

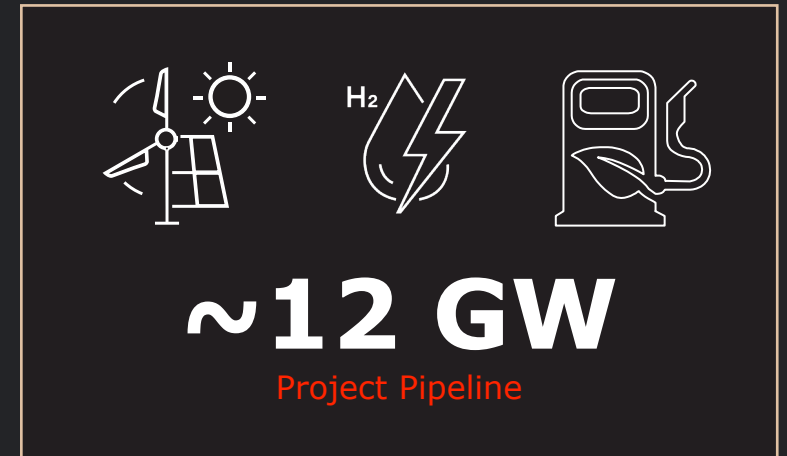


SMARTENERGY

Financing Green Hydrogen Projects in Iberia: case studies

EHEC 2024 – Plenary Session 1: Green Hydrogen production, transport and distribution
Bilbao, 6th March 2024

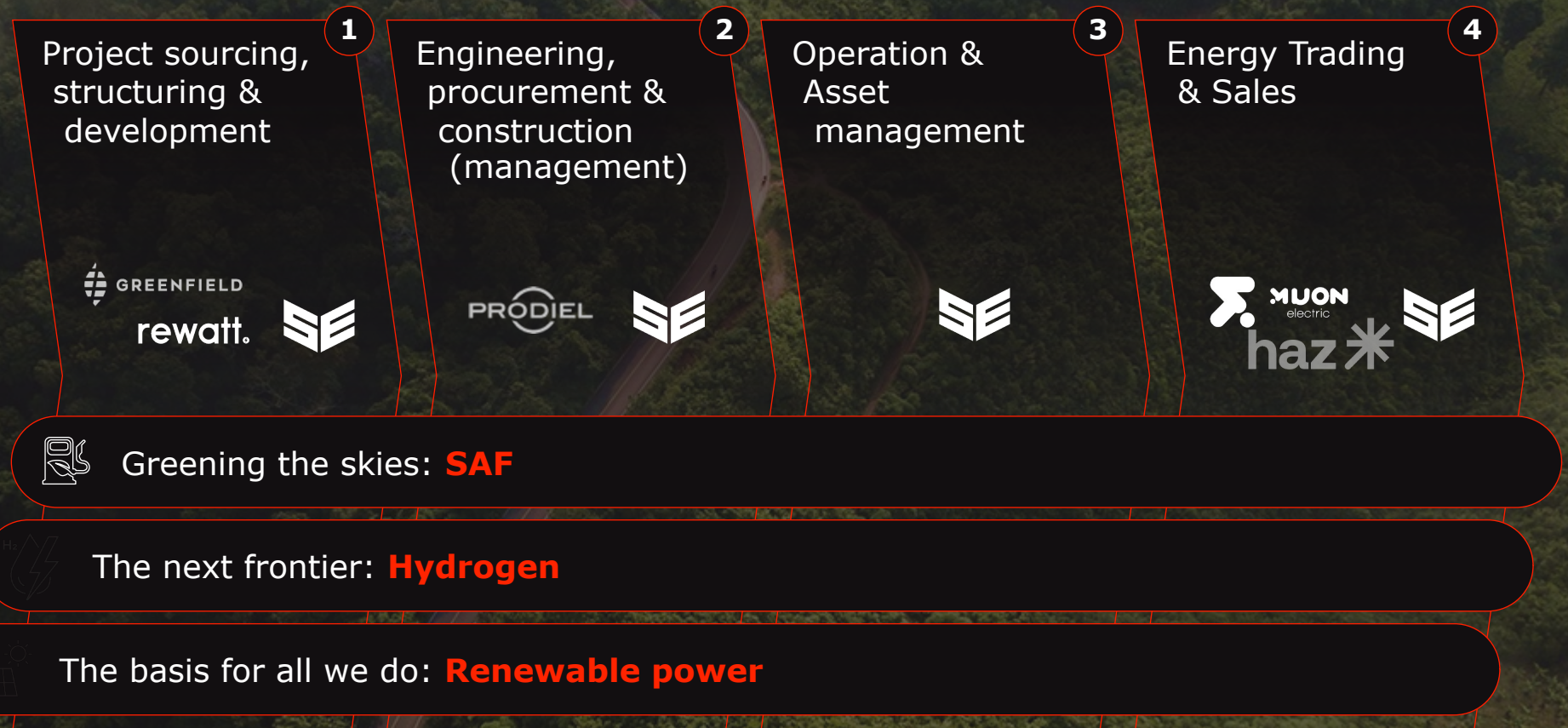
We invest sustainably by promoting renewable projects



