

Building Hydrogen Valleys: Lessons Learnt from the ground

Košice Hydrogen Valley Workshop

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AGENDA

- 1) About Energy
- 2) Hydrogen Valleys:
 - a) Concept
 - b) A Selection of our project examples
- 3) Building a Hydrogen Valley: challenges & lessons learnt

OUR MISSION

Energy's Mission is to enable the Sustainable Energy Transition

We are committed to contributing to the EU Net Zero goals by helping to

reduce at least half a million tons of CO2 equivalent emissions from the European economy by 2030

by building green hydrogen infrastructure in the transport, industry, energy and built environment sectors.



Our Expertise - Green Hydrogen Valleys

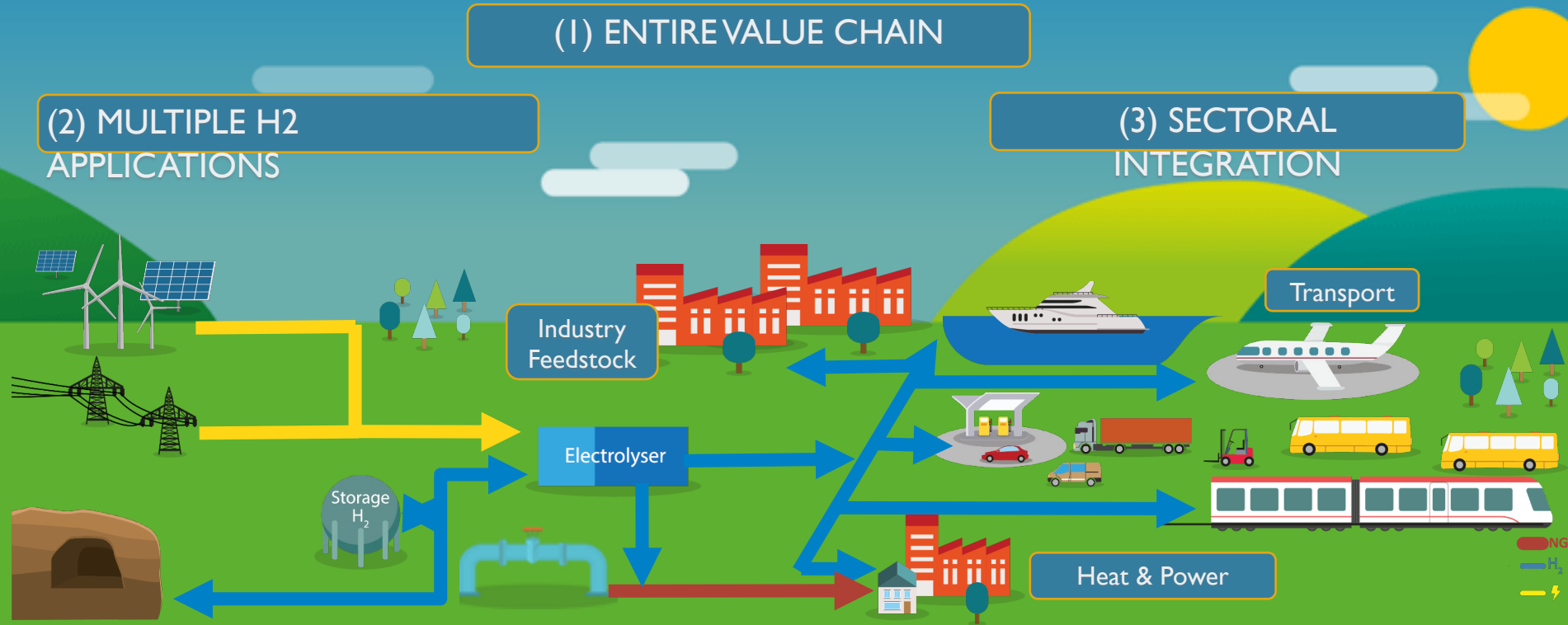


Hydrogen Valleys

- The concept

Hydrogen Valley: the concept

Integrated H₂ ecosystem (local/regional) including deployment of hydrogen across the **whole value chain** (supply/distribution/end-use) and **multiple applications across sectors** (heat, power, mobility, industry)

