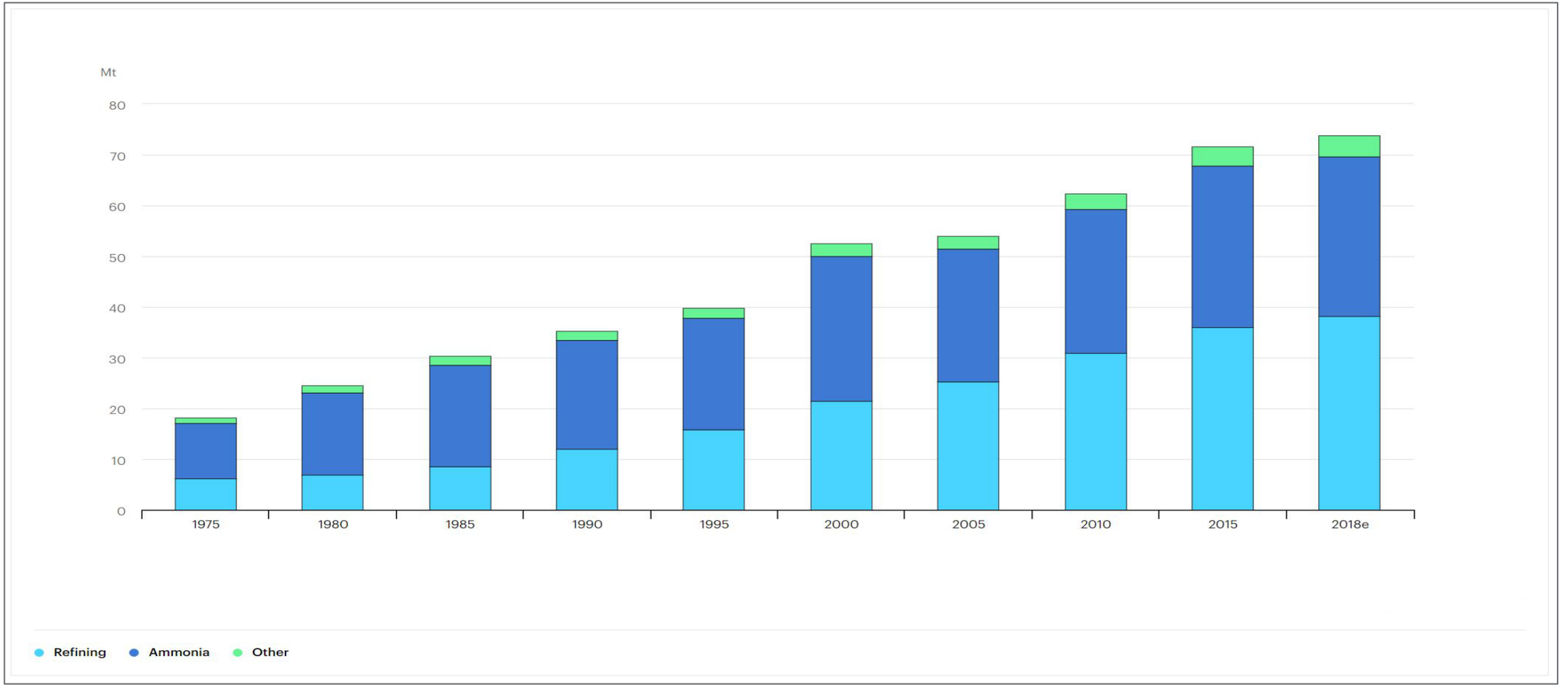
The EU H_2 Initiative - Can Blue Power be Green?
Global demand for pure hydrogen 1975-2018



Source: International Energy Agency (IEA)

