



Centre for Research and Technology Hellas (CERTH)
Chemical Process and Energy Resources Institute (CPERI)



R&D in Hydrogen Technologies: European Funding and Cooperation

H₂ INNOVATION HUB

The Transition project in W. Macedonia

23th of June 2022

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ΣΧΕΔΙΟ ΔΙΚΑΙΗΣ
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ΜΕΤΑΒΑΣΗΣ



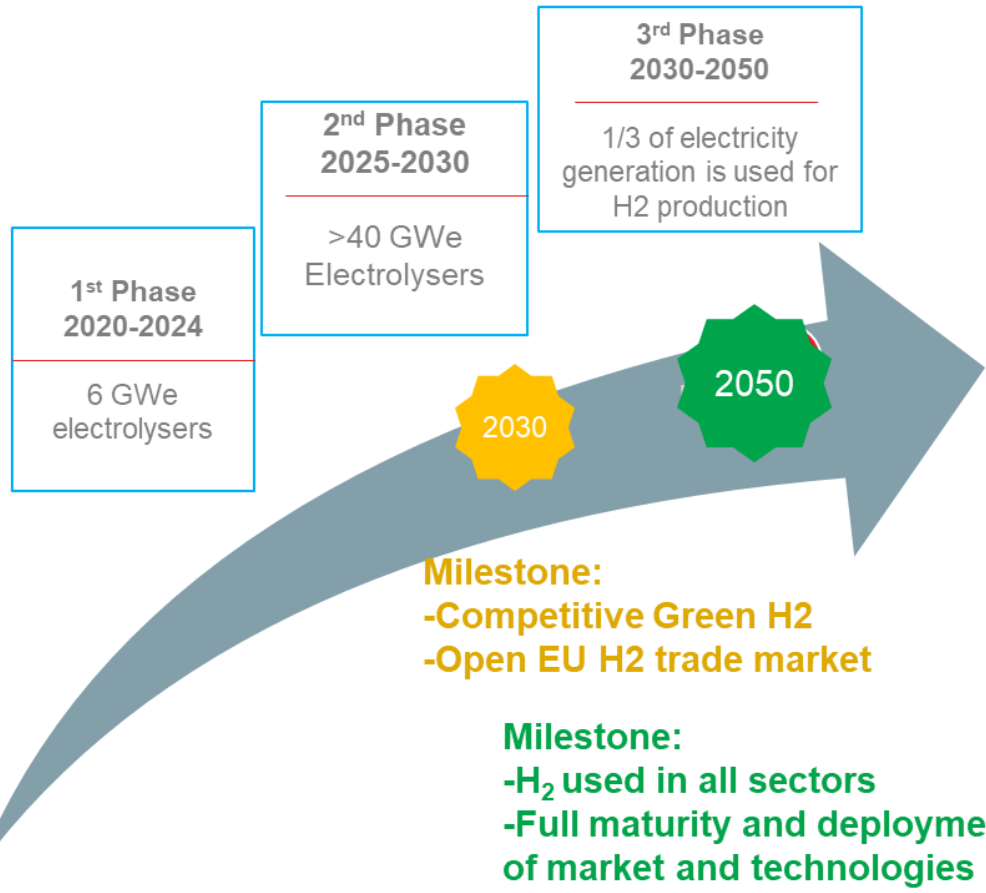
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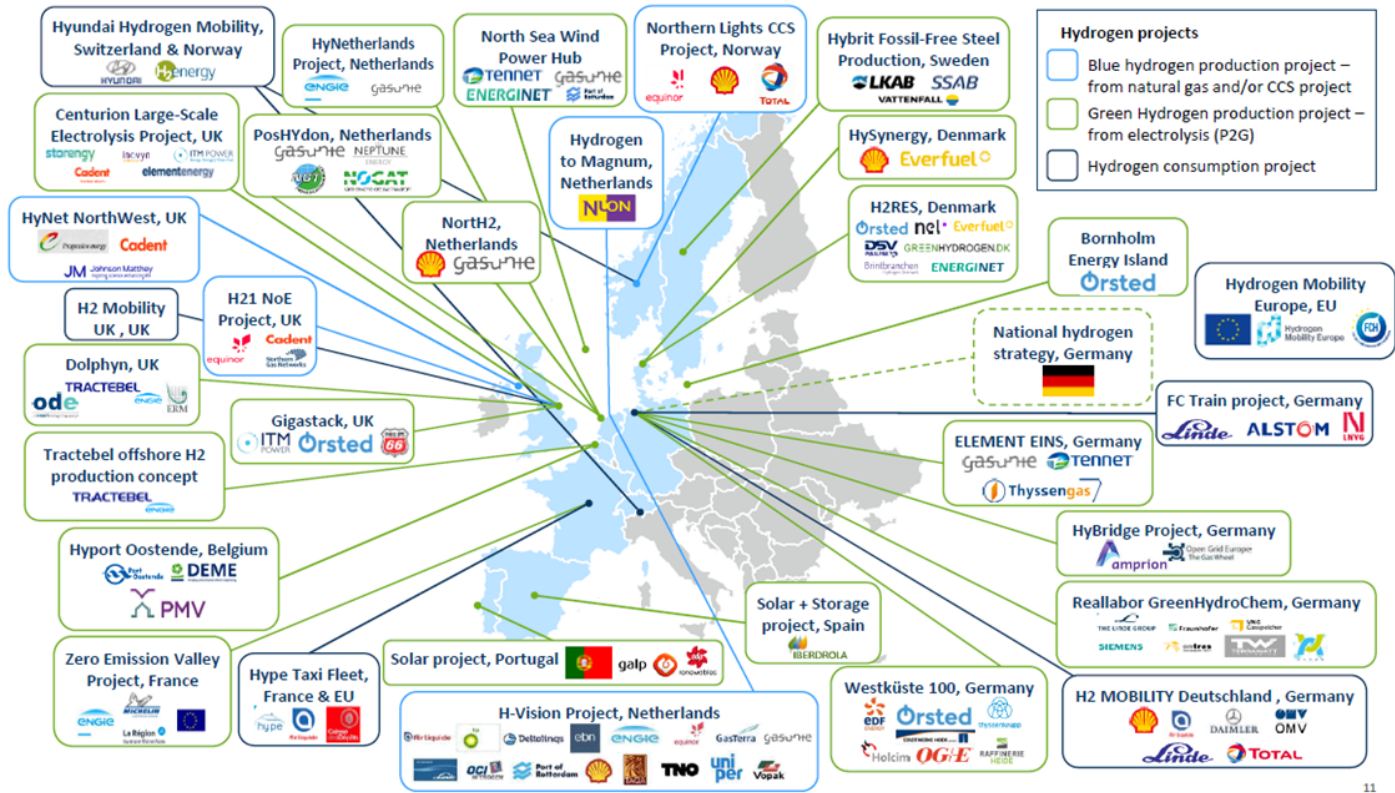
Hydrogen Strategy & Investments in Europe

