TotalEnergies

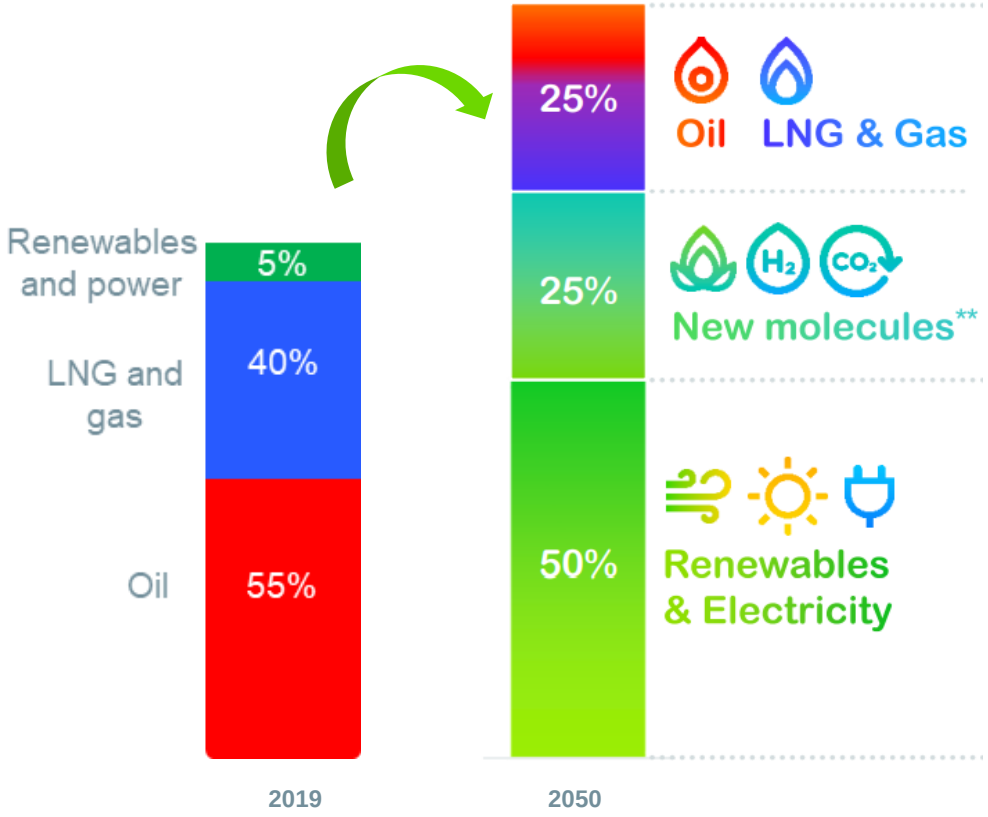
H2 from an Offshore Wind Developers perspective

The future energy carrier

H2 Conference, Copenhagen June 2022

TotalEnergies a multi-energy company

Emerging as a promising contributor to Net-Zero



Oil Gas Electricity Hydrogen

Biomass Wind power Solar power

1 # Major Ambition on Renewables

Active since 2011
Target 2025 @ 35 GW
Target 2030 @ 100 GW

2 # LNG player, integrating a strong of commitment to reduce CO_2 emission

3 # CCS Development

Leveraging skills to build a multi-energy Company

Experts in floating structures
Metocean data specialists

Chemical and process engineers

Cryogenics experts (LNG) for H2 liquefaction

Geologists
Drillers

Offshore wind

E fuels

Hydrogen

Carbon capture and storage

World class expertise in project management

TotalEnergies an integrator along the full H2 chain

1 Kick-start clean hydrogen to cover our refining demand

- Integrating along the **entire value chain**, including **renewal electricity supply as offshore wind**.
- Pioneering in **mass production** of clean H2 and derivatives, including synthetic fuels.