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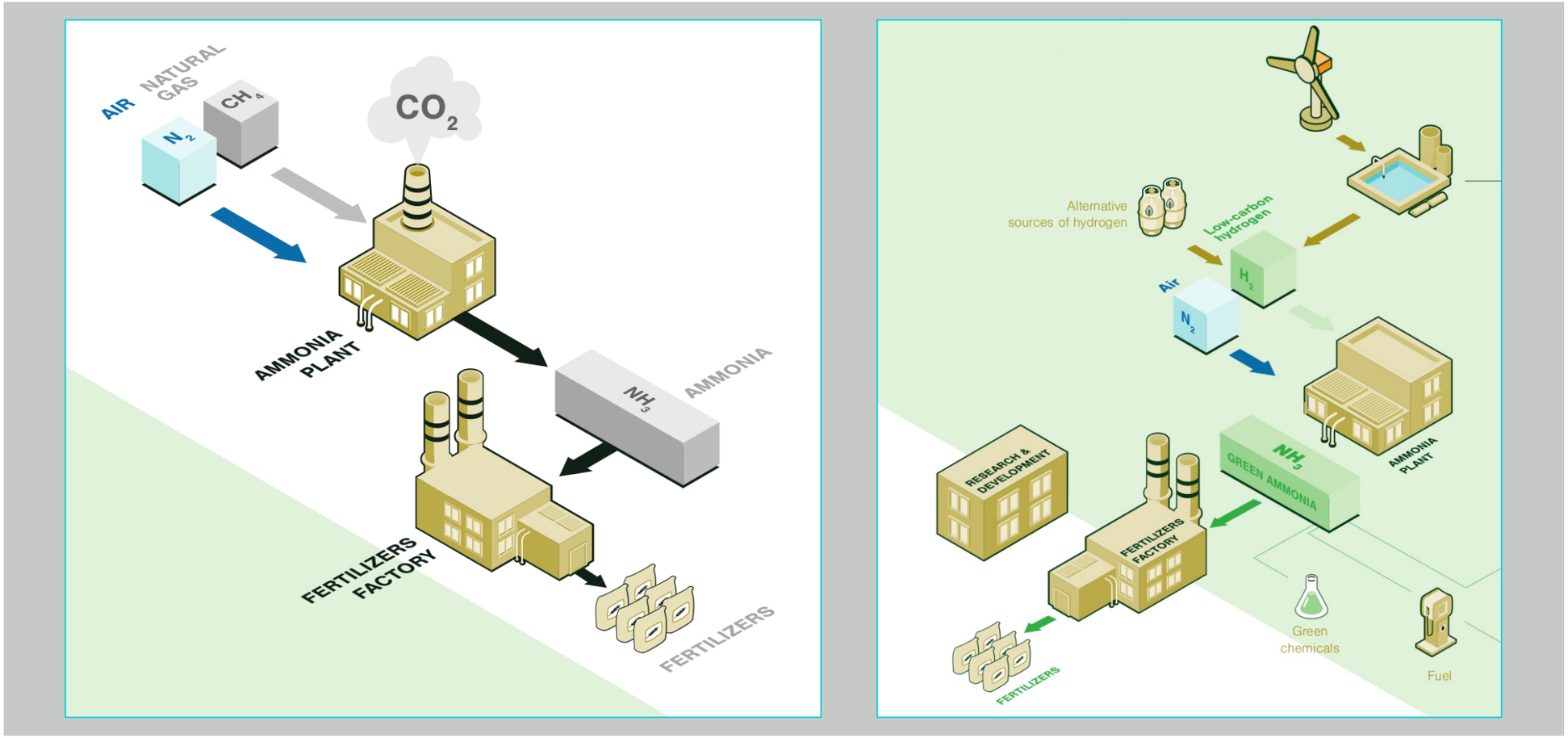
The EU H_2 Initiative - Can Blue Power be Green?
2050 green ammonia and low-carbon fertilizer



Source: Fertilizer Europe

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The EU H_2 Initiative - Can Blue Power be Green?
Hydrogen production

→ Natural Gas Reforming/Gasification

→ Electrolysis

→ Renewable Liquid Reforming

→ Fermentation

→ Several hydrogen production methods are at an early experimental stage

→ Advanced researches

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The EU H_2 Initiative - Can Blue Power be Green?
The EU Hydrogen Strategy

"To become climate-neutral by 2050, Europe needs to transform its energy system, which accounts for 75% of the EU's greenhouse gas emissions. The EU strategies for energy system integration and hydrogen, will pave the way towards a more efficient and interconnected energy sector, driven by the twin goals of a cleaner planet and a stronger economy."

