



SMARTENERGY

Aveiro Hydrogen Valley – Portugal Orange.Bat - Spain

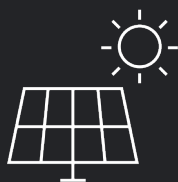
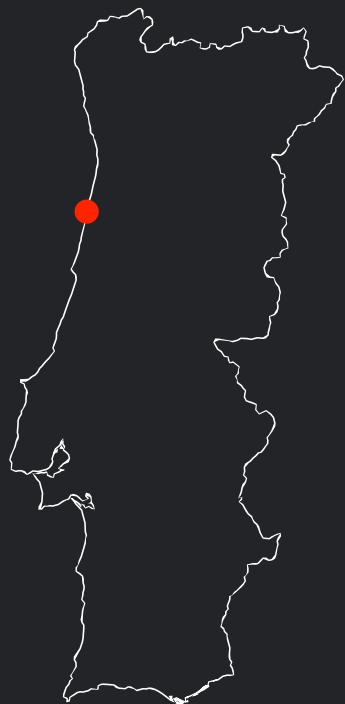
Roteiro para a Introdução dos Gases Renováveis no Setor Industrial Nacional

12 December 2022

Lisbon

Aveiro Green H2 Valley

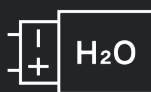
Project structure



PHOTOVOLTAICS
170 MWp



POWER GRID CONNECTION
Off-grid



ELECTROLYSER
100 MW



ANNUAL H2 OUTPUT
Up to 5'700 tons

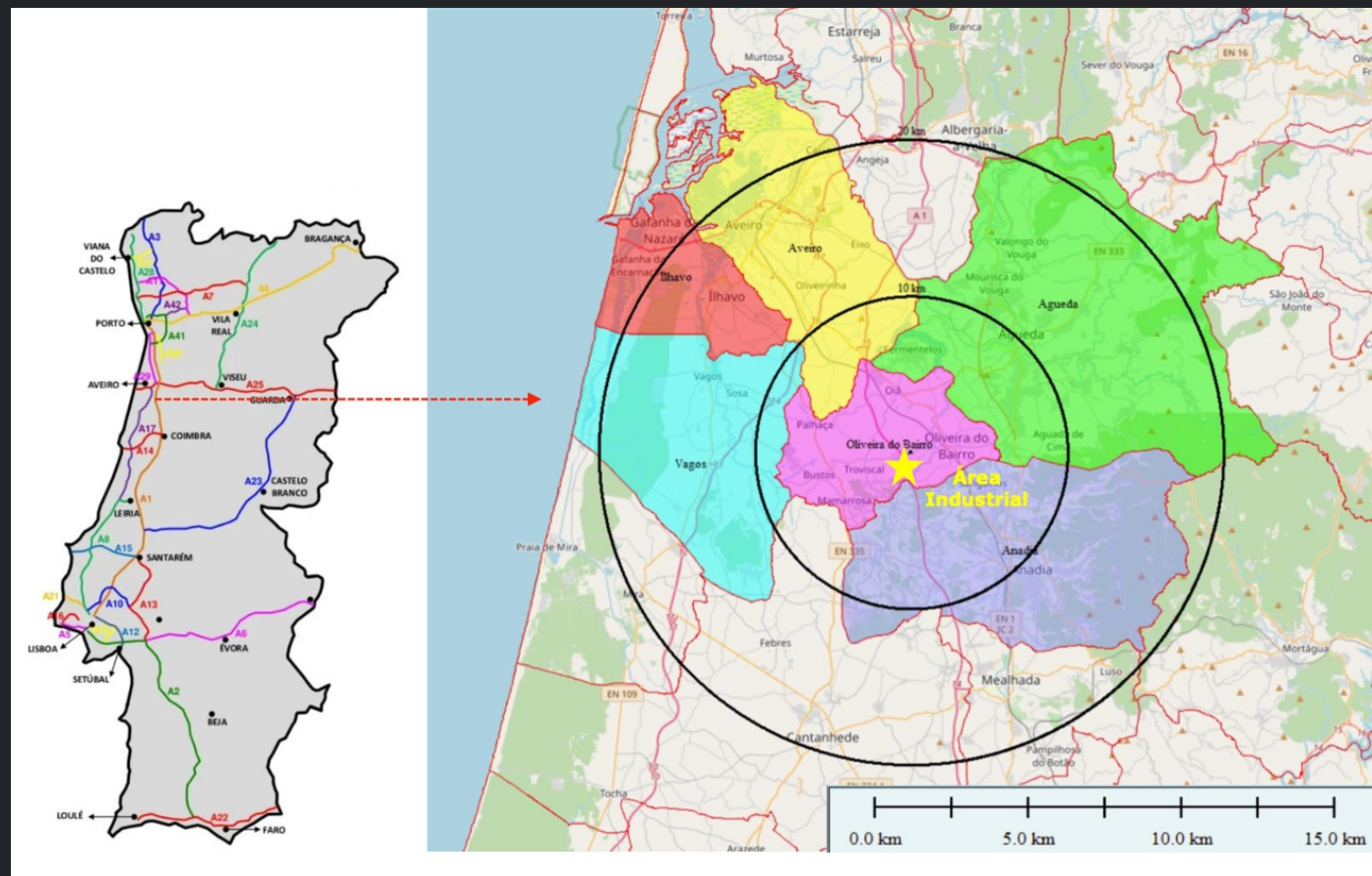
OFFTAKE MODEL
Power to Industry
Gas grid Injection
Power to Mobility