European Hydrogen Strategy

(EC, COM(2020)301 final)



Significant investment in large-scale clean hydrogen projects has been concentrated in Europe



Source: FTI Analysis

- FIDs expected from 2024 onwards
- Regulatory framework needed
- CfDs, CO₂ pricing and market conform support mechanisms



Hydrogen In Greece and West Macedonia

Greece

- Hydrogen included in national development plan Q2 2022 (envisages the production of 1 GW of electrolysis by 2025)
- Hydrogen included in the Just Transition Mechanism
- A number of IPCEI projects are evolving in the area:
 - GreenHiPo (Advent)
 - H2Cat (B&T composites)
 - H2CEM (Titan)
 - BLUE MED (Motoroil)
- Missing legislative framework for green hydrogen characterization, large PJ development, commercial operation, market formation and green certificates

JTF -West Macedonia

- EU Press release 16/6/2022: First (JTF) Programme adopted by the Commission today, Greece will mobilise a total investment of €1.63 billion (grants amounting to €1.38 billion) to alleviate the impact of the energy and climate transition on the local economy and society. Regional efforts on Transition Planning initiated in 2017 with EU Coal Regions Transition Platform, while in 2019 World Bank conducted a study under EU-SRSS project
- JTF envisions the 'H2 Innovation Hub' of Western Macedonia, an emblematic project for the promotion of RES and innovative entrepreneurship



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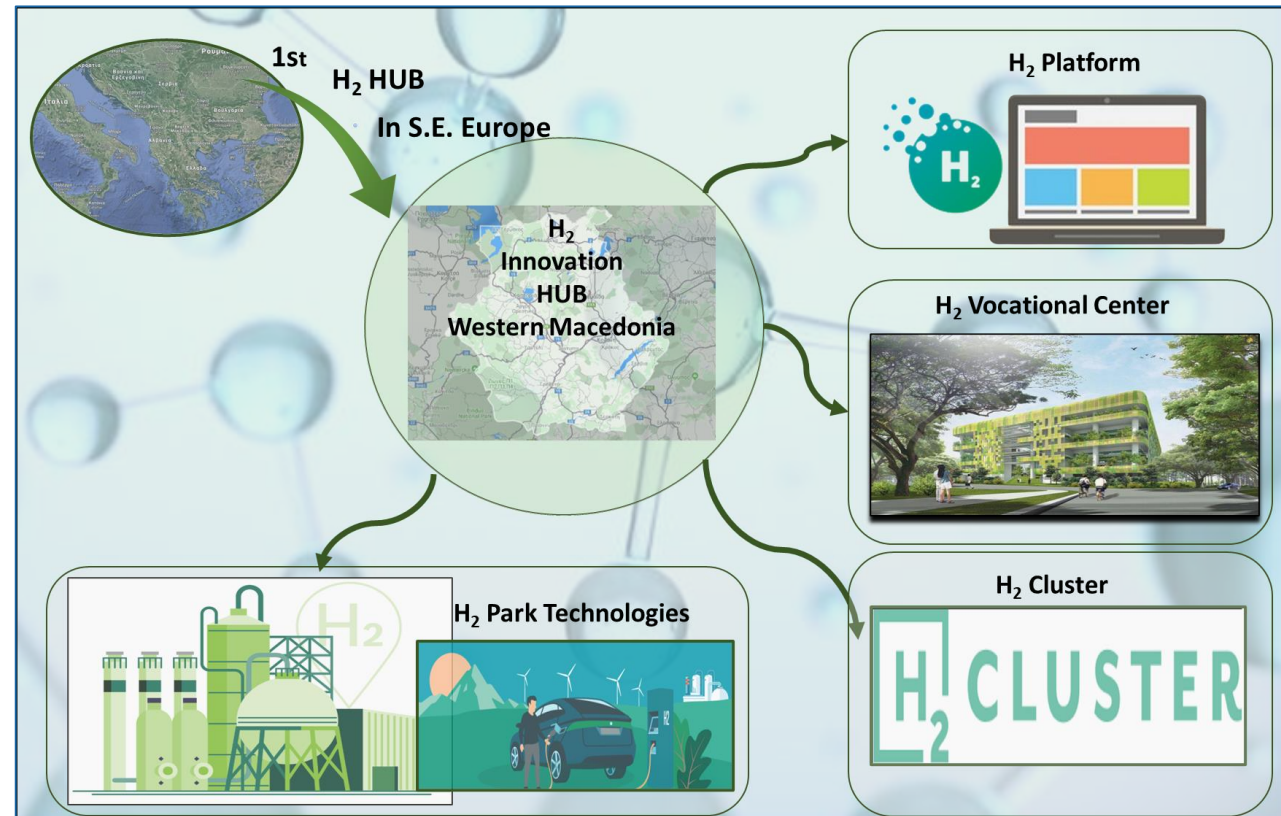


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H₂ Innovation Hub

VISION: “Become the number one hub connecting science, industry, politics and other partners in the Greek hydrogen economy by 2025 and onwards, establishing a green hydrogen technology park, offering top-quality services, promoting innovation and know how transfer”