Brussel, July 8, 2020

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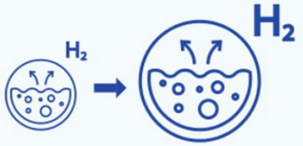
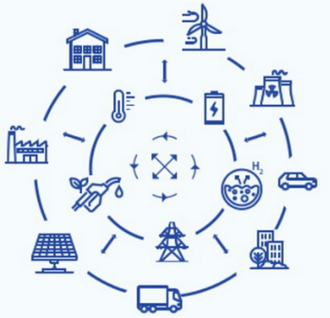
The EU H_2 Initiative - Can Blue Power be Green?
The EU Hydrogen Strategy Tollgates



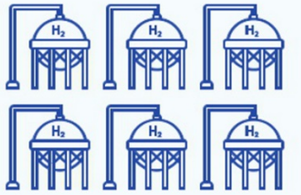
Today - 2024

From now to 2024, we will support the **installation of at least 6GW of renewable hydrogen electrolysers in the EU**, and the production of **up to 1 million tonnes** of renewable hydrogen.



2025 - 2030

From 2025 to 2030, hydrogen needs to **become an intrinsic part of our integrated energy system**, with at least 40GW of renewable hydrogen electrolysers and the production of **up to 10 million tonnes** of renewable hydrogen in the EU.



2030 -

From 2030 onwards, **renewable hydrogen will be deployed at a large scale** across all hard-to-decarbonise sectors.

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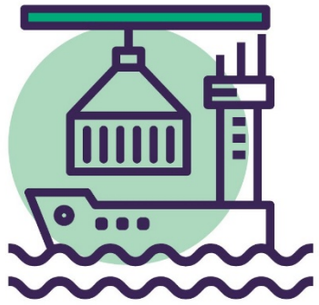
The EU H_2 Initiative - Can Blue Power be Green?
Projects contributing to the Hydrogen Strategy

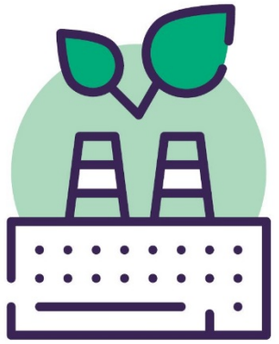
AVIATION
HEAVEN

REGULATION
CERTIFICATION
CERTIFHY

REFUELLING STATIONS
HYDROGEN CARS
MOBILITY
H2ME



MARITIME – PORT
INFRASTRUCTURE
H2PORTS



SUSTAINABLE INDUSTRY
STEEL PRODUCTION
HEAVY INDUSTRY
H2FUTURE

PUBLIC TRANSPORT
SUSTAINABLE CITIES
BUSES – MOBILITY
JIVE and JIVE2

SOLAR ENERGY
POWER-TO-X
SUSTAINABLE INDUSTRY
PECSYS'

More information on the projects funded by Horizon 2020 is available at cordis.europa.eu

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The EU H_2 Initiative - Can Blue Power be Green?
The Hydrogen Europe Association

"Would hydrogen be a human being, it would not be a child anymore, but it's not an adult either. Hydrogen is like a teenager with a huge potential, which deserves to blossom. It is our responsibility to help it grow, to have a very strong character and have a great future.

However, adolescence is always a difficult phase.

So, let's keep our collective mindset.

We are not there yet! We need to do it together!"