Aveiro Green H2 Valley

Project location

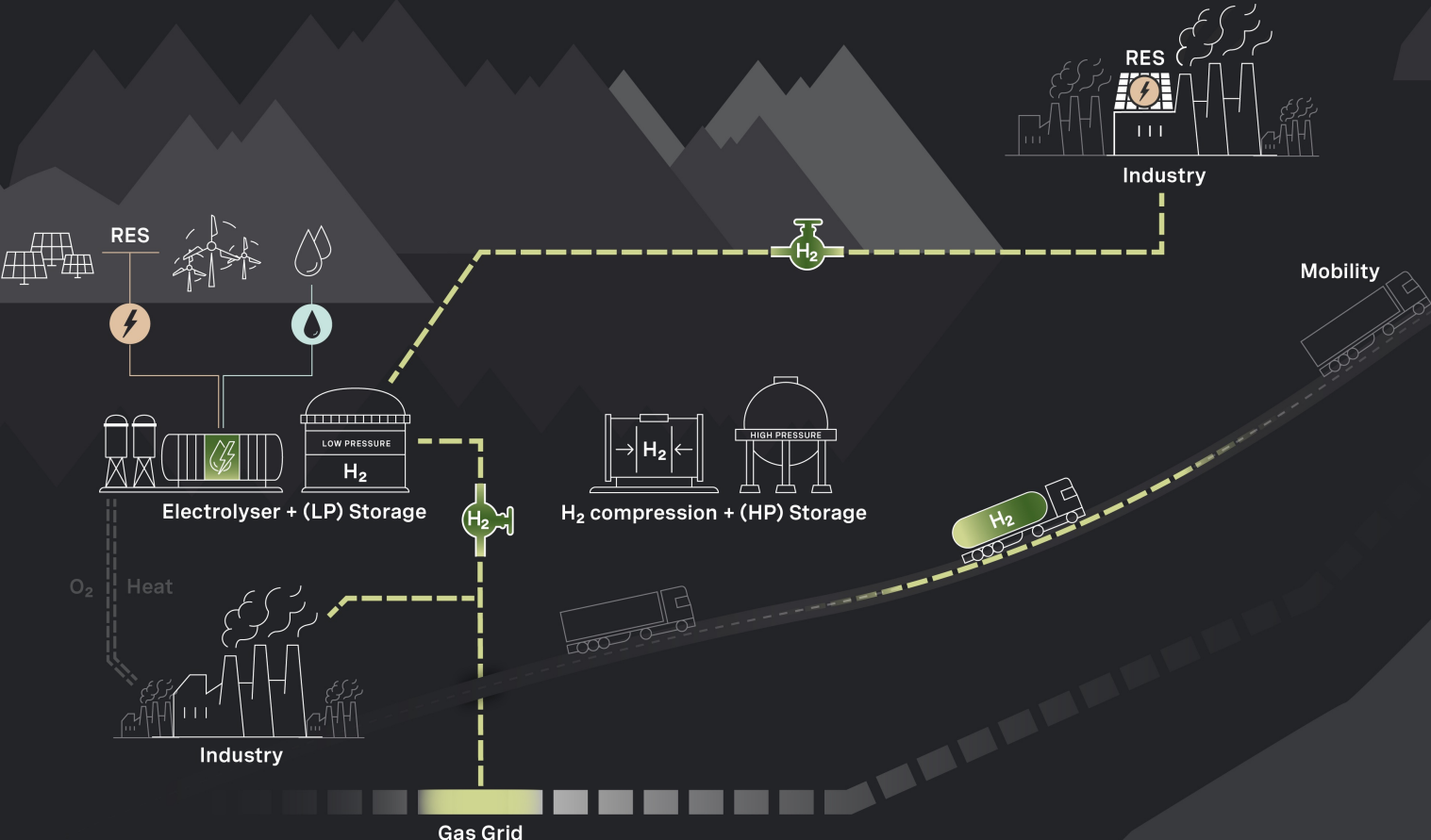
Green hydrogen production plant location:

- District of Aveiro
- Municipality of Oliveira do Bairro



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Project setup



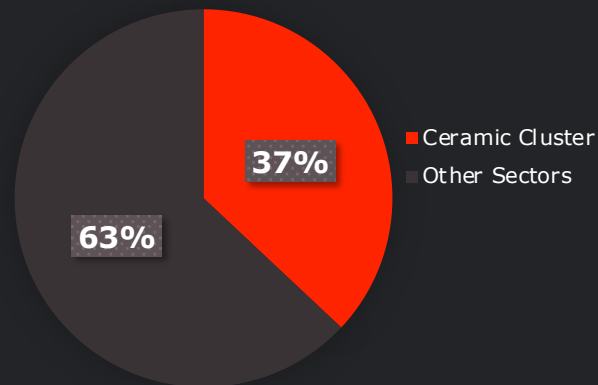
Aveiro Green H2 Valley

Value chain partnerships

- Production:
 - Electrolyser - Smartenergy is partner with leading technology-players in the hydrogen industry, e.g. with ThyssenKrupp and Sunfire to design cutting-edge technology solutions for our projects. We are also in advanced discussions with further technology suppliers which may be required for specific projects and additional supply.
 - Compressors - Smartenergy has identified potential partners with leading technology-players in the compressor industry;
 - High pressure storage - Smartenergy has identified potential partners with leading technology-players;
- Transport:
 - the development of a hydrogen infrastructure network project targeting the development of a hydrogen based industrial cluster will be considered in due time.
- Off-takers
 - conversations ongoing with ceramic industries, with the support of APICER.

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The challenge that this project tackles and its opportunity



% of CO2 emissions from the cluster compared to total emissions in the Valencian Region, Spain

- > Ceramic cluster of strategic importance for Spain and Europe
- > Most companies are SMEs that make high-quality ceramic products
- > 20.000 direct jobs, an annual turnover 5+ Billion €, large part from exports outside Europe
- > Annual natural gas consumption of 16 TWh, producing 3.2 Mtons of CO2

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The challenge that this project tackles and its opportunity

✓ Primary benefits

- › Offtakers secured and onboard
- › Offtakers close to each other and H2 plant
- › All stakeholders fully committed to decarbonize the cluster urgently
- › Abatement of a challenging sector

✓ Secondary benefits

- › Direct connection with RE plant – Independence on results from additionality, additional electricity from RE PPA with our plants
- › Proximity to natural gas pipeline
- › Proximity to port




