



**TotalEnergies**

## Hydrogen and Carbon Capture&Storage

Building a sustainable multi-energy  
company

18<sup>th</sup> January 2022

# Getting to Net Zero worldwide by 2050 together with society

## Ambitions \_\_\_\_\_

## 2030 objectives vs 2015 \_\_\_\_\_

**Net Zero worldwide  
on operated activities**  
(Scope 1+2)



Net emissions on operated  
oil and gas facilities

**-40%**

**Net Zero worldwide  
for indirect emissions<sup>(1)</sup>**  
(Scope 3)



Scope 3 worldwide  
emissions

**2030 < 2015**

Carbon intensity <sup>(2)</sup>  
(Scope 1+2+3)

**> -20%**

<sup>(1)</sup> Related to the use by our customers of energy products sold for end-use  
<sup>(2)</sup> Average carbon intensity of energy products used by our customers worldwide

# Key drivers for energy transition in each sector

How to decarbonize?

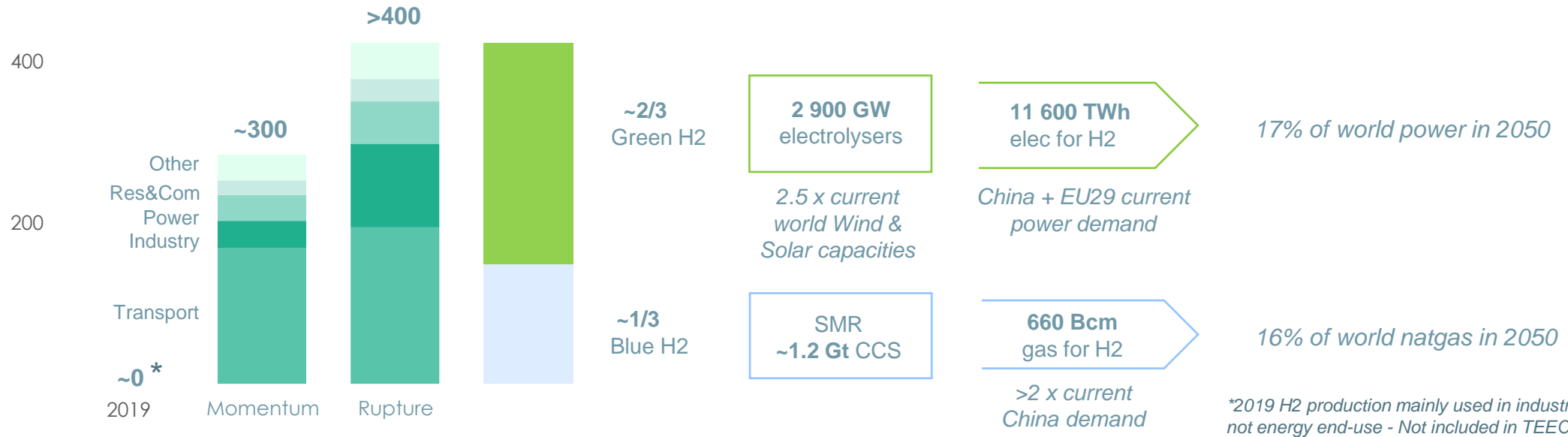


# TotalEnergies Energy Outlook 2021: World Clean Hydrogen

Emerging as a promising contributor to Net-Zero

## Clean H2 balance in 2050

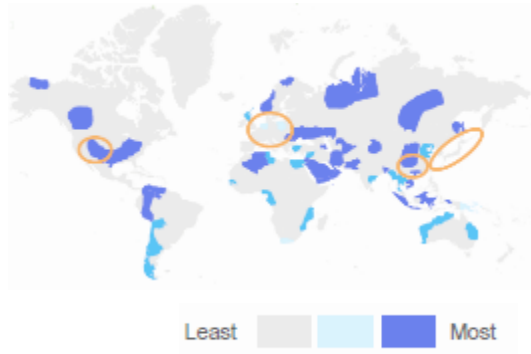
MtH2



- H2 production drives up electricity & gas demand, as well as CCS & electrolysis development
- Transport & Industry are the main users of H2: in Industry, H2 deployment will take place in steel, petrochemicals and cement
- Costs must come down in order to support H2 adoption and industrial scale up