Valérie Bouillon-Delporte
President of Hydrogen Europe

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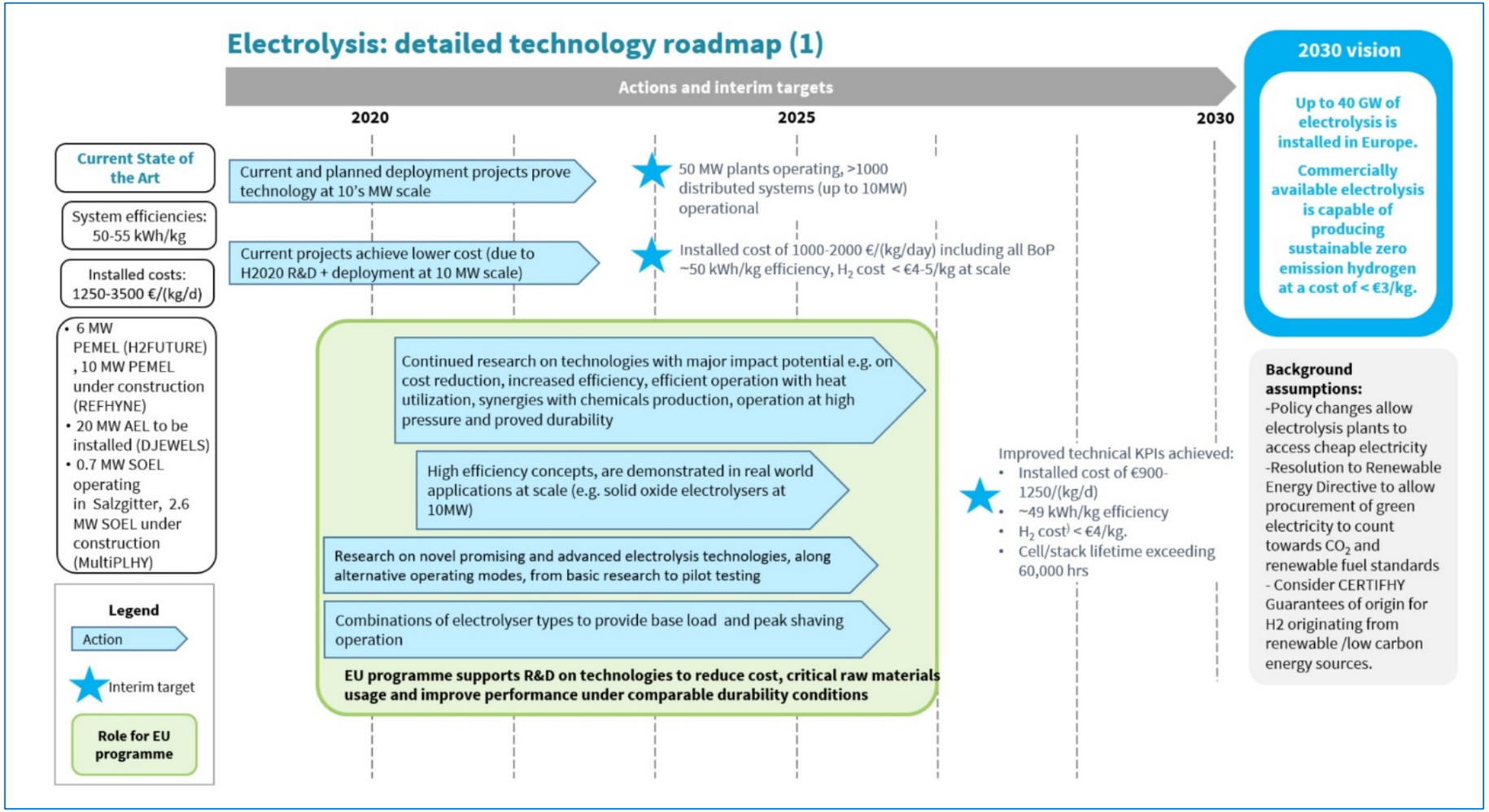
The EU H_2 Initiative - Can Blue Power be Green? Challenges



Source: Hydrogen Europe - Strategic Research and Innovation Agenda (Final Draft July 2020)

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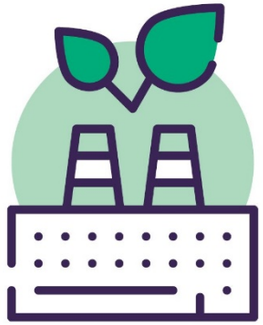
The EU H_2 Initiative - Can Blue Power be Green?
The H2FUTURE "green" hydrogen to steel industry

Voestalpine, VERBUND, Siemens, Austrian Power Grid, K1-MET and TNO are researching into the industrial production of green hydrogen.

→ Steel manufacturer "Voestalpine" in Linz (Austria)