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ΠΡΑΣΙΝΟ ΤΑΜΕΙΟ



✓ Demonstration of the full Green H₂ value chain



Energy Management System for energy storage & regulation

RES & Hydrogen Production

- PV with Li-on battery
- Alkaline electrolysers
- PEM electrolysers

Hydrogen Storage

- Innovative solutions for high pressure storage tanks & H₂ handling
- H₂ injection in Nat. Gas grid

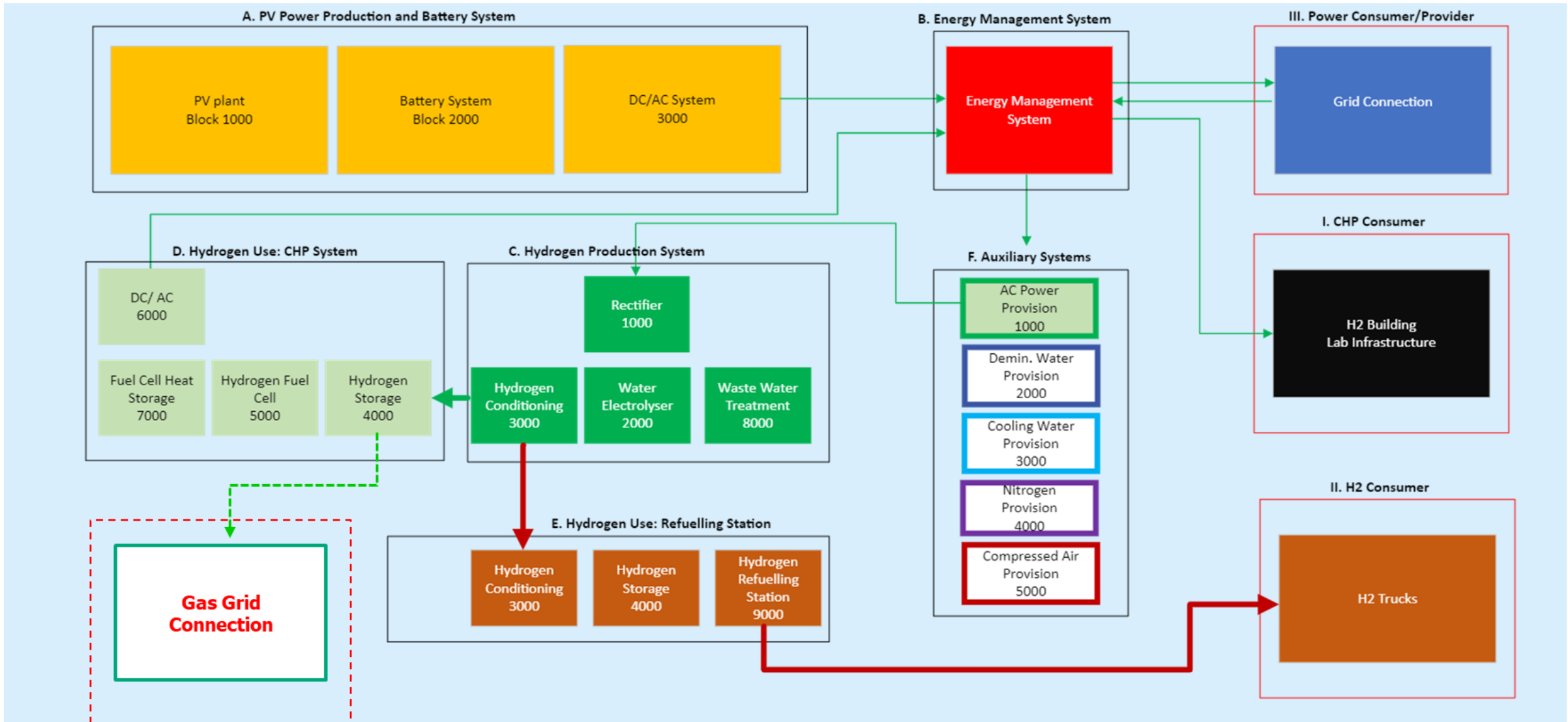
Hydrogen Use

- Pilot fuel cell rig for combined heat & power
- Green H₂ fueling station for Heavy Duty vehicles