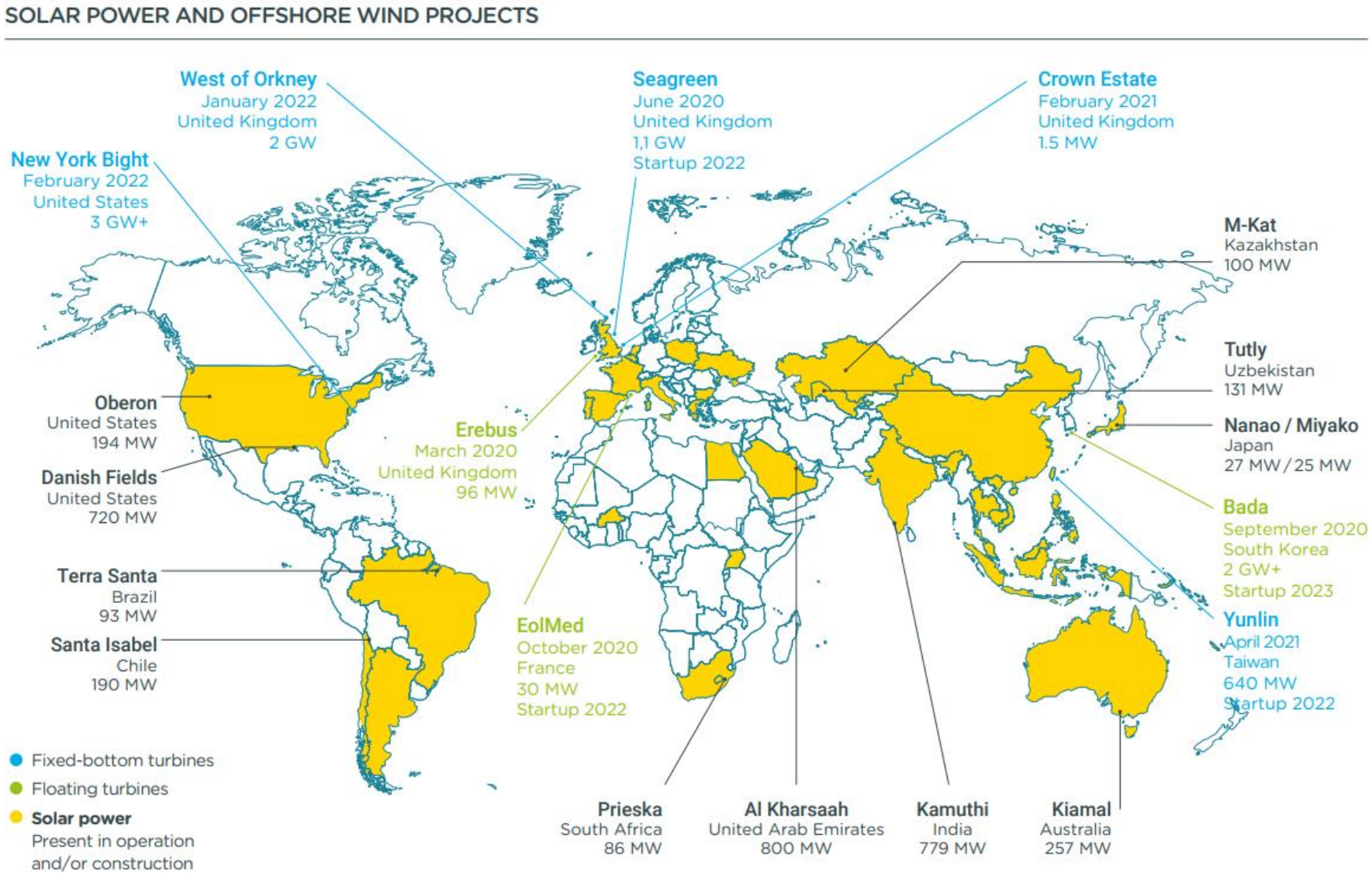
2 Develop mass production of low-cost carbon-free H_2

- Blue H2, NH_3 from competitive gas.
- Green H2 in areas with low cost of renewable electricity.
- R&D on H2/ammonia/e-fuels as transportation carrier.
- Emerging portfolio of large-scale **export-oriented** green and blue hydrogen/derivatives projects in locations with advantaged renewables and gas feedstock and CCS capacity.

3 Act on hydrogen demand

- **Decarbonizing transport**: investments in Hysetco (H2 taxi fleet), Hyzon (H2 trucks).
- Support blending mandates to decarbonize natural gas.
- Advocate for decarbonization of industry.

