



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



Ministry of Trade & Industry  
وزارة التجارة والصناعة



EGYPT

GEIPP

GLOBAL ECO-INDUSTRIAL PARKS PROGRAMME



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,  
Education and Research EAER  
State Secretariat for Economic Affairs SECO



# MODULE 3: GUARANTEES OF ORIGIN IN EUROPE

Development of Roadmap for Green Hydrogen Ecosystem in the SCZone (Sokhna). Training

# INDEX

- 1** Introduction: Hydrogen economy and value chain development
- 2** Strategic overview and funding instruments
- 3** Project organisation and development
- 4** Best practices: integrated ecosystems and valleys

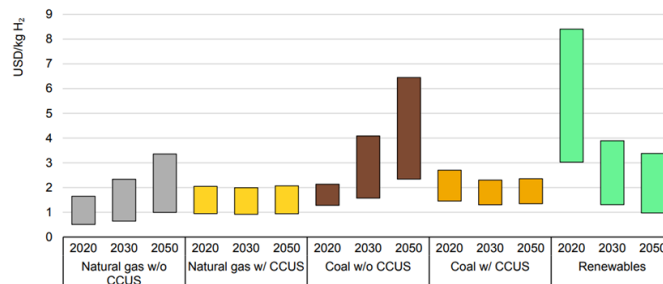
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# INTRODUCTION

## Hydrogen in the EU economy

- **H<sub>2</sub> is a key lever to decarbonize the EU economy**
  - EU set up an ambitious objective: to be the first climate neutral economy by 2050
  - Hydrogen technologies have the potential to play a key role in the energy transition process
  - Lack of commercial availability + Challenge of producing green hydrogen
  
- **H<sub>2</sub> in the long-term**
  - Fossil fuel-based hydrogen is currently cheaper
  - Trend towards lower costs of H<sub>2</sub> production from renewable energy:
    - 1,5-4 USD/kg H<sub>2</sub> in 2030
    - 1-3 USD/kg H<sub>2</sub> in 2050



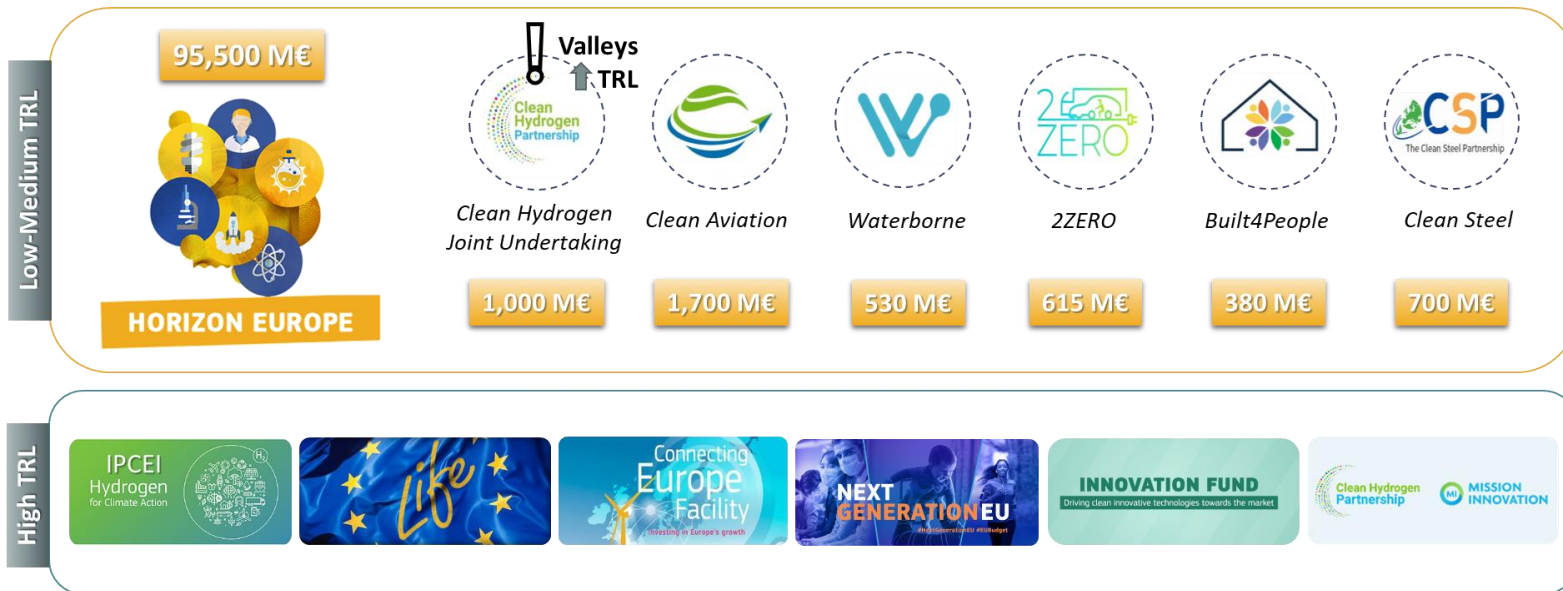
Source: IEA (2021)