Torreced, ceramic company in the cluster

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Project structure

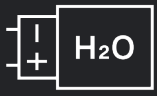


Phase 1




PHOTOVOLTAICS
50 MWp

Phase 1




ELECTROLYSER
100 MWe

Phase 1



ANNUAL H2 OUTPUT
Up to 15'000 tons



POWER GRID CONNECTION
On-grid

Phase 2



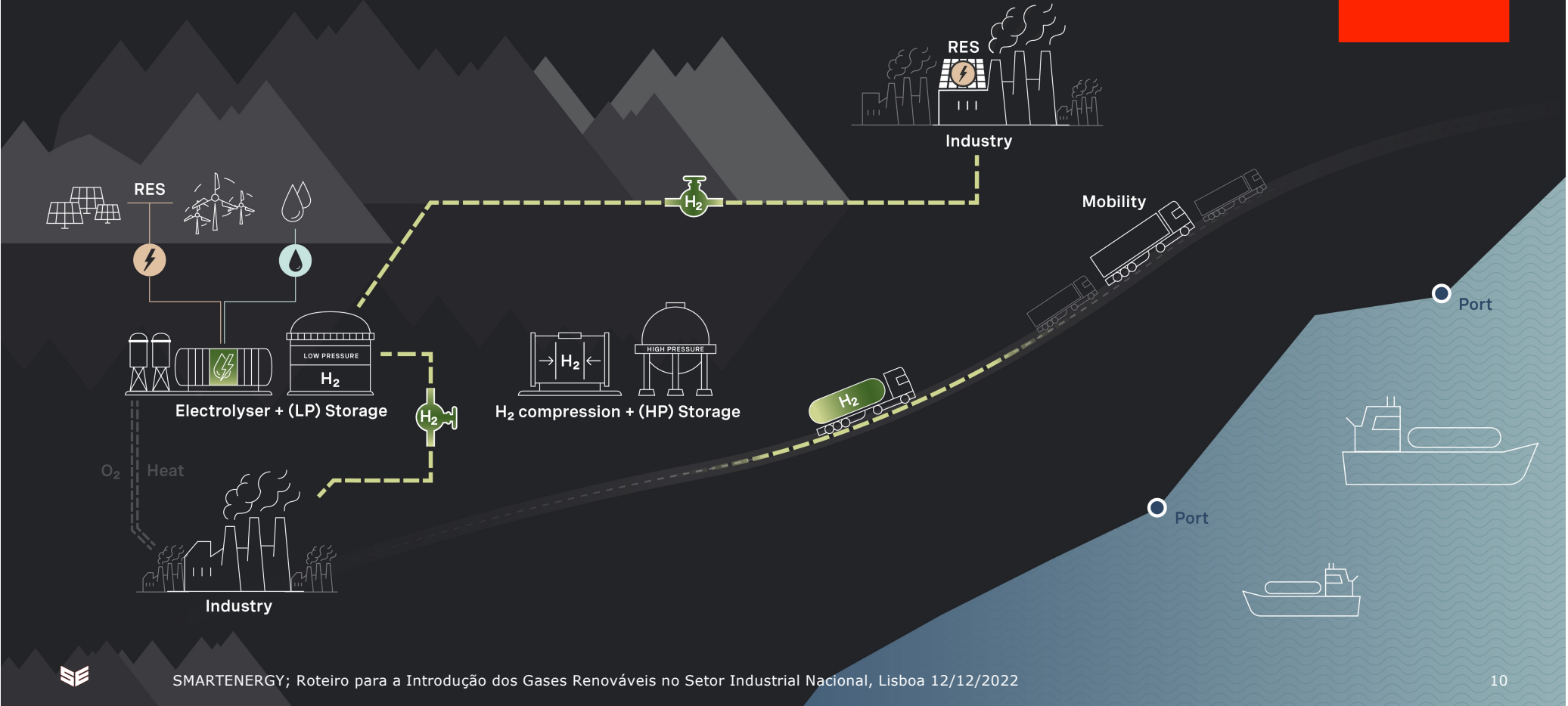
ELECTROLYSER
800+ MWe

PRIMARY OFFTAKER
Ceramic Industry
SECONDARY OFFTAKER
**Gas Grid injection
Mobility**