✓ Testing facilities, sizing, certifying and supporting services



A) H2 Technology Park: Main Technology Blocks

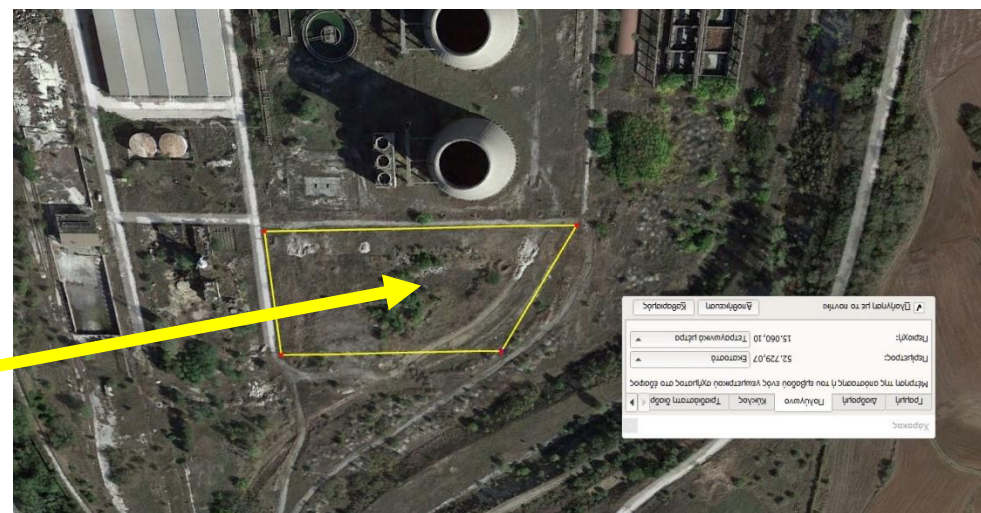




Location of H₂ Technology Park



Old AEVAL industrial area

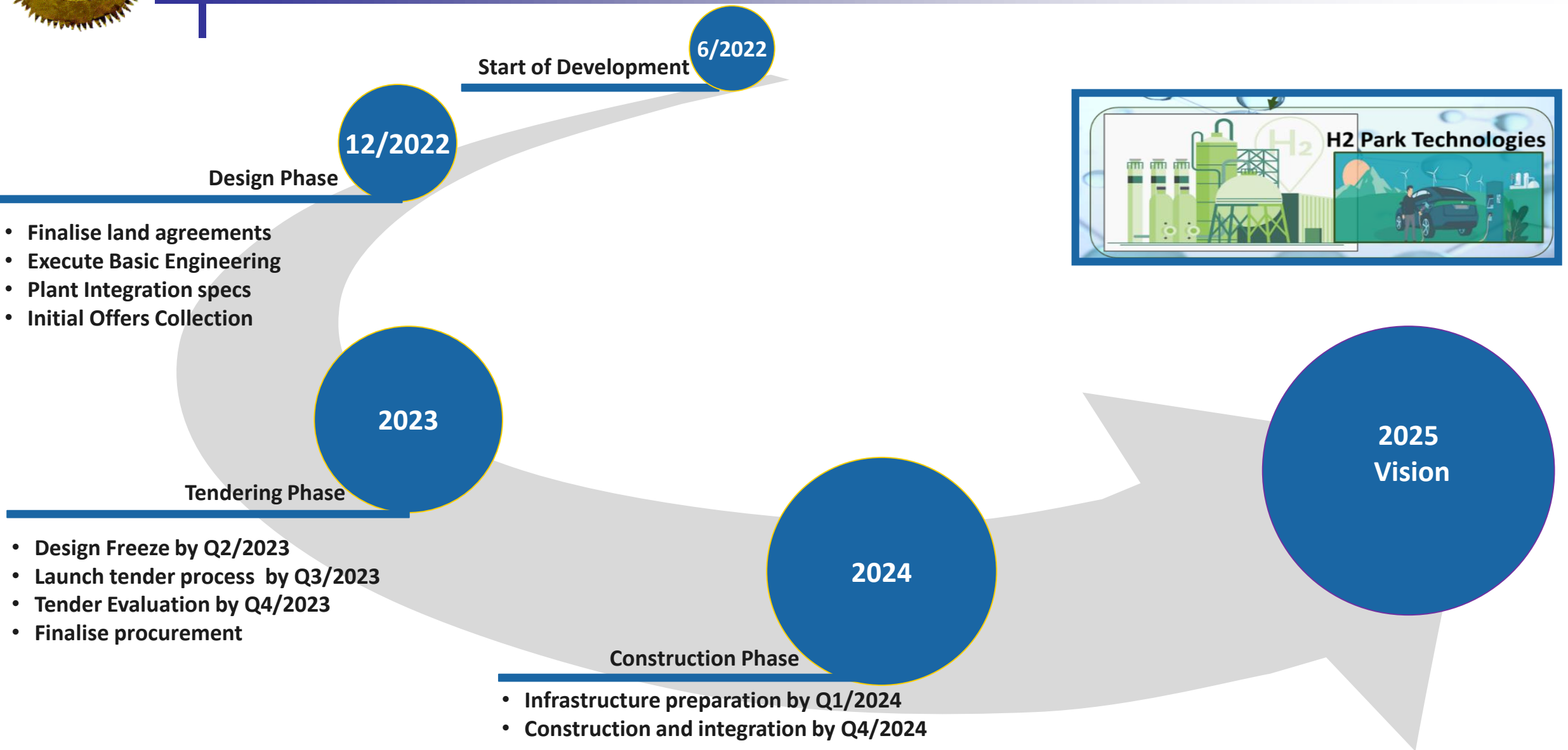


- Advantages of old industrial site:**
- power and water provision feasible
 - simplified permitting process
 - easy access

<https://e-ptolemeos.gr/i-p-aeval-entyposiaka-plana-apo-drone-video/>



H₂ Innovation Hub: The Timeline of H2 Technology Park





Hydrogen Cluster, Center and AppPlatform

H₂ Innovation Hub:



*Development study in progress –
Initial budget allocation ~20 Mil. EUR*

- **B) H2 CLUSTER** 
 - International Hydrogen Network for R&D and joint investments
 - Co-development of large projects and consulting services
 - Market and Policy analysis in Greece & South-Eastern Europe
 - Research facility for industrial scale applications and certification

- **C) HYDROGEN VOCATIONAL CENTER** 
 - Establishment of a competence center for hydrogen technologies (reskilling and upskilling for technical and managerial business-oriented staff)