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# STRATEGIC OVERVIEW

## Hydrogen funding programmes



# STRATEGIC OVERVIEW

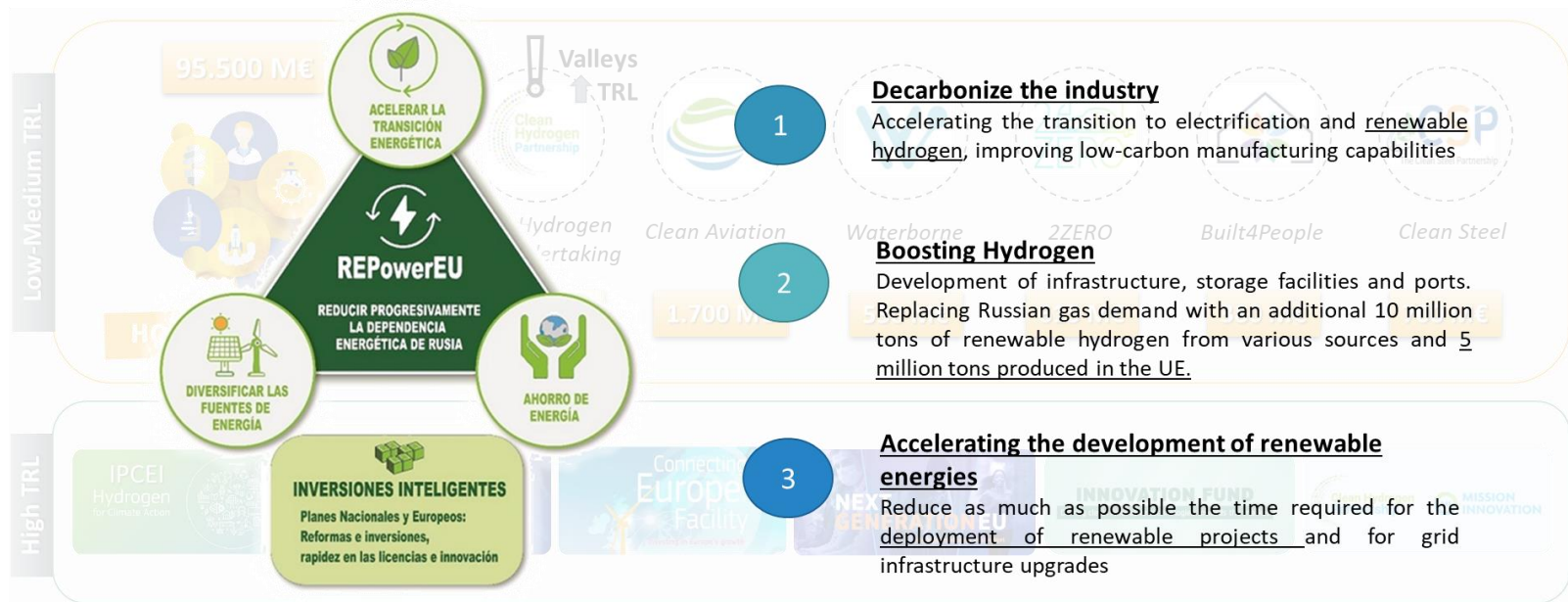
## Technical Readiness Level

Indicator of technological maturity used in financing studies