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PENDING
PRENOTIFICATION
IPCEI



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Timeline and Milestones

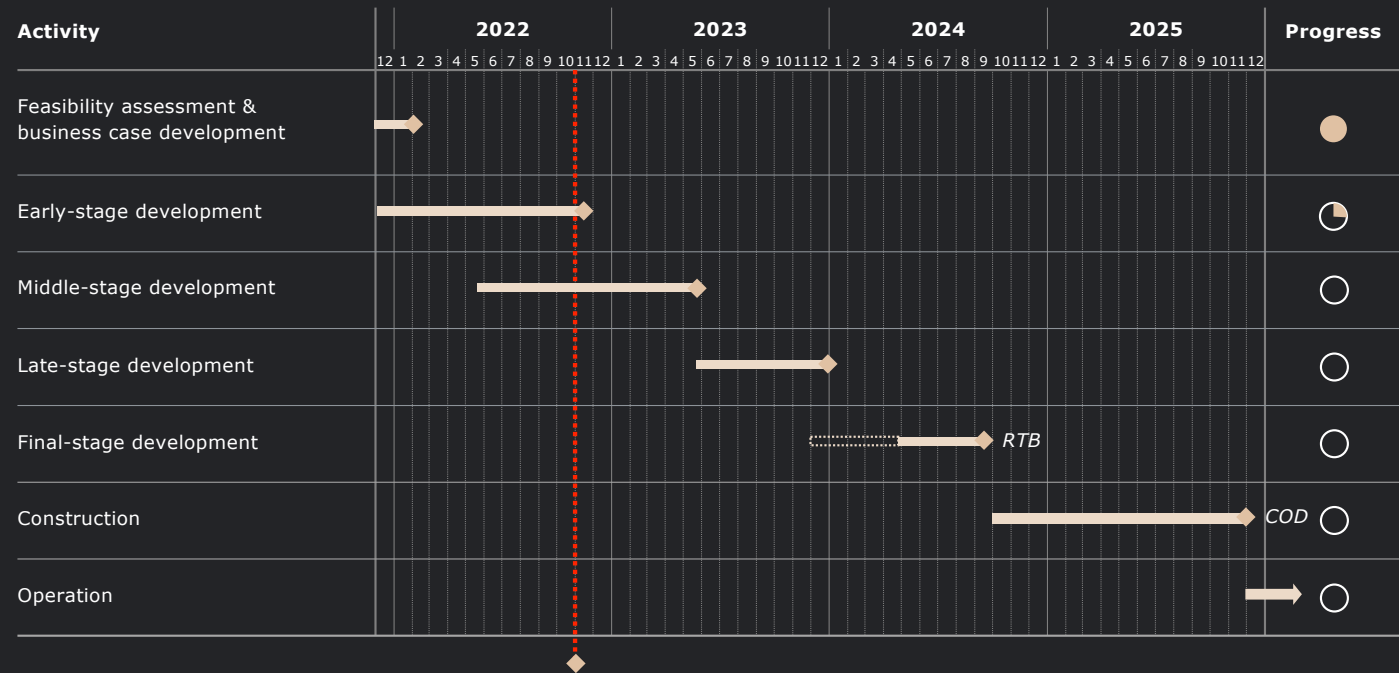
Phase 1 - Achieved milestones

A. Feasibility assessment

- ✓ Land scouted and secured
- ✓ Land Use Regime assessed (IGT)
- ✓ Preliminary Business Case study
- ✓ Preliminary technical study conducted