Our capabilities & green portfolio

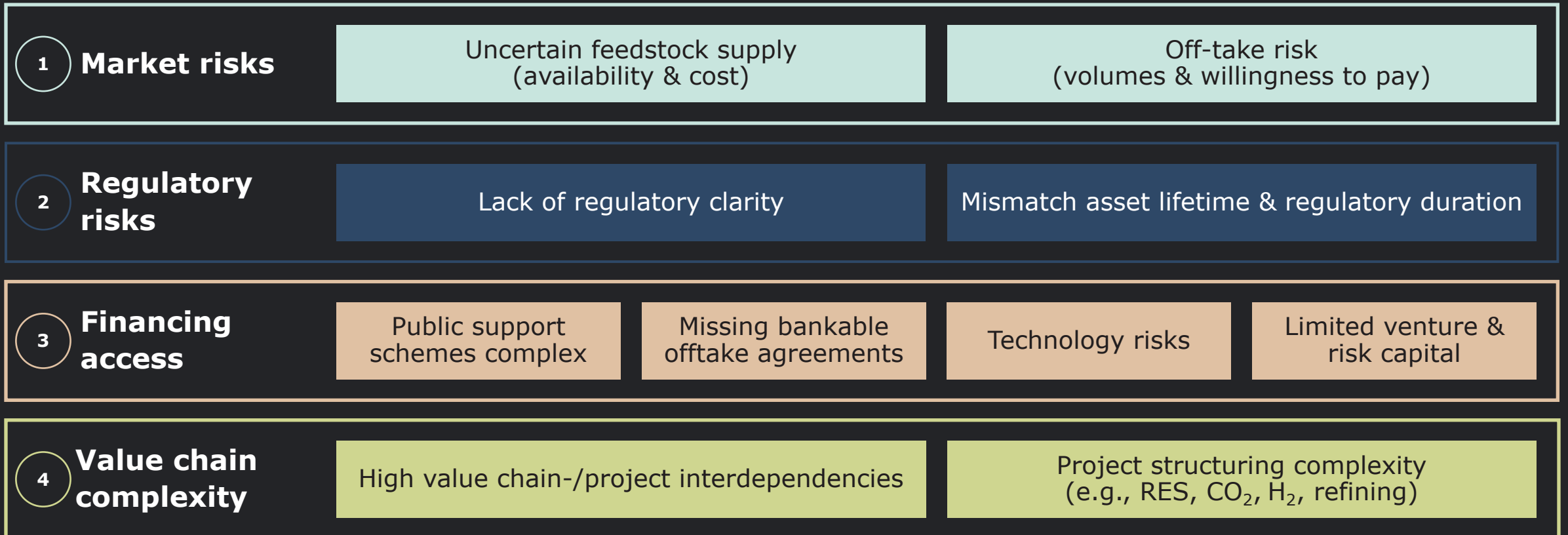
We cover the entire green energy project value chain for key technologies required by the energy transition

Extensive capabilities along the entire project value chain...