# Global resources for renewable and low-carbon H<sub>2</sub>

Not always aligned with global demand centers

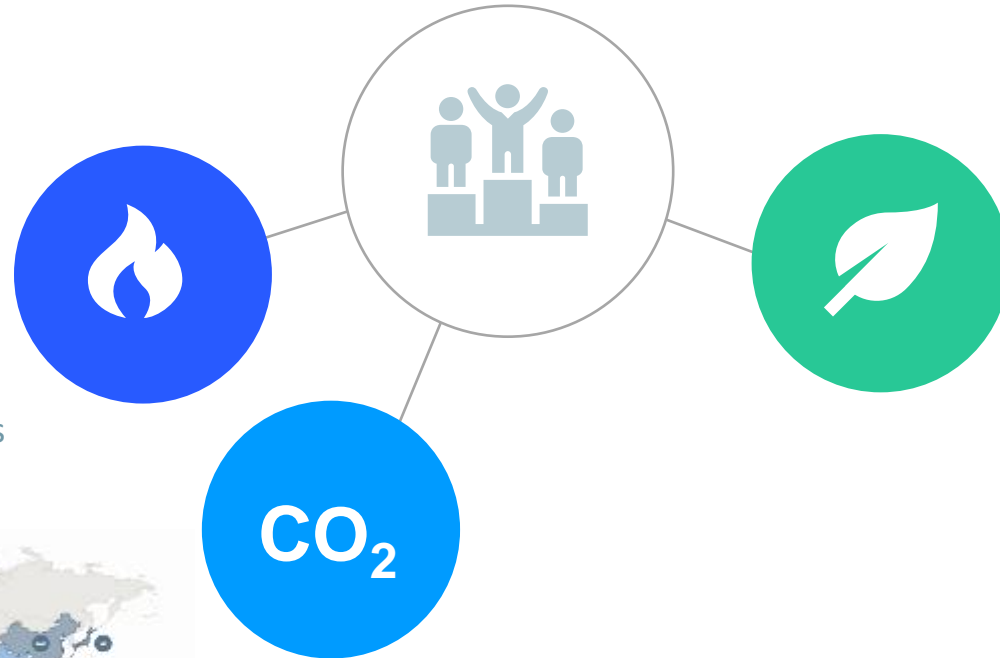


## Blue Opportunity

Storage Capacity may not match with Gas Production Reserve.