B. Early-stage development

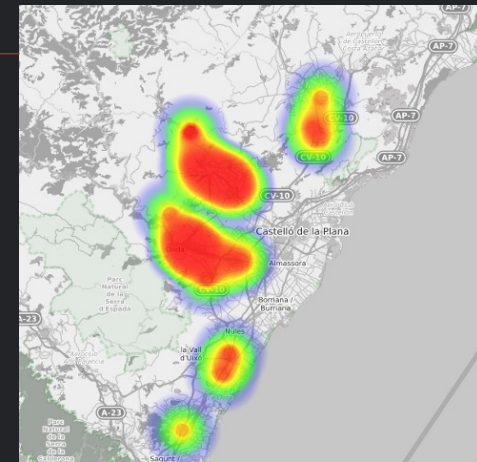
- ✓ Feasibility assessment ongoing
- ✓ SPV allocated
- ✓ Land agreement signed
- ✓ Conceptual design finalized
- Urbanistic Compatibility & pre AAI Statement from municipality
- AAI from Autonomic Region



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Offtakers

- > H2 will be consumed by a cluster of **20+ companies** in the ceramic sector
- > H2 will be used in **kilns** and **cogeneration systems** to produce ceramics and related products
- > H2 will be injected into the **natural gas network**
- > Oxygen by-product will be **valorized and used by ceramic companies** for oxyfuel combustion and other end-users, such as local hospitals



Infrastructure, Connection and Access to Renewables

- > The **electrolyser**, **solar PV** plant and the **substation** are located in the Municipality of Onda, Castellón, within a radius of ~5 km

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Strong network and support from all parties

Project Partners and Offtakers

Project sponsor

Smartenergy



Project coordinator

ETRA – Technology, engineering, installation and operation of management and control systems

Consumption stakeholders

Offtakers: 20+ ceramic industries represented by ASCER and ANFFECC

ASCER, Spanish Ceramic Tile Manufacturer's Association

ANFFECC, Spanish Ceramic Frits, Glazes and Pigments Producers' Association

Public stakeholders

Regional Government authority – Generalitat Valenciana

Local Government authority – Onda City Council

Technical stakeholders

Electrolyzer manufacturer

Engineering company

EPC company

R&D stakeholders

Centro Nacional del Hidrógeno (CNH2)

Instituto Tecnológico de la Energía (ITE)

Fundación para la Investigación y Desarrollo en Transporte y Energía (Cidaut)

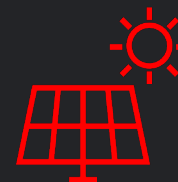
Instituto Tecnológico de la Cerámica, ITC



Smartenergy is active in major EU markets for on PV, wind and green H2 project development



Founded in
**2011 in
Wollerau (CH)**



PV, onshore wind
& green H2
development

Since 2018
**1,063 MW
transacted**



Major European
markets (**focus on
Southern Europe**)



Experienced team
~140 people

Pipeline of
**1.9 GWe (H2)
8.8 GW (PV,
onshore wind)**

Green H2 | Project pipeline 2022 | 1.9 GWe

PROJECT NAME	COUNTRY	ELECTROLYSER CAPACITY (MWe)		RTB/FID	COD
		Initial phase	Final phase		
Real	Portugal		100	Q4 2024	Q4 2025
Frio	Portugal		60	Q4 2024	Q4 2025
Magos	Portugal		40	Q4 2024	Q4 2025
Tagus	Portugal	10	30	Q3 2024	Q3 2025
Côa	Portugal	5	50	Q3 2024	Q3 2025
Sado	Portugal		60	Q3 2024	Q3 2025
Sizandro	Portugal	5	50	Q4 2024	Q4 2025
Galileu	Portugal	25	200+	Q3 2024	Q4 2025
Sabor	Portugal	20	40	Q4 2024	Q4 2025
Seda H2	Portugal		300	Q3 2025	Q4 2027
Sines H2	Portugal		100	Q1 2025	Q4 2025
Aveiro H2	Portugal		100	Q1 2025	Q4 2025
Leça H2	Portugal		140	Q3 2025	Q4 2027
Orange.bat	Spain	100	800+	Q4 2024	Q4 2025
Montealegre del Castillo	Spain		150	Q3 2025	Q4 2027
Escuriza	Spain		10	Q3 2024	Q4 2025
Porto Torres	Italy	20	200	Q1 2025	Q4 2025



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Thank you!

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