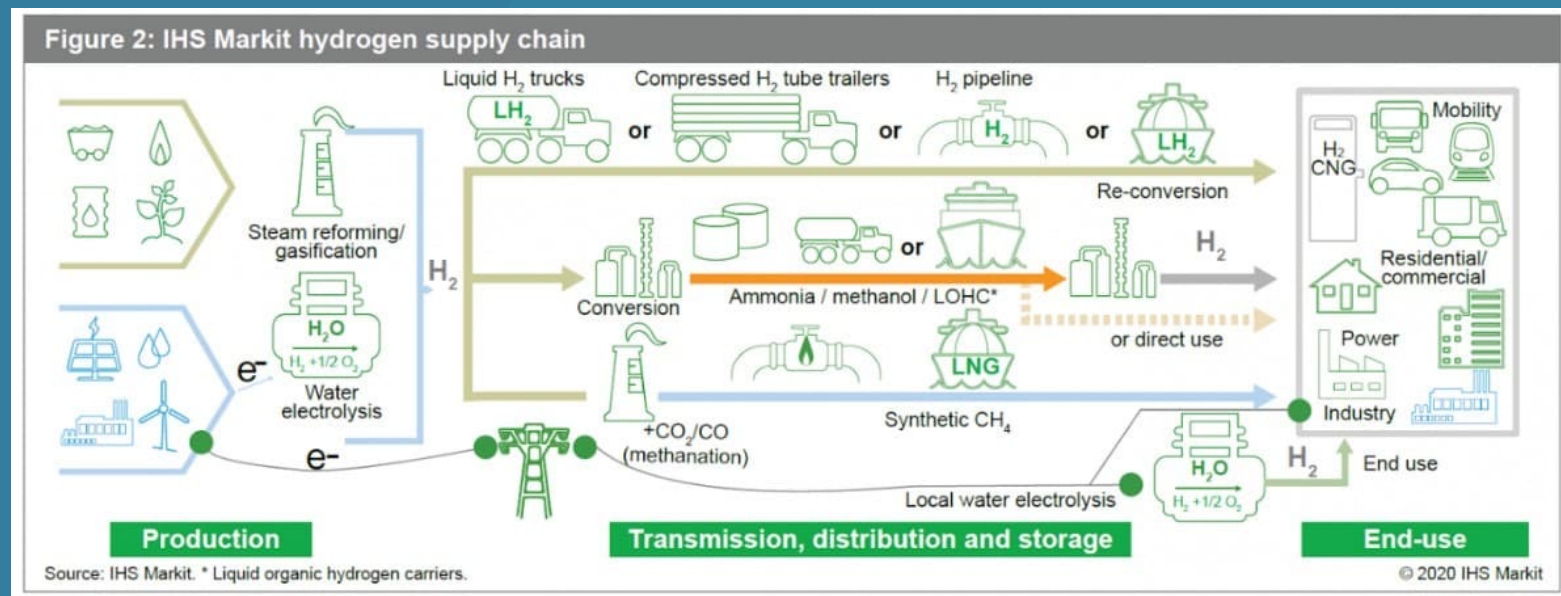


Source: Adapted from Clean HP (CHP)