→ Project receives 18 million EUR in EU funding

→ Project started 1st January 2017 and has a duration of 4.5 years



Goal to reduce CO2 emissions by 80% by 2050

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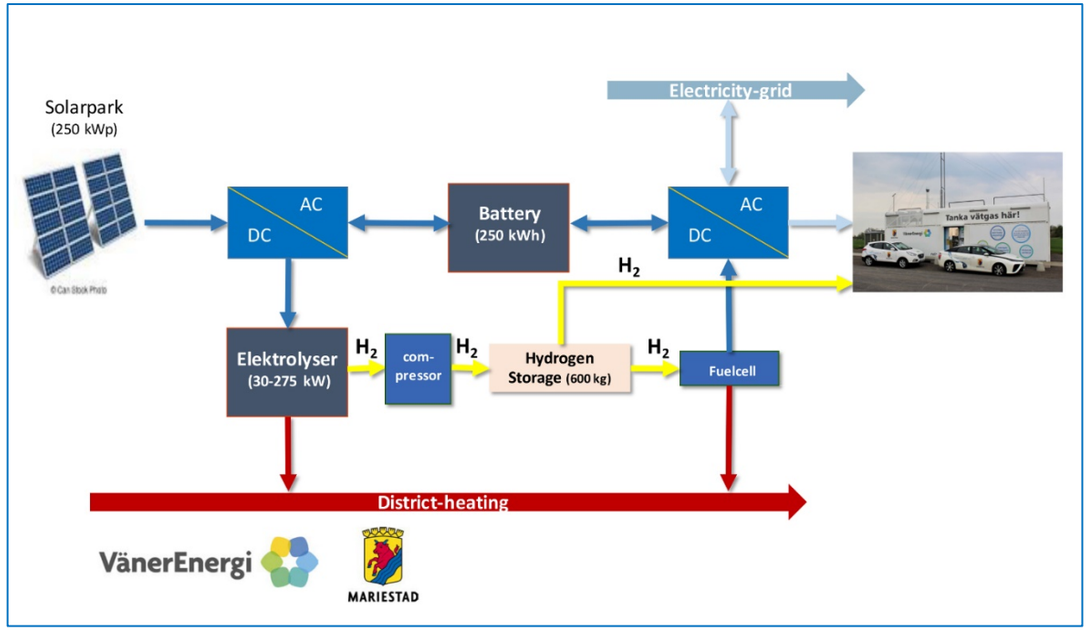
The EU H_2 Initiative - Can Blue Power be Green?
Micro-Grid and H_2 station in Mariestad Sweden



- → Local project to provide micro-grid power and to offer refueling station for service vehicle
- → Business model tested to deploy to school, business park and others in the region
- → Larger scale projects considered e.g.; Local train powered by hydrogen

REFUELLING STATIONS
HYDROGEN CARS
MOBILITY
H2ME

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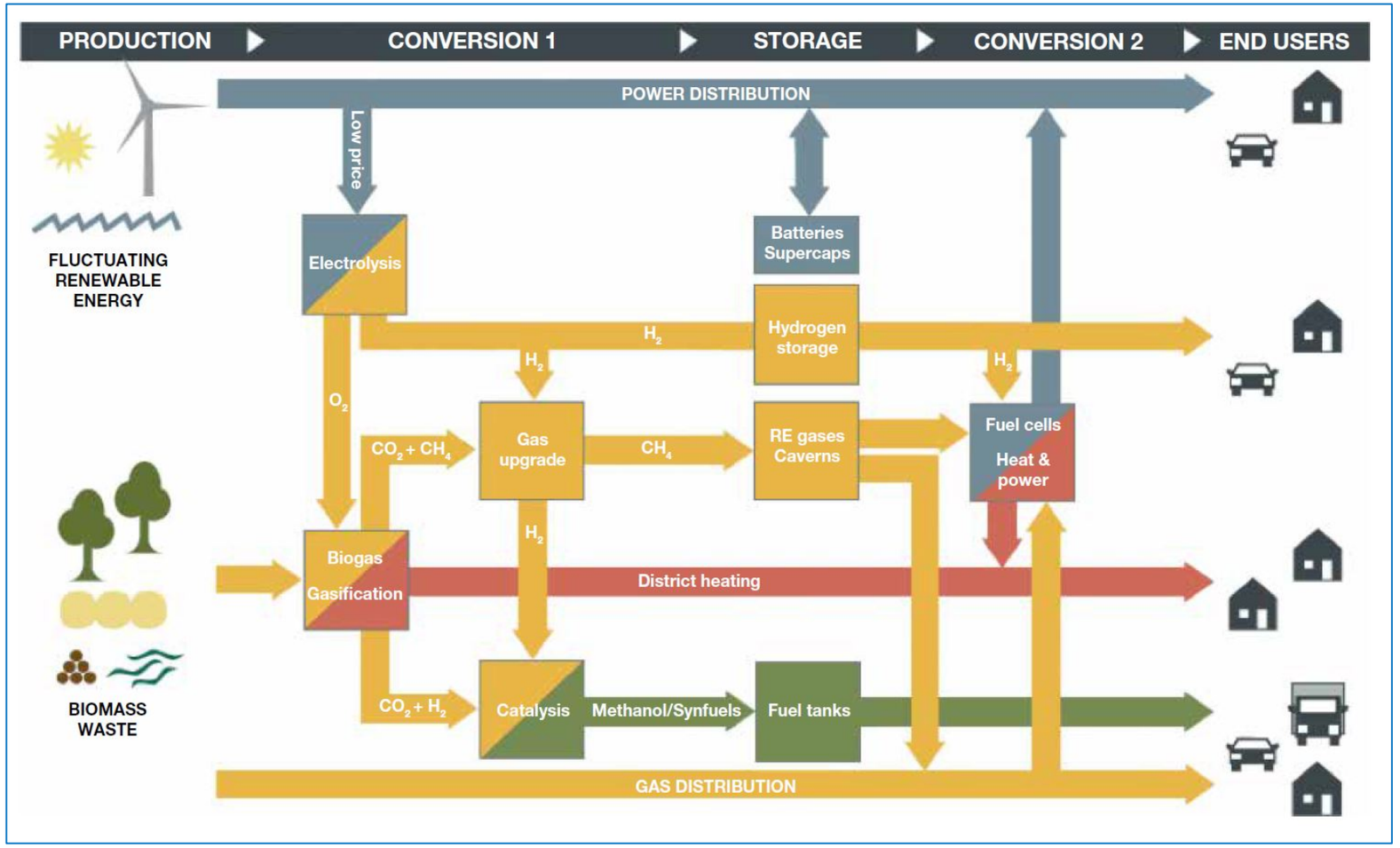
The EU H_2 Initiative - Can Blue Power be Green?
The Danish Partnership for Hydrogen and Fuel Cells