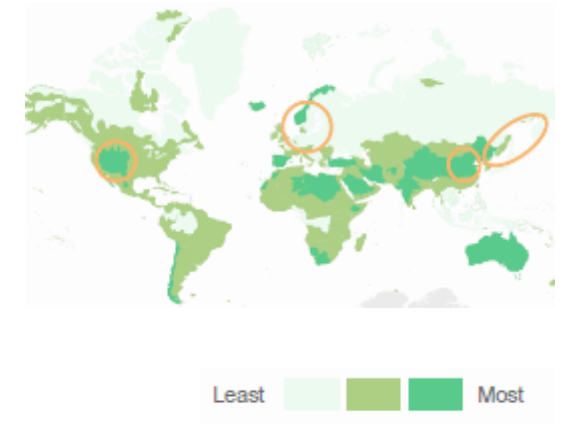


Source: CCS Global Institute 2018



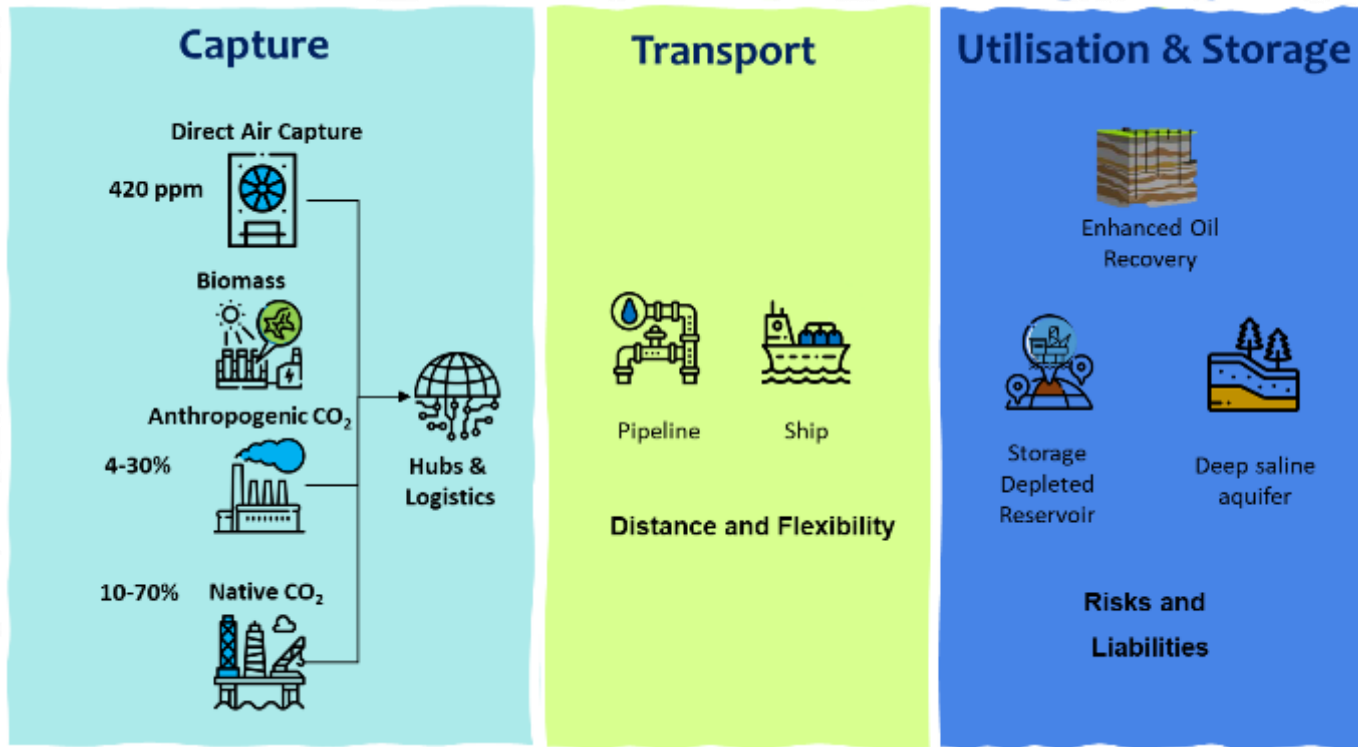
## Green Opportunity

Whereas renewable energy is startlingly cheap, it is remaining far from the main demand.