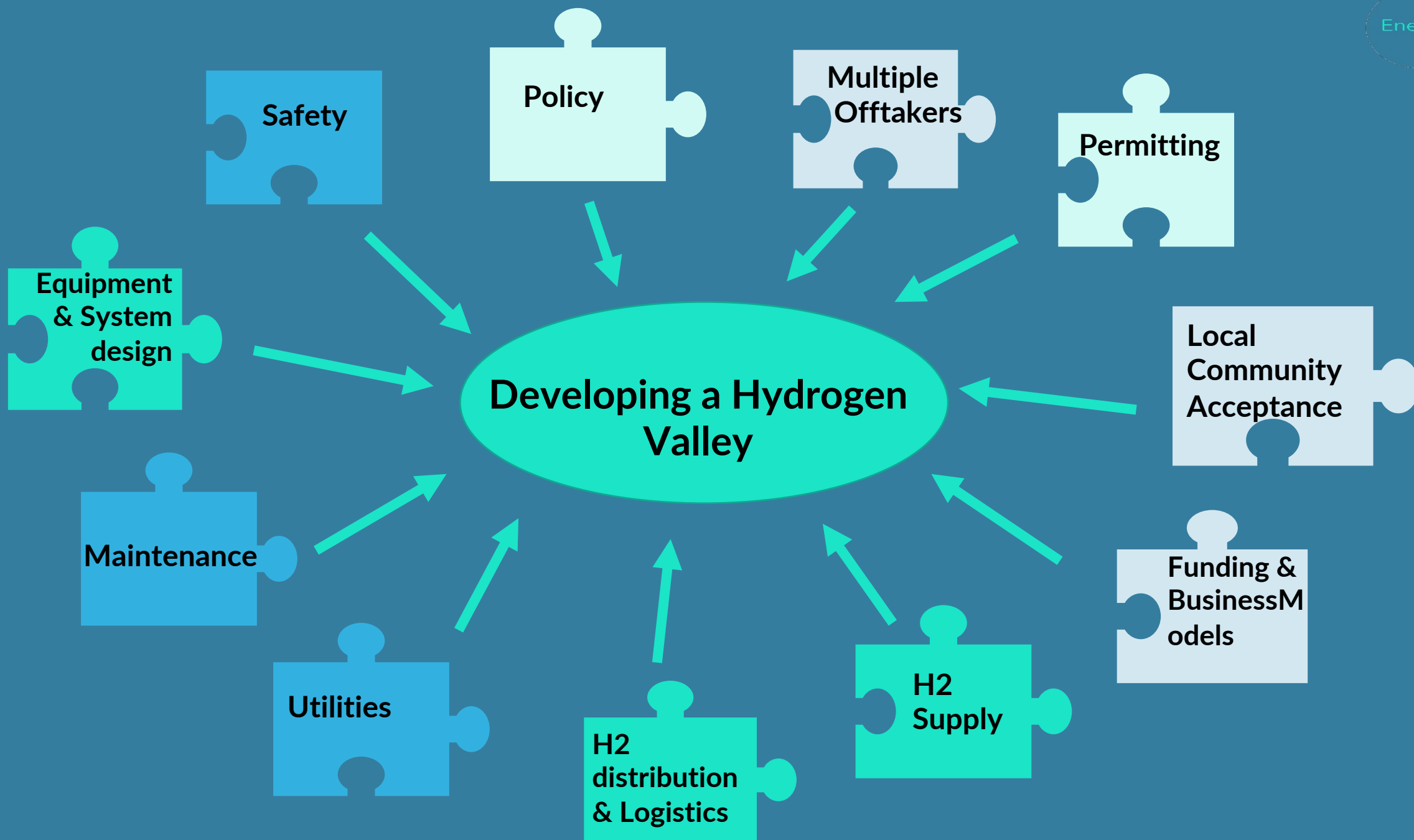
→ Create economies of scale within and between different Hydrogen Valleys