...to deliver large-scale **clean energy technology assets**

Challenges of Green H₂-projects to tackle



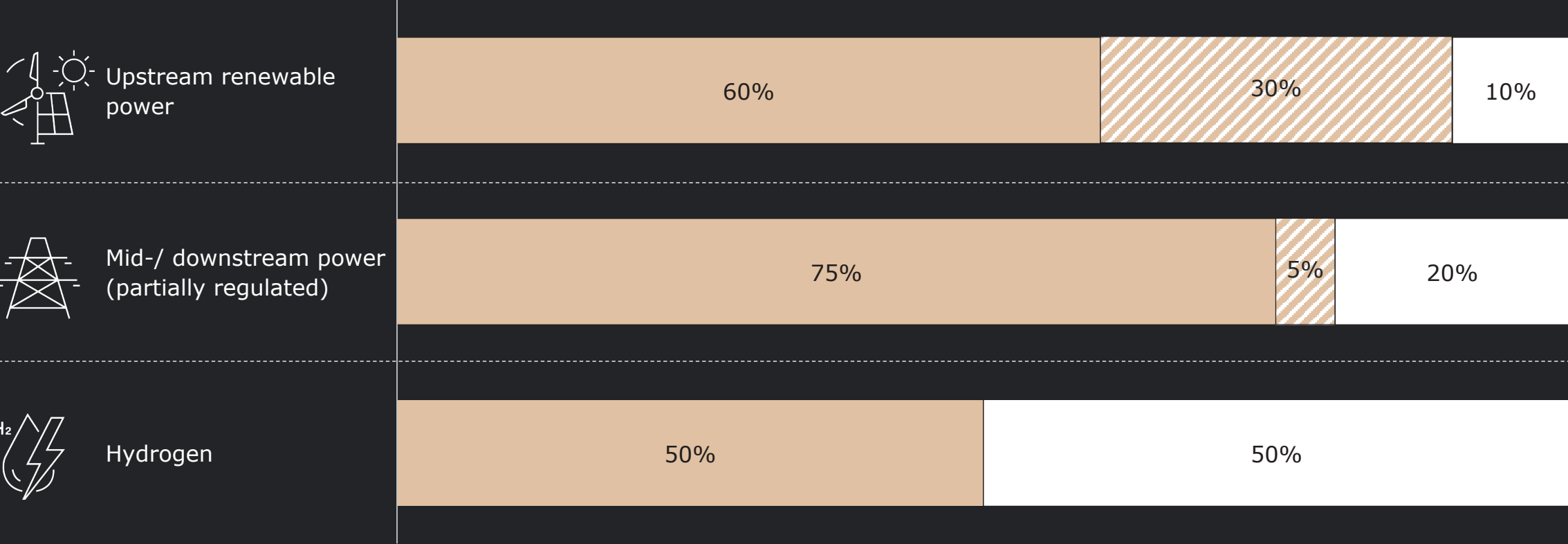


SMARTENERGY Bridging the gap

1 Market risks	Integration: Invest in integrated RE + green H ₂ projects to secure competitive power supply Partnering: E.g., with airlines to secure direct access to final markets
2 Regulatory risks	Focus: Target segments with clear regulatory business case (SAF) Cooperation: Long-term offtake agreements
3 Financing access	Cooperation: Strategic Partnering with best technology OEMs incl. co-investing Innovation finance: Equity GreenH ₂ vehicle, Debt/Convertibles with smart public support
4 Value chain complexity	De-risking: Captive projects with synchronized up-, mid- and downstream asset development Experience: >7 GW of renewable energy projects built globally