# STRATEGIC OVERVIEW

## RepowerEU Plan



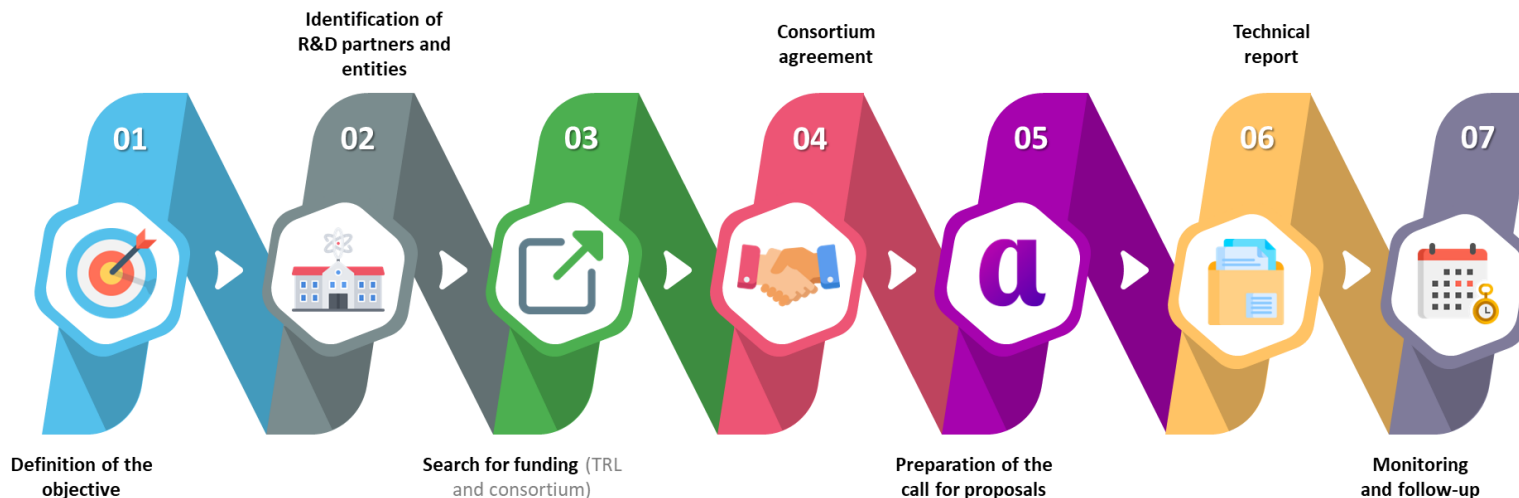


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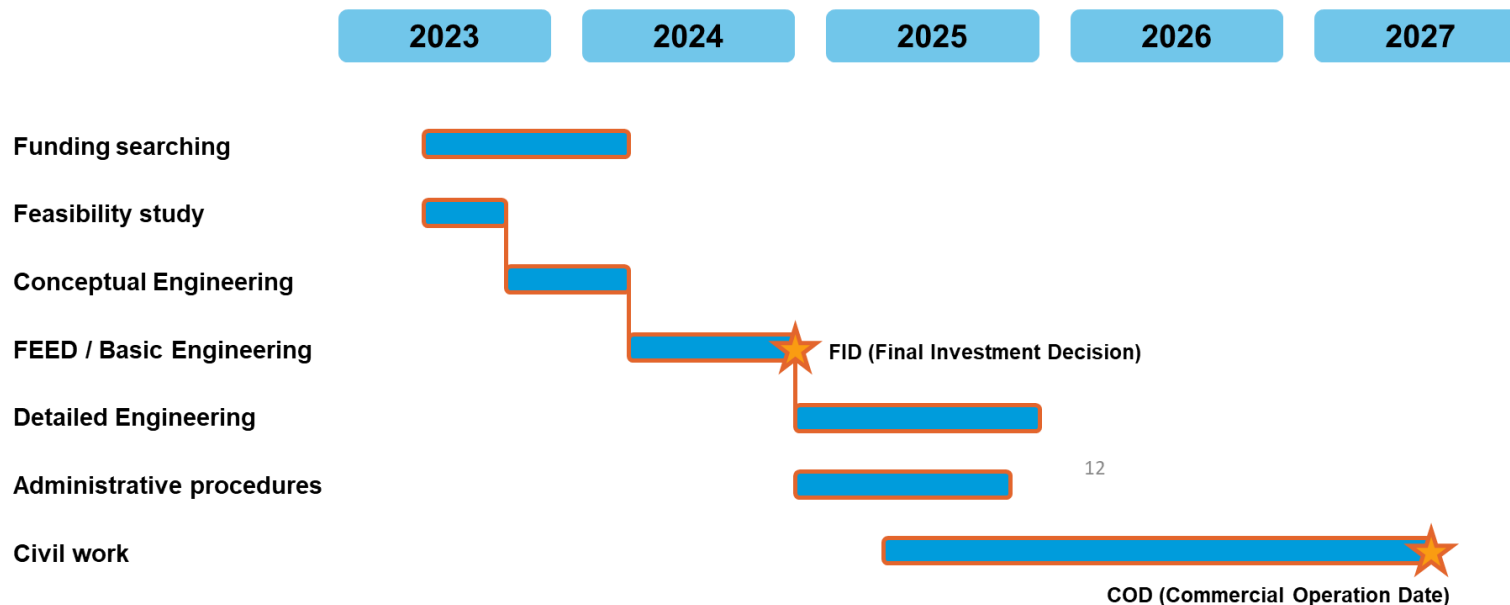
# PROJECT DEVELOPMENT

## Project organisation



# PROJECT DEVELOPMENT

## Project timeline

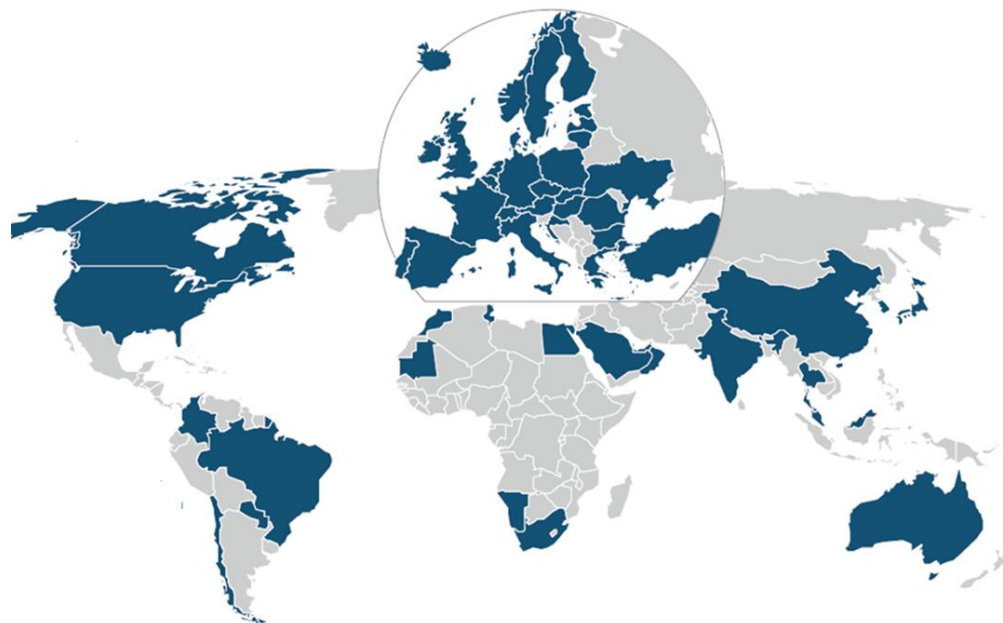


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# BEST PRACTICES

## Integrated ecosystems and Hydrogen Valleys



**United Kingdom**  
→ HyNet North West  
→ BIG HIT Orkney Islands

**Netherlands**  
→ HEAVENN  
→ Hydrogen Delta  
→ Europe's Hydrogen Hub:  
H<sub>2</sub> Proposition  
Zuid-Holland/Rotterdam