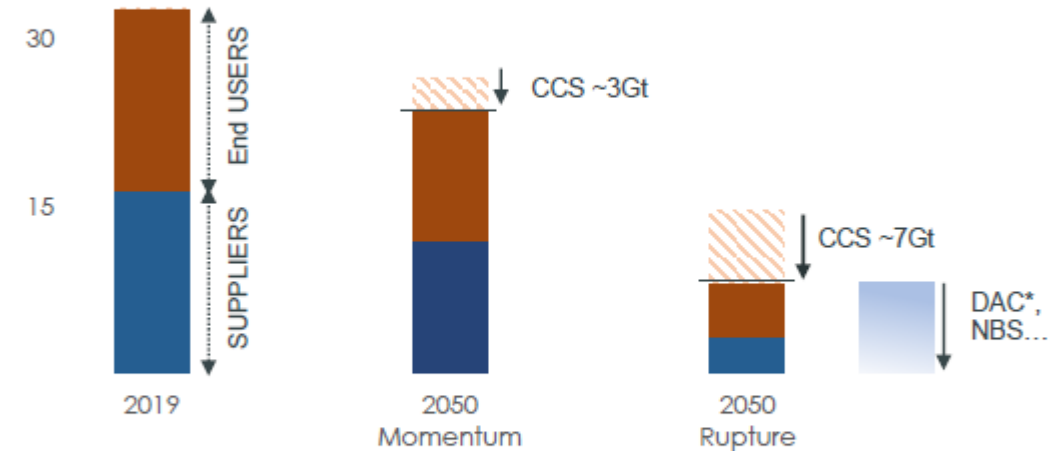


This creates opportunities for global players on international market

# CCS is needed to reach Net-Zero



Energy-related CO<sub>2</sub> emissions Gt



- CCS mainly on power generation (50%) and industry (25%)
- Scaling up yet-to-be-industrialized technologies such as DAC\* required to lower residual emissions
- Reaching Net Zero also requires nature-based solutions