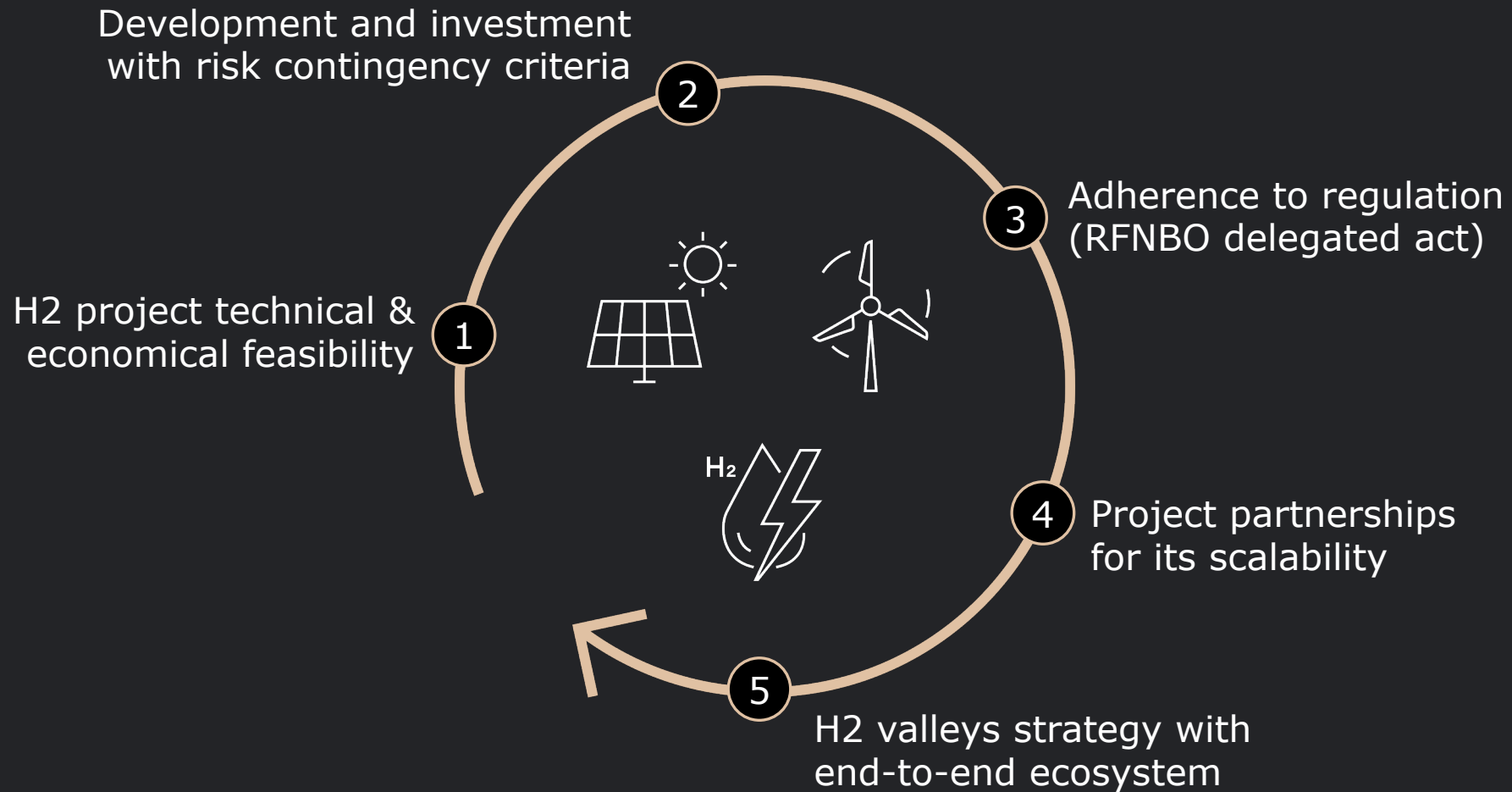
GreenH₂ is not yet a mature asset class with consequences on financing structures



■ Debt financing lower bound ■ Debt financing upper bound ■ Equity financing

Note: Includes transactions of for assets at all maturity levels
 Source: IJGlobal (2021)

Key development criteria to enable equity and debt investment





Iberian case studies
Ceramics
e-Fuels



Orange.bat

Backing the decarbonization of the Ceramic Cluster in Castellón
by replacing Natural Gas (fossil fuels) with Green Hydrogen

IBERIA – Abundant Solar and On-shore Wind translate into competitive Green Hydrogen