The project Green Hydrogen Hub Denmark aims to establish one of the World's largest green hydrogen production plants and combine it with an underground hydrogen storage in the area between Hobro and Viborg.

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The EU H_2 Initiative - Can Blue Power be Green?
The Nordic Hydrogen Corridor

Everfuel · HYUNDAI · Statkraft · TOYOTA · VÄTGAS SVERIGE

REFUELLING STATIONS
HYDROGEN CARS
MOBILITY
H2ME

PSMA

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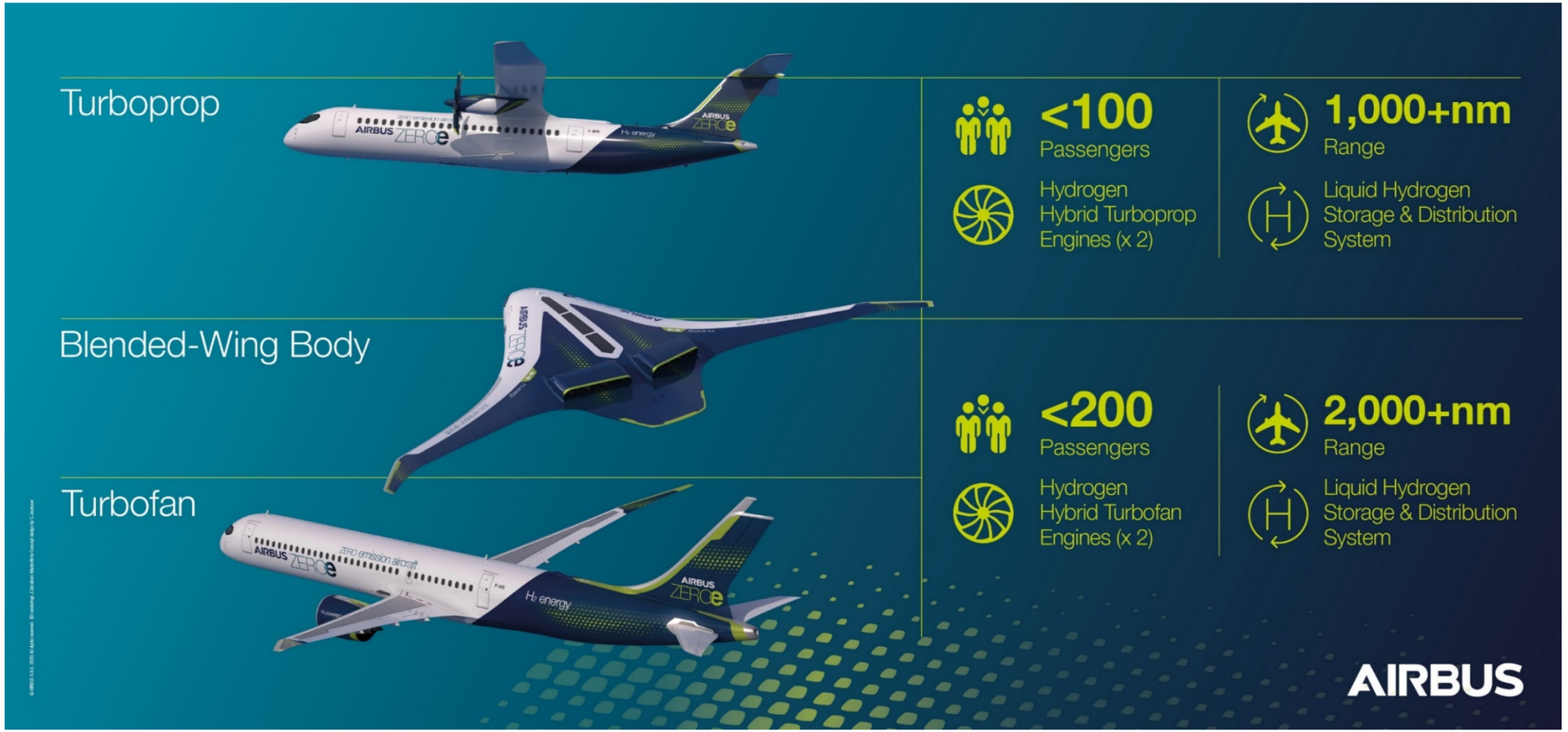
The EU H_2 Initiative - Can Blue Power be Green?
AIRBUS The ZEROe project