Hydrogen Valleys are a key part of the European Energy Transition

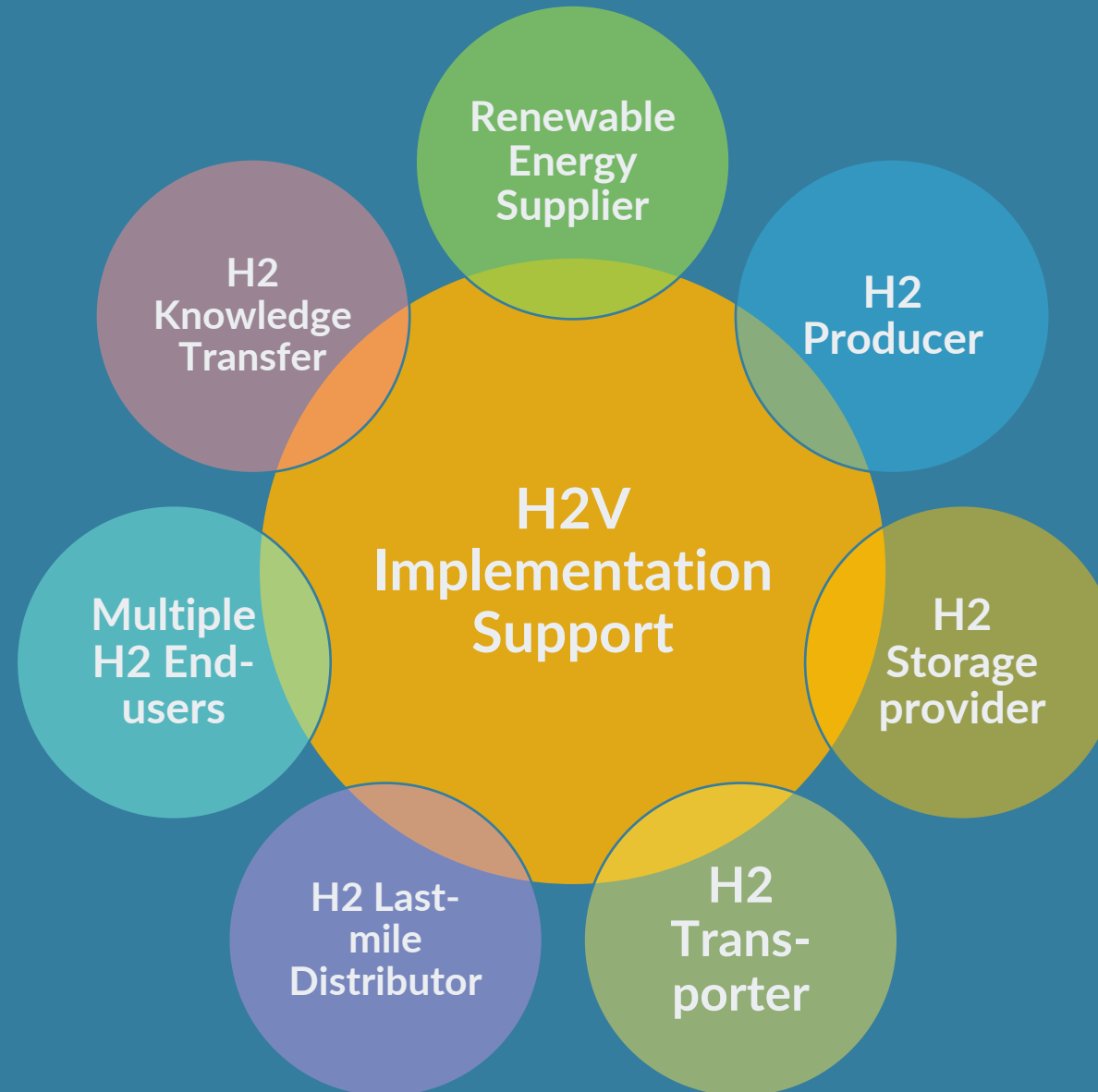
- H2 Valleys enable creation of economies of scale
- Connection of supply AND demand & decarbonisation of the economy
- H2 Valleys enable a Collaboration of PPPs along the entire value chain



- Hydrogen Valleys are identified as a key driver for kick-starting the Hydrogen Economy in the European Hydrogen Strategy



Key Roles in a Hydrogen Valley (H2V)



Hydrogen Valleys in Practice

- Some of our real-life examples

VALLEY 1

BIG HIT – 1st Hydrogen Valley Test Concept

Location: Orkney Islands (Scotland, UK)

Rationale:

- Onshore wind RES curtailment = economic penalty
- Decarbonise local economy
- Boost local economy (innovation + Jobs)

Deployment solution:

- Local energy system based on green hydrogen for heating and road & maritime transport
- Basic infrastructure for future projects

12 partners from across Europe (+ supporters)

Budget: approx. 13.5m€, PPP co-funding structure

Project timeline: 2016-2022



HEAVENN – 1st Hydrogen Valley in Europe

Location: Northern Netherlands (Groningen/Delfzijl/Emmen)

Rationale:

- Reduction of natural gas exploitation (loss of GDP/jobs)
- Sustainability: Need to decarbonize local economy

Deployment solution:

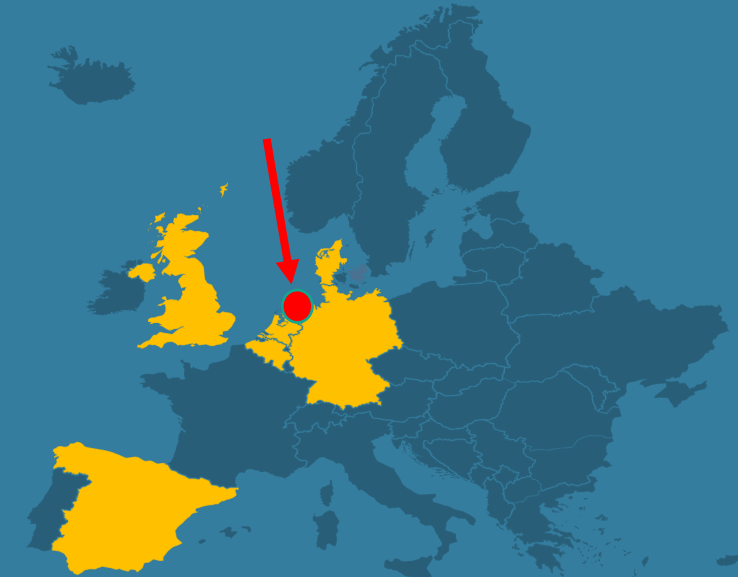
- Build Regional energy system based on Green Hydrogen (4 Clusters) for industry, transport and storage, powered by offshore wind

30 partners from across Europe

Budget: approx. 92m€, PPP structure

Timeline: 2020-2026

CO₂ emission reduction of min. 60,000 t/year



GREEN HYSLAND – 1st Southern European Hydrogen Island

Location: Island of Mallorca, Spain

Rationale:

- Closure of local cement plant (loss of income & jobs)
- Sustainability: decarbonise local economy
- Boost & diversify local economy (skills & capacity building)

Deployment solution:

- Local energy system based on Green Hydrogen focused on the tourism, transport & built environment sectors, using solar PV (6 integrated sites + infrastructure)
- Create economies of scale for Hydrogen-based local economy

31 partners from across Europe (+ Observers)