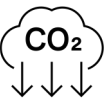


1 Ceramic sector: requires of clean high-grade heat and low possibilities of electrification alternatives.

2 Localitation: high geographic concentration of the industry in the province of Castellón (94%)

3 The business figures (2019)

Environmental impact: (data of 2019)



16,000 GWh NG consumption
3,2 Mtons of CO2 (3% of the whole Spain)



3.757 M€
de ingresos



15.800
ocupados



2.818 M€
exportaciones



2º país
exportador del mundo
(75% del valor del producto es exportado)



510M
Producción (m²)



248
empresas



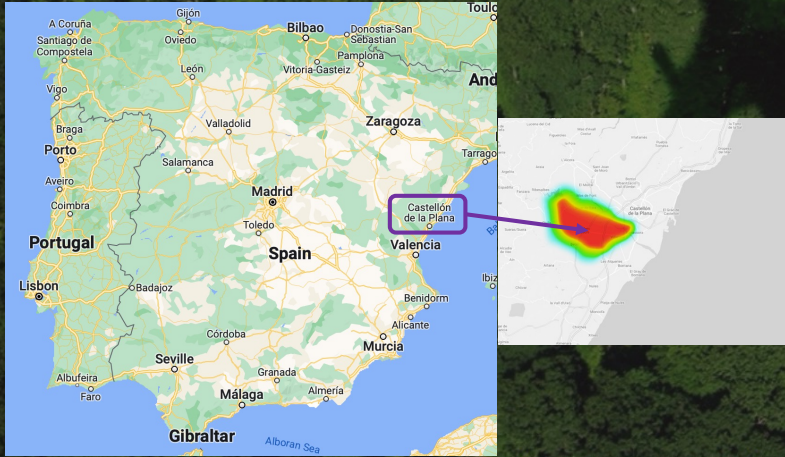
190 países
presencia de los productos
cerámicos




5º país
productor del mundo

Our capabilities & green portfolio


Example: Hard-to-abate Industries – replacing Natural gas (NG) with Green hydrogen



Phase 1



PV
50 MWp

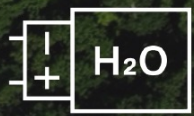


CONNECTED TO THE GRID
On-grid

PRIMARY OFFTAKER
Ceramic Industry

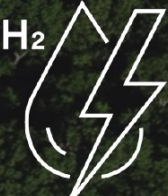


Phase 1



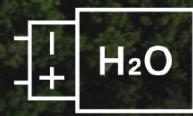
ELECTROLIZER
100 MWe

Phase 1



ANNUAL PRODUCTION H₂
15'000 tons

Phase 2



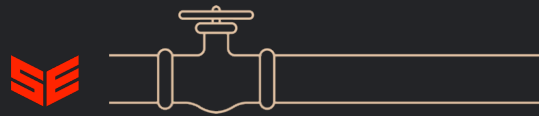
ELECTROLIZER
+800 MWe

An underwater scene with blue water and many bubbles. A red arrow points downwards from the top center of the image.

eSAF Green Valleys Portugal


Green H₂ to decarbonize the industry and
value biogenic CO₂ in Sustainable Aviation Fuels

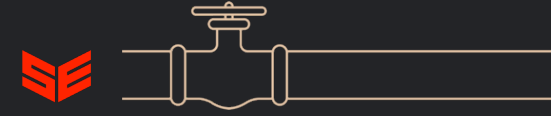
Dedicated projects for sustainable aviation fuels




1 Project "Galileu"


 **c. 31 k t**
SAF p.a. (2028-2029)

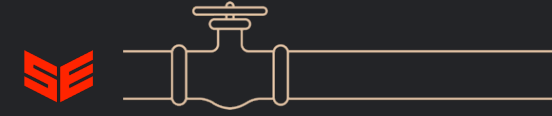
 **c. 49 k t**
SAF p.a. (2030+)