**Belgium**  
→ Flemish Hydrogen Ports  
Valley

**USA**  
→ Advanced Clean  
Energy Storage  
Project  
→ Port of LA, Shore to  
Shore Demonstration  
Project  
→ Wyoming Clean  
Power Center

**Chile**  
→ Hydrogen Facility  
Initiative

**Portugal**  
→ Sines Industrial Hub

**Germany**  
→ H2Rivers  
→ HyBayern  
→ eFarm  
→ Northern German  
Living Lab  
→ Hyways for Future

**Italy**  
→ Hydrogen Valley  
South Tyrol  
→ H2iseO Hydrogen  
Valley

**France**  
→ Zero Emission Valley  
→ Normandy Hydrogen  
→ Hydrogen Territory  
Bourgogne Franche Comté  
→ Centrale Electrique de l'Ouest  
Guyanais

**Oman**  
→ Green Hydrogen and  
Chemicals Oman

**Spain**  
→ Green Hysland  
→ Basque Hydrogen  
Corridor

**Japan**  
→ FH2R Fukushima

**China**  
→ Foshan Nanhai Xianhu  
Lake Hydrogen Valley  
Town  
→ Zhangjiakou  
Demonstration Project  
→ Rugao Hydrogen  
Energy Town

**Denmark**  
→ HyBalance

**Austria**  
→ WIVA P&G:  
Hydrogen Flagship  
Region

**Australia**  
→ Crystal Brook  
Hydrogen Superhub  
→ Eyre Peninsula  
Gateway

**Thailand**  
→ Phi Suea House

# BEST PRACTICES

## Recently funded valleys

NEWS ARTICLE | 31 January 2023 | Clean Hydrogen Joint Undertaking

### REPowering the EU with Hydrogen Valleys: Clean Hydrogen Partnership invests EUR 105.4 million for funding 9 Hydrogen Valleys across Europe

The Clean Hydrogen Partnership has selected 9 Hydrogen Valley projects following its first call proposals (2022). The total funding requested for the 9 Hydrogen Valleys amounts to EUR 105.4 million.



- North Adriatic area
- Baltic Sea countries
- Bulgaria (Stara Zagora)**
- Greece (Crete and Corinthia)
- Ireland (Galway)
- Italy (Lombardy)
- Turkey (South Marmara)
- Luxembourg

# BEST PRACTICES

## Project Development Assistance for Regions (PDA)

### Clean Hydrogen Partnership selects 15 regions to receive project development assistance

The chosen European regions will receive targeted support from dedicated hydrogen consultants beginning in early 2023 to advance fuel cell and hydrogen technologies.



- Estonia Islands (estonia)
- Tartu City (Estonia)
- La Réunion (France)
- Peloponnese región (Greece)
- Valentia Island (ireland)
- Riga (Latvia)
- Madeira (Portugal)
- Alenquer (Portugal)
- City of Plock (Poland)
- Podckaparckie (Poland)
- Cluj-Napoca (Romania)
- Galati (Romania)
- Kôstice (Slovakia)
- Central Sava (Slovenia)
- Velenje (Slovenia)

# BEST PRACTICES

## Hydrogen Valleys – BIG HIT

### PROJECT DESCRIPTION

BIG HIT is a six-year demonstration project which aims to create an integrated low carbon and localised energy system establishing a replicable model of hydrogen production, storage, distribution and utilisation for low carbon heat, power and transport.