# TotalEnergies showcase in North Sea

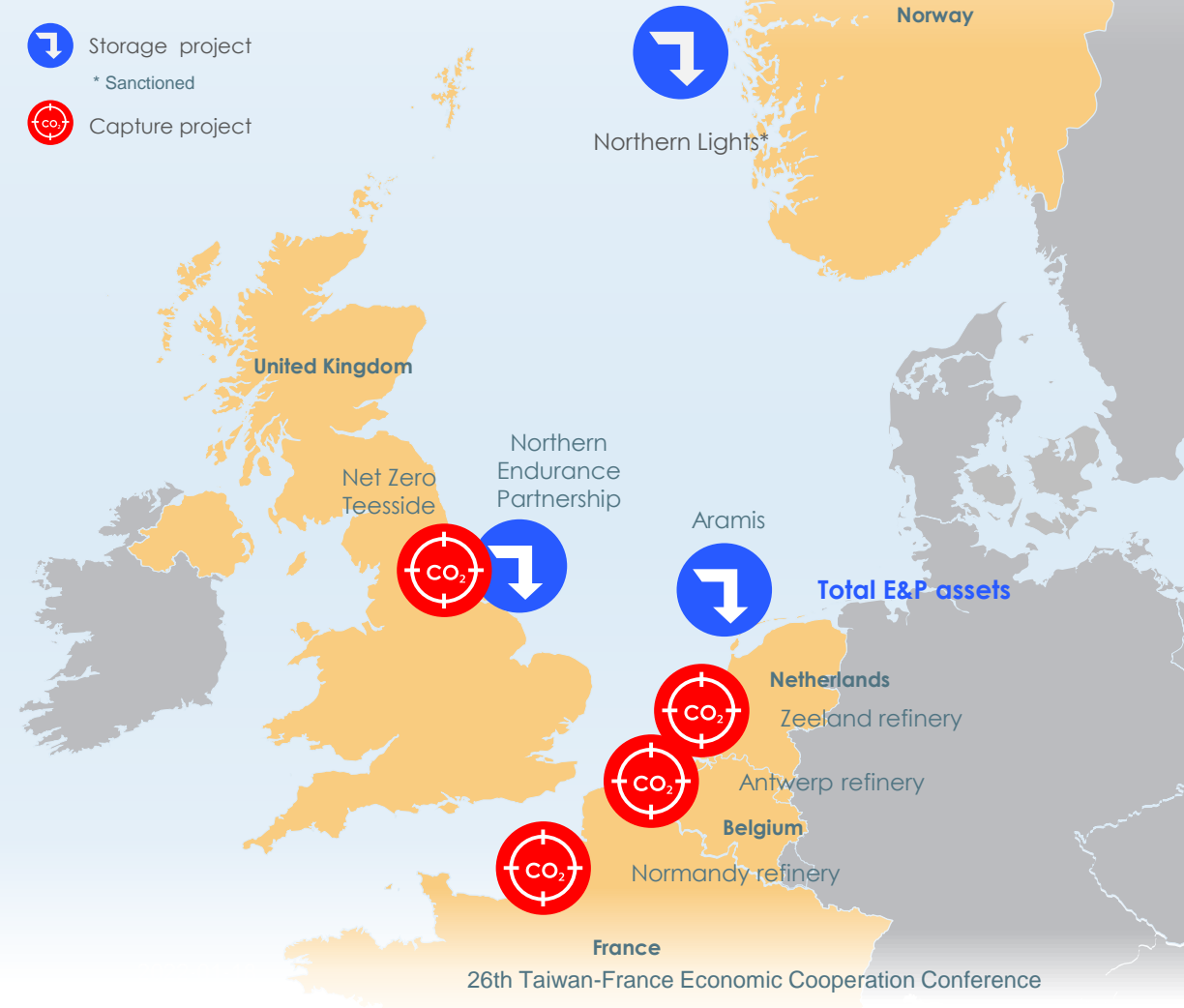
## EU favorable regulatory policies

- North sea region: area of concentrated CO<sub>2</sub> emissions and large storage potential

## TotalEnergies's approach

- Reducing Scope 1 emissions from assets through CO<sub>2</sub> capture and storage
- Scale enabling cost reduction in transportation and storage
- Targeting ~5 MtCO<sub>2</sub>/y injection capacity\* by 2030

(\* ) Company share



# Decarbonizing Zeeland refinery (Scope 1)



Producing clean hydrogen

## Zeeland refinery

TotalEnergies (55%), Lukoil (45%)

- **Dutch climate accord** setting the pace for a decarbonized economy, targeting a CO<sub>2</sub> tax increase (~150 \$/tCO<sub>2</sub> by 2030)
- **Attractive national subsidy schemes** for CCS (SDE++) in addition to European Union funding
- **Maximizing CO<sub>2</sub> emissions reduction** by optimizing process synergies and heat recovery opportunities

**Capex: ~300 M\$<sup>1</sup>**

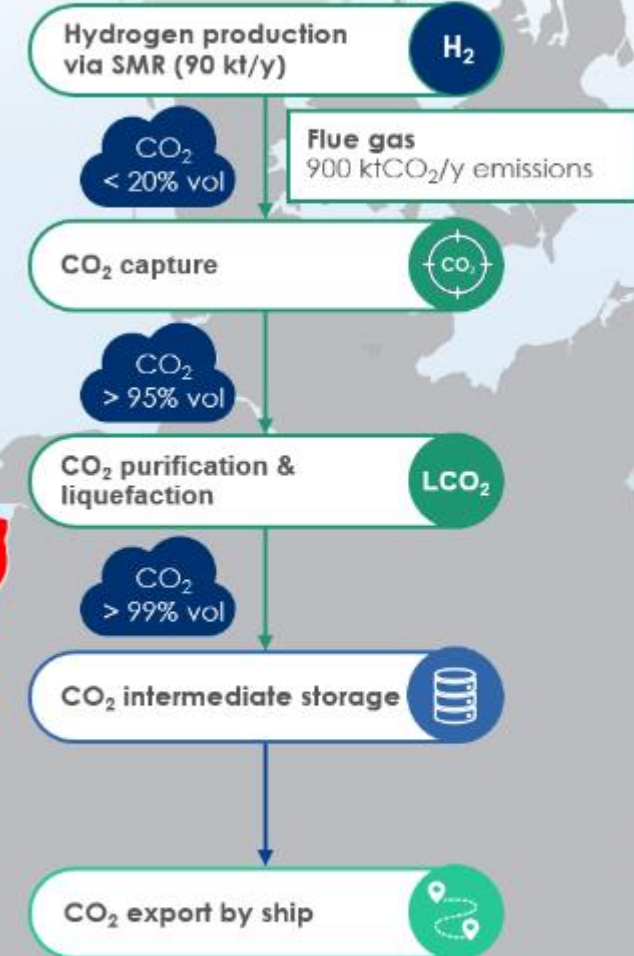
**for capture and conditioning**

<sup>1</sup> Capex at 100%



**~0.8 MtCO<sub>2</sub>/y\***  
captured and avoided from 2025

Zeeland Refinery







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Thank you for your attention