2 Project "Leça"


 **c. 20 k t**
SAF p.a. (2028-2029)

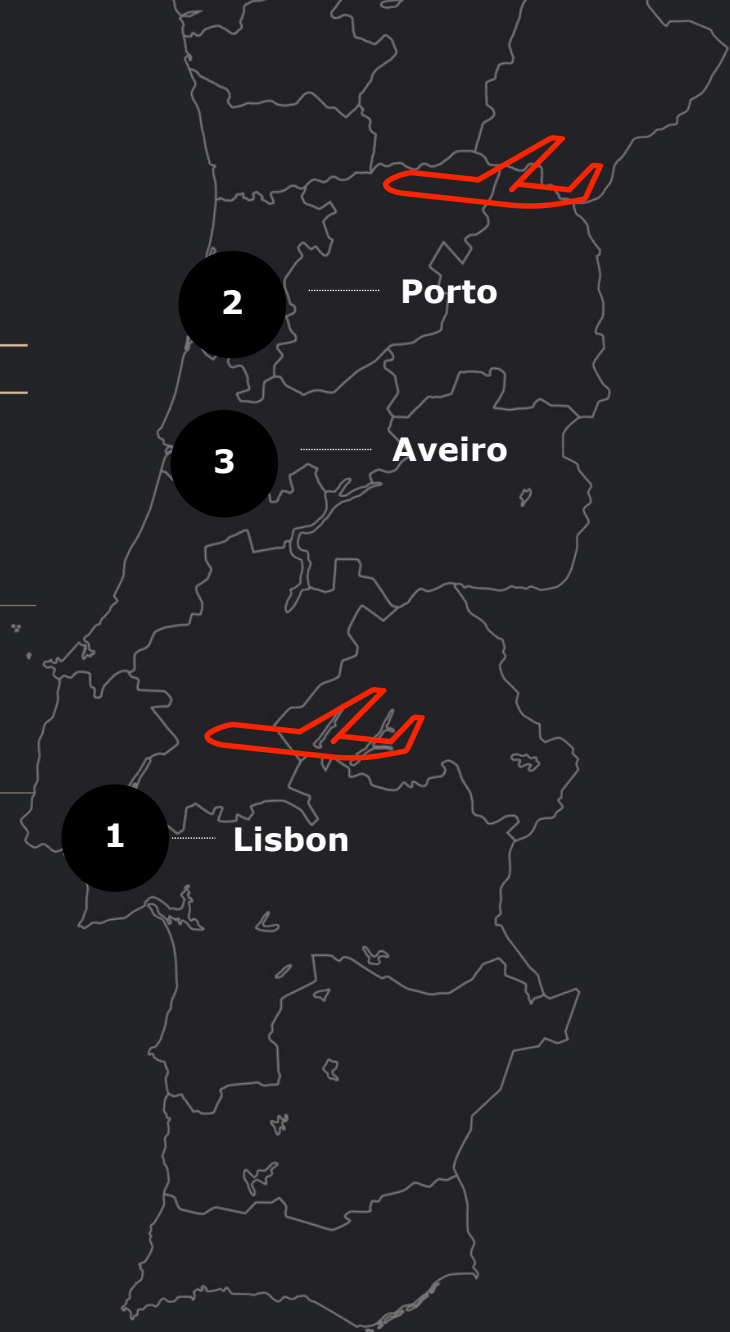
 **c. 51 k t**
SAF p.a. (2030+)



3 Project "Mondego"

 **c. 43 k t**
SAF p.a. (2028-2029)

 **c. 68 k t**
SAF p.a. (2030+)



Note: Increasing load factor of production from 35% to 55% (from 2030 onwards)