 - Courses, Seminars and Conference events focused on dissemination

- **D) H2AppPLATFORM** 
 - Connection and communication of associated entities for the promotion and development of hydrogen technologies
 - “Data Warehouse” and Analytics



Non exhaustive suggestion list of **Horizon JU Innovation Actions** (Deadline: 20 September 2022)

- Integration of multi-MW electrolysers in industrial applications (HORIZON-JTI-CLEANH2-2022-01-08)
- Demonstrating offshore production of green hydrogen (HORIZON-JTI-CLEANH2-2022-01-10)
- Design for advanced and scalable manufacturing of electrolysers (HORIZON-JTI-CLEANH2-2022-01-04)
- Scaling up of cells and stacks for large electrolysers (HORIZON-JTI-CLEANH2-2022-01-05)
- Safe hydrogen injection management at network-wide level: towards European gas sector transition (HORIZON-JTI-CLEANH2-2022-05-03)
- Hydrogen Valleys (HORIZON-JTI-CLEANH2-2022-06-01/2)
- Development and optimisation of reliable and versatile PEMFC stacks for high power range applications (HORIZON-JTI-CLEANH2-2022-03-01)
- Development of large scale LH2 containment for shipping (HORIZON-JTI-CLEANH2-2022-02-06)



Thank you for your attention

Questions?