### LOCATION

Orkney Islands



### H<sub>2</sub> PRODUCTION VOLUME

confidential

### TOTAL INVESTMENT VOLUME

14 EUR m

### PROJECT PARTNERS

FHA, ITM, Orkney Council, Calvera, SDT, CES, EMEC, DTU, SymbioFC, SFHCA, Giacomini, Ministry of Transport and Infrastructure – Malta

### PROJECT SUPPORTERS

- Clean Hydrogen Joint Undertaking
- Scottish Government
- UK Government

### VALUE CHAIN COVERAGE

#### H<sub>2</sub> production route

- PEM electrolysis

#### H<sub>2</sub> end uses (target off-takers)

- Mobility (cars)
- Energy (stationary fuel cells)

#### H<sub>2</sub> transport / distribution

- Ship

### PROJECT TIMELINE



### PROJECT STATUS

Post-FID (financing, tendering, etc.)



# BEST PRACTICES

## Hydrogen Valleys – HEAVENN

### PROJECT DESCRIPTION

HEAVENN is a large-scale demo project addressing the requirements of the call, by bringing together core elements: production, distribution, storage and local end-use of hydrogen into a fully-integrated and functioning Hydrogen Valley.

### LOCATION

- Province of Groningen
- Province of Drenthe



### H<sub>2</sub> PRODUCTION VOLUME

**36,500** tons/year

### TOTAL INVESTMENT VOLUME

**2,800** EUR m

### PROJECT PARTNERS

Gasunie, Nobian, Engie, Getec, Groningen Seaports, Nederlandse Aardolie Maatschappij, QBuzz, TotalEnergies, Energie Beheer Nederland, Lenten Scheepvaart BV, Green Planet, Municipalities of Groningen, Hoozeveen and Emmen, HyEnergy TransStore, Shell, H2Tec, Enery, Rijksuniversiteit Groningen

### PROJECT SUPPORTERS

Province of Groningen, Province of Drenthe, The Netherlands Ministry of Economic Affairs and Climate, The Netherlands Ministry of Infrastructure and Water Management

### VALUE CHAIN COVERAGE

#### H<sub>2</sub> production route

- PEM electrolysis
- Alkaline electrolysis
- Byproduct

#### H<sub>2</sub> end uses (target off-takers)

- Industry
- Mobility (cars, buses, trucks, ships)
- Energy (stationary fuel cells)

#### H<sub>2</sub> storage / conversion

- Cavern

#### H<sub>2</sub> transport / distribution

- Pipeline
- Trucking

### PROJECT TIMELINE



### PROJECT STATUS

Post-FID (financing, tendering, etc.)

# BEST PRACTICES

## Hydrogen Valleys – GREEN HYSLAND

### PROJECT DESCRIPTION

Green Hysland aims to create a replicable Hydrogen Territory in the Balearic Islands by converting solar energy generated in Mallorca into green H<sub>2</sub> which will be used in multiple applications: mobility, heat and power and injection into the gas grid.

### LOCATION

Mallorca



### H<sub>2</sub> PRODUCTION VOLUME

**300** tons/year

### TOTAL INVESTMENT VOLUME

**50** EUR m

### PROJECT PARTNERS

A balanced and multi-disciplinary consortium of 30 partners from industry (large and small), public bodies, research and academia and community organisations

### PROJECT SUPPORTERS

- Regional Balearic Government
- IDAE
- Spanish Ministry of Industry, Trade and Tourism
- Spanish Ministry for the Ecological Transition and the Demographic Challenge

### VALUE CHAIN COVERAGE

#### H<sub>2</sub> production route

- PEM electrolysis

#### H<sub>2</sub> end uses (target off-takers)

- Mobility (cars, buses)
- Energy (stationary fuel cells, gas grid injection)

#### H<sub>2</sub> storage / conversion

- Cylinder

#### H<sub>2</sub> transport / distribution

- Pipeline
- Trucking

### PROJECT TIMELINE



### PROJECT STATUS

Post-FID (financing, tendering, etc.)



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