HEAVEN will allow zero-emissions long-range flights.

Source: AIRBUS Industry

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The EU H_2 Initiative - Can Blue Power be Green?
The World's Largest Green Hydrogen Project

→ Shell Netherlands, the Dutch gas grid operator Gasunie and the port of Groningen joined forces in the NortH2 project

NortH$_2$

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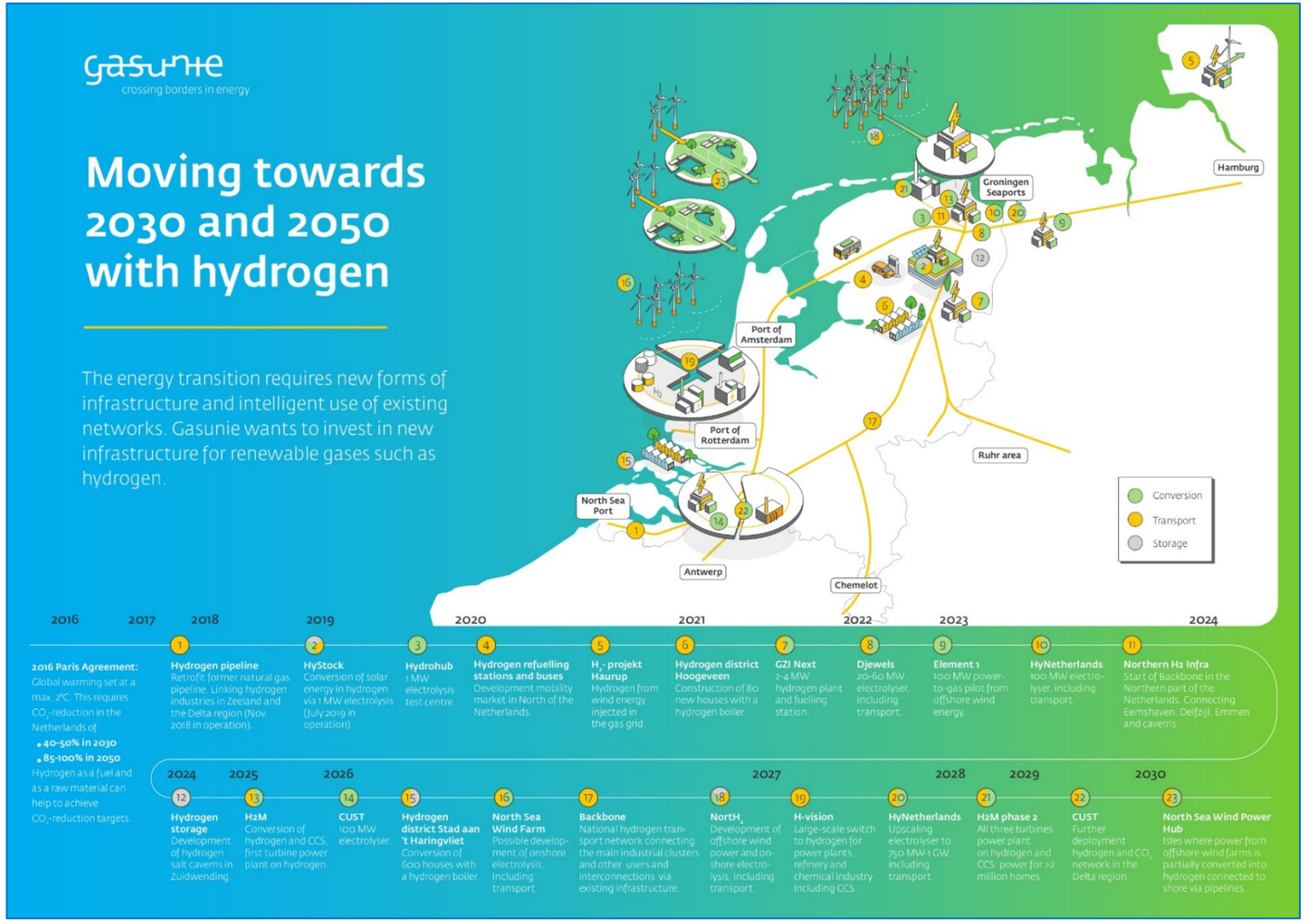
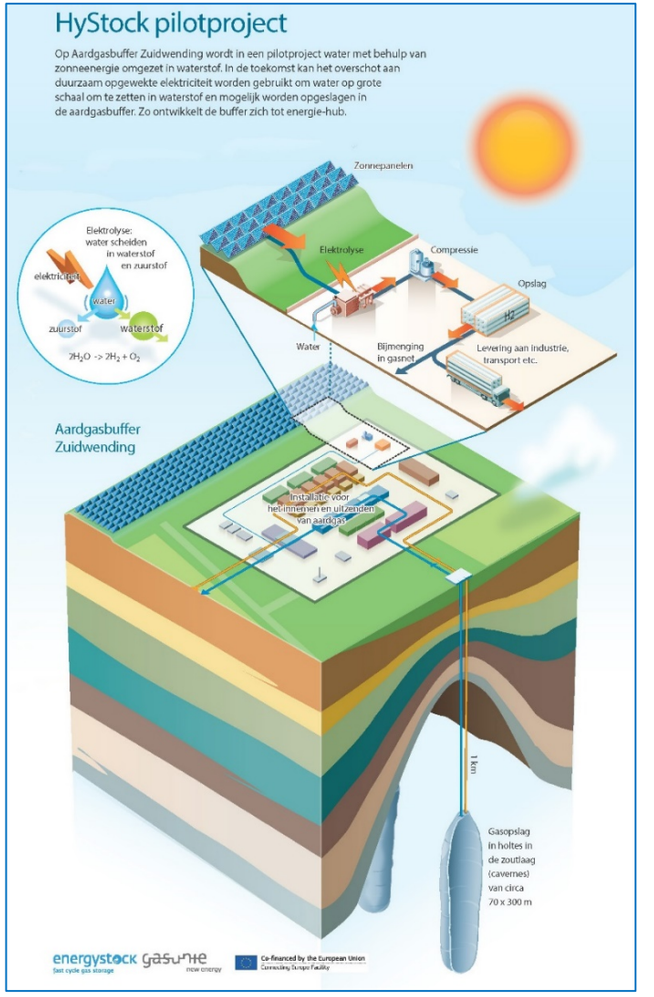
The EU H_2 Initiative - Can Blue Power be Green?
The Netherlands Hydrogen Valley project





Source: GASUNIE

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The EU H_2 Initiative - Can Blue Power be Green?
In Conclusion

→ The European Hydrogen Initiative is moving forward

→ The number of projects and the level of researches have never been so high

→ Energy storage will benefit from hydrogen deployment

→ H_2 will be a significant part of the renewable energy ecosystem

→ Europe has 29 years to go to become the Climate Neutral Continent

→ Yes: “The Blue Power can be Green!”

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Thank you!

Hydrogen
for Climate Action

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