Leça H2 Green Valley

Context and scope

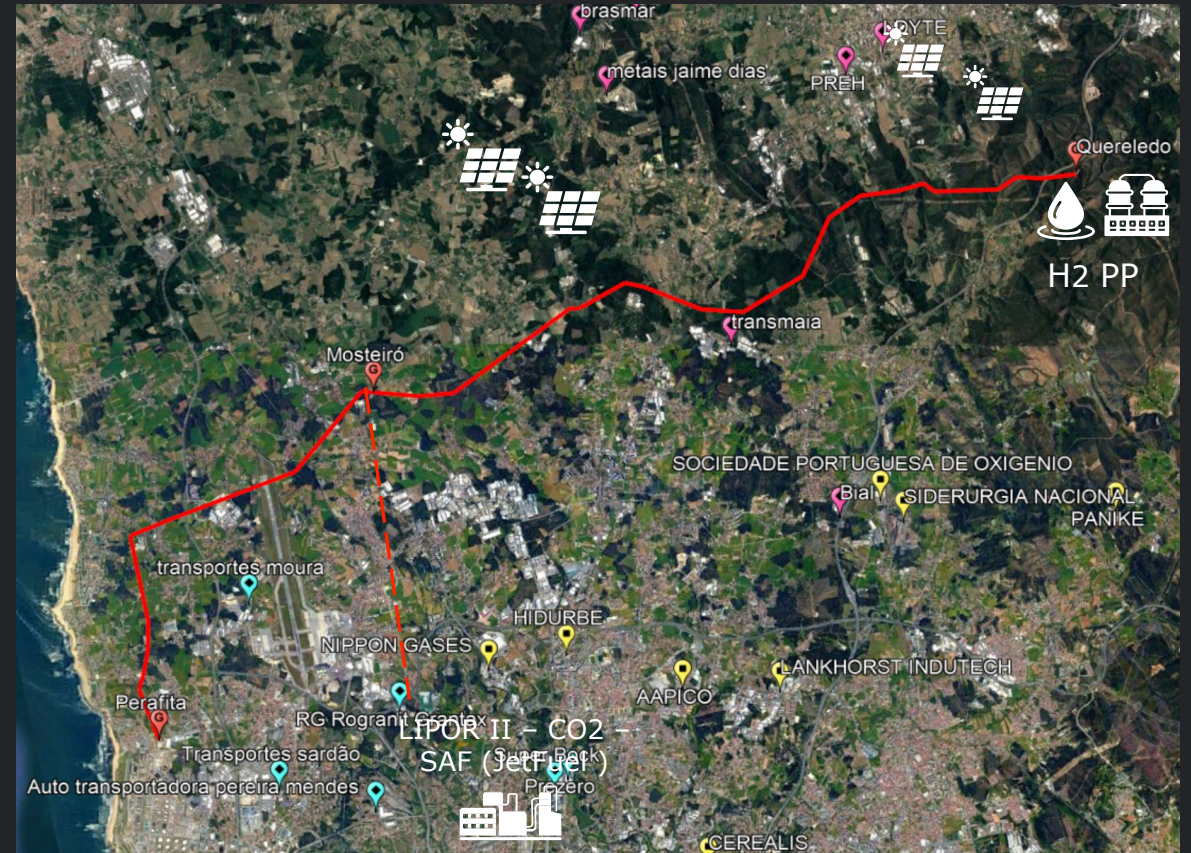
REN

- REN Gasodutos owns concession to operate the existing natural gas pipeline that connects Quereledo (JCT 4120) to Perafita (DP 4148), which served the former Matosinhos refinery, and is suitable for repurposing to 100% H₂
- This being potentially the first repurposing of gas assets into a pure hydrogen gas pipeline, linking green H₂ producers with industrial consumers in the area.
- Repurposed pipeline is a cost efficient enabler for Smartenergy*/Lipor project and potentially for other production and consumption projects in the region, ensuring conditions for a competitive green H₂ market development

Smartenergy

Smartenergy analyzed different structuring and location scenarios of a potential project, embodied in the materialization of a Hydrogen Production Plant (H₂PP) and a Derivative Synthetic Fuels Production Unit (eFuels), considering:

- Proximity of the H₂PP to the REN gas pipeline, in particular to the Quereledo JCT
- Proximity to sources of necessary raw materials – water, renewable energy and biogenic CO₂
- Proximity to potential consumers – local industry and, in the case of eFuels, Port of Leixões and Sá Carneiro Airport
- Proximity to product transport & distribution infrastructures – Port of Leixões, Gas Pipeline Quereledo – Perafita, and existing Natural Gas distribution network



LIPOR II (one of the largest producers of biogenic CO₂ in Portugal) as the main supplier of the CO₂, a critical factor for SAF production
CCU enables circular economy, while decarbonizing heavy-duty and long-haul mobility (maritime; aviation)

Thank you!

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