Renewables portfolio



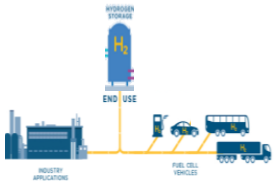
H2 scale up expected as Renewables and market ramp up

Today | *2025* | *2030+*

On-site
(x.10^1MW scale)

Electrolysers are on-site.
(energy transport is only possible upstream for electricity or CH_4).

Regional hydrogen hubs
(x.10^2 MW scale)



Hydrogen production is centralized in industrial clusters.
H2 pipelines emerge at a regional scale.

Intercontinental supply chain
(x.10^3 MW scale)

Hydrogen shipping (LH2, NH3 or LOHC) and long range pipelines enable an intercontinental H_2 supply chain

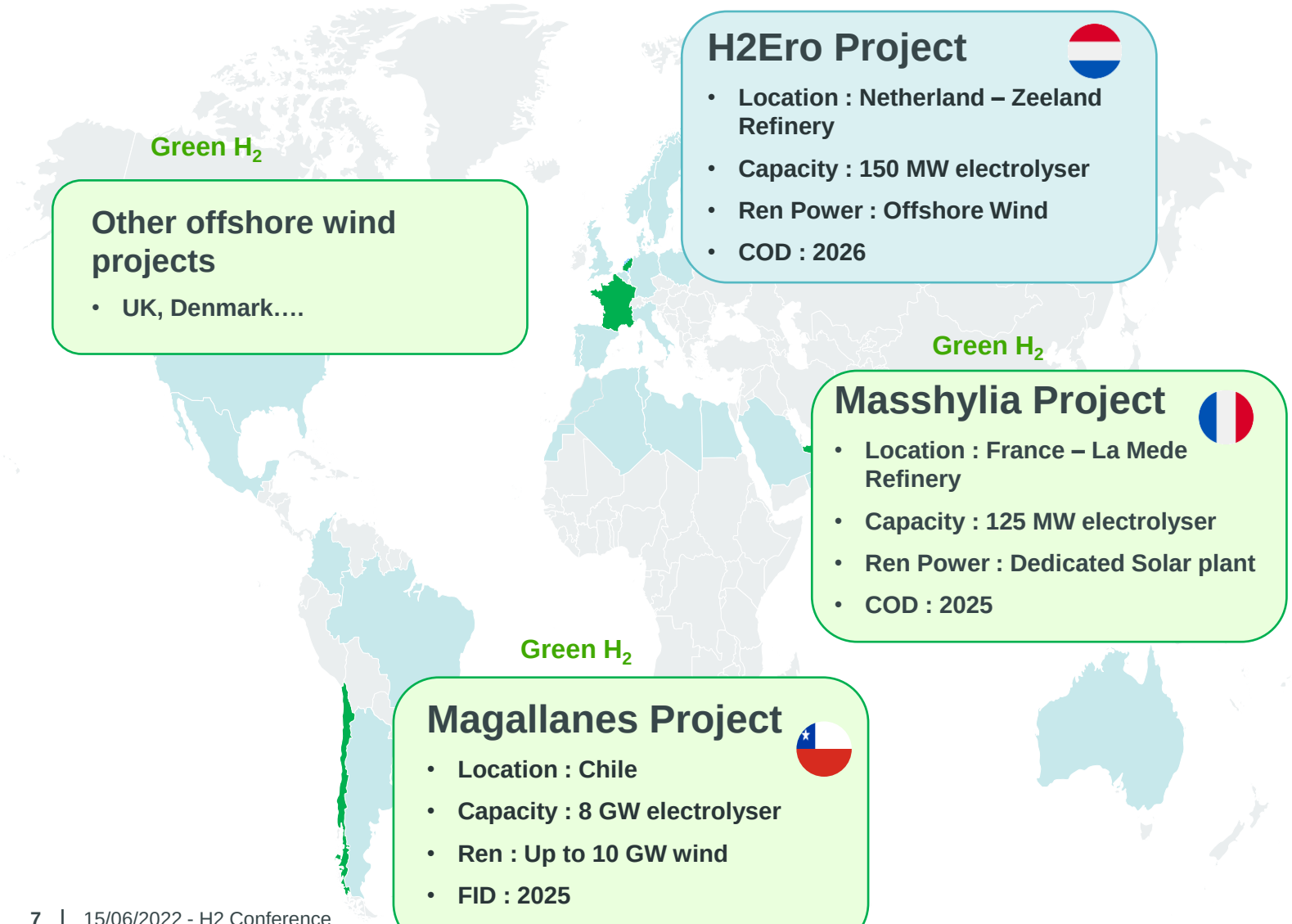
FINDING RELEVANT OPPORTUNITIES REQUIRES…