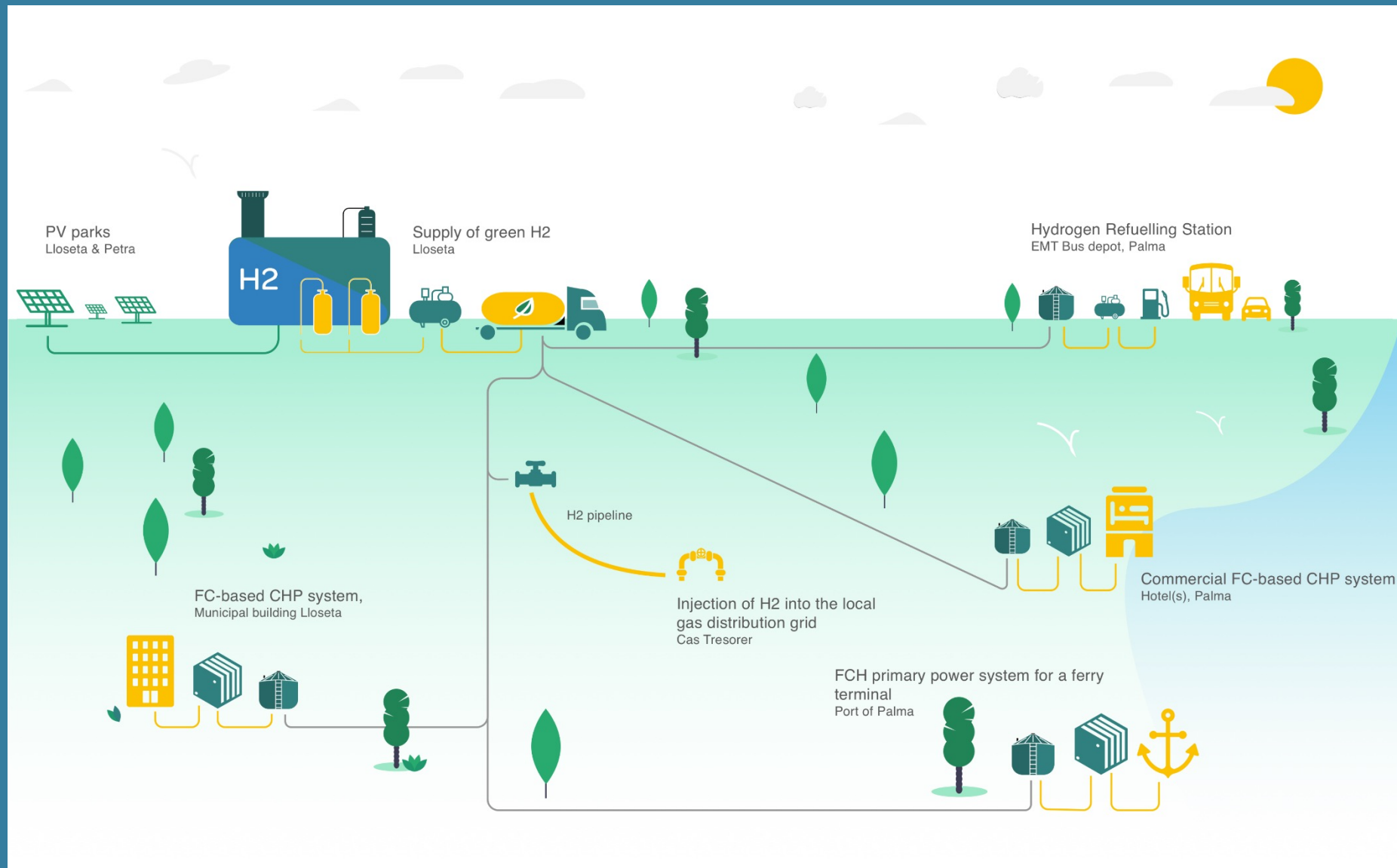
Budget: approx. 50m€, PPP structure

Timeline: 2021-2026

CO₂ emission reduction of 21,000 t/year



GREEN HYSLAND Project schematic



Hydrogen Valleys in Practice

- Key Challenges & Lessons Learnt

Challenges on the Road to the Valley

Financial

- Multistakeholder co-funding structures and business models?
- Management of PPPs & private/public co-funding?



Social

- Public awareness & acceptance (local authorities & communities unfamiliar with H2)
- Operational competence: local training & up-skilling?



Technical

- Deployment of H2 across entire value chain (legal, logistics, boundaries/interfaces, geography, climate)?
- RCS & lengthy permitting (pre-commercial deployment)?

Political

- Alignment with policy objectives?
- Insufficient green hydrogen supply capacity and high price?
- Non-existent/limited Legal framework for Green H2



Hydrogen Valleys: Challenges & Solutions

Category	Challenges	Solutions
 Policy	<ul style="list-style-type: none">• Alignment with policy objectives?• Insufficient green hydrogen supply capacity and high price?• Non-existent/limited Legal framework for Green H2	<ul style="list-style-type: none">• Integrate scope with EU/local policy & economic framework• Incentivise green hydrogen production (incl. manufacturing capacity)• Develop H2 policies & legal framework
 Social	<ul style="list-style-type: none">• Public awareness & acceptance? (local authorities & communities unfamiliar with H2)• Operational competence: local training & up-skilling?	<ul style="list-style-type: none">• Work on public awareness and social acceptance from start (Local community involvement/ Local champion)• Develop training offerings/partner with training providers
 Technology	<ul style="list-style-type: none">• Deployment of H2 across entire value chain (logistics, boundaries/interfaces, geography, climate)?• RCS & lengthy permitting (pre-commercial deployment)?	<ul style="list-style-type: none">• Allow for contingency in costs & timescales• Incorporate experience (Project Management, Engineering & Integration)
 Finance	<ul style="list-style-type: none">• Multistakeholder co-funding structures and business models?• Management of PPPs & private/public co-funding?	<ul style="list-style-type: none">• Incorporate local/regional off-takers at the earliest stage (demand aggregation)• Set up PPPs & create suitable co-funding structures at design stage



Image credits:
EMEC 2021

Let's make the Energy
Transition happen together!

*Thanks very much for
your attention!*

Energy

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