Matching small scale **production** + **markets** attractiveness criteria **locally**

Matching **production** + **markets** attractiveness criteria at **a regional scale**

Optimizing the match between **production** and **markets** attractiveness criteria **in different countries**

Current projects in Europe and worldwide



Green & Blue H_2

H2Ero Project

- Location : Netherland – Zeeland Refinery
- Capacity : 150 MW electrolyser
- Ren Power : Offshore Wind
- COD : 2026

Green H_2

Other offshore wind projects

- UK, Denmark….

Green H_2

Masshylia Project

- Location : France – La Mede Refinery
- Capacity : 125 MW electrolyser
- Ren Power : Dedicated Solar plant
- COD : 2025

Green H_2

Magallanes Project

- Location : Chile
- Capacity : 8 GW electrolyser
- Ren : Up to 10 GW wind
- FID : 2025

Our Strategic Partners

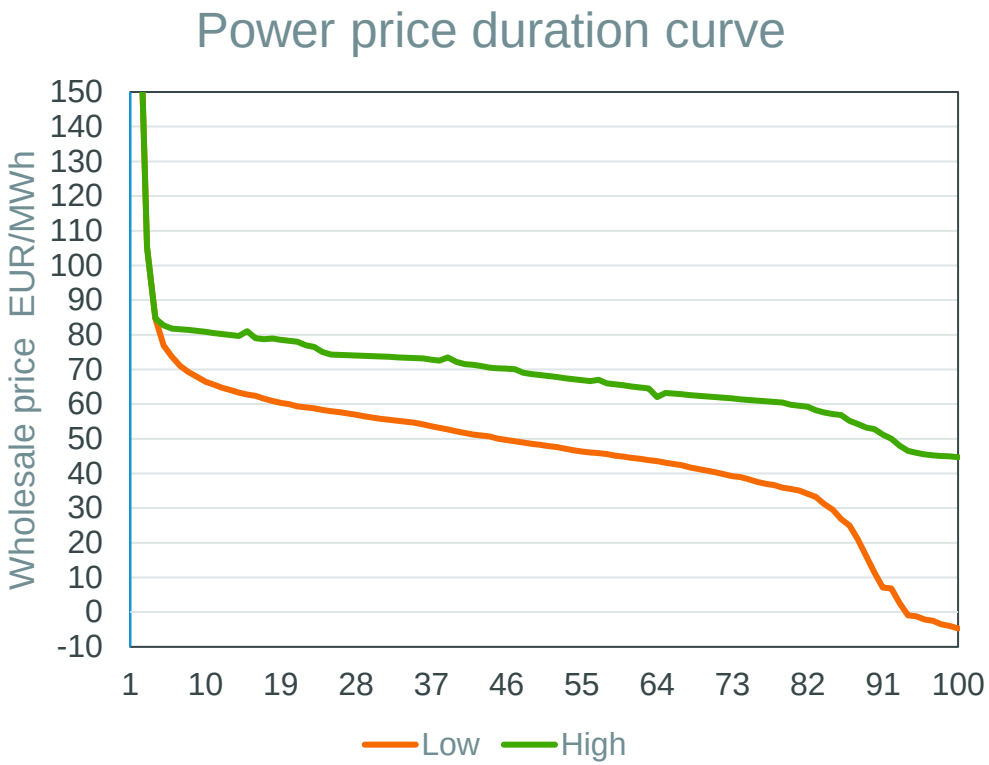
H2 opportunities and challenges

Opportunities

- Green H2 accelerates low carbon energy transition
- H_2 production drives up electricity & gas demand, as well as CCS & electrolysis development -> large offtake of power from OFW
- Technologies known....

Challenges

- Costs must come down in order to support H_2 adoption and industrial scale up
- From local to international H2 market
- Dedicated Infrastructure for H2
- H2 commercial market model
- Break-even prices for green power, H2 and PtX products
- Right incentive structure - subsidy free in the long run



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Thank you very much

Merci beaucoup