

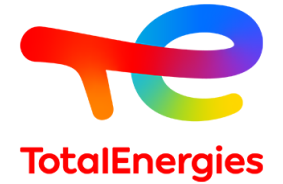
Decarbonizing the Steel Industry: A Global Multi-Energy Company Perspective

Cyril Duchanois – VP Metals

Christian Koulic – Global Market Executive Metals



TotalEnergies in brief



TotalEnergies is a **global multi-energy company** that produces and markets energies: oil and LNG, new low-carbon energies, electricity and renewables



OIL



GAS



ELECTRICITY



HYDROGEN



BIOMASS



WIND



SOLAR



\$20.5bn
in net income*
in 2022



World no.3
in liquefied natural
gas



2.8 mboe/day
produced in 2022,
of which **53%** is
natural gas



17 GW
of gross installed renewable
power generation capacity in 2022

100 GW
in production capacity by 2030



A goal of
150,000
charge points
for electric vehicles



8.8 million
gas and power
customers
in Europe

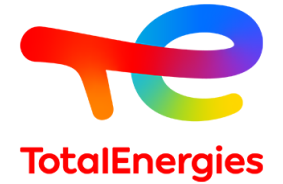


> \$4 billion
invested
in low-carbon
energies in 2022

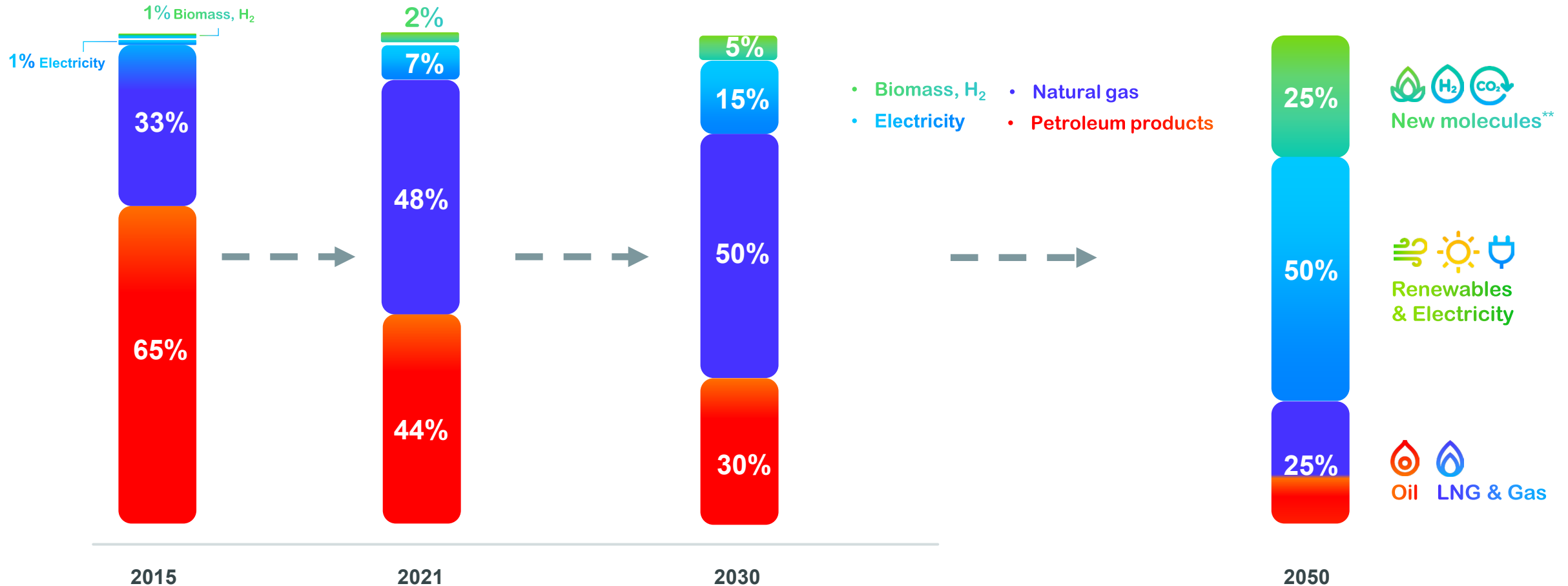


More than
3,500
researchers
in our
18 R&D centers

TotalEnergies energy mix* is dramatically evolving



TotalEnergies' ambition is to be a major player in the energy transition, to get to net-zero by 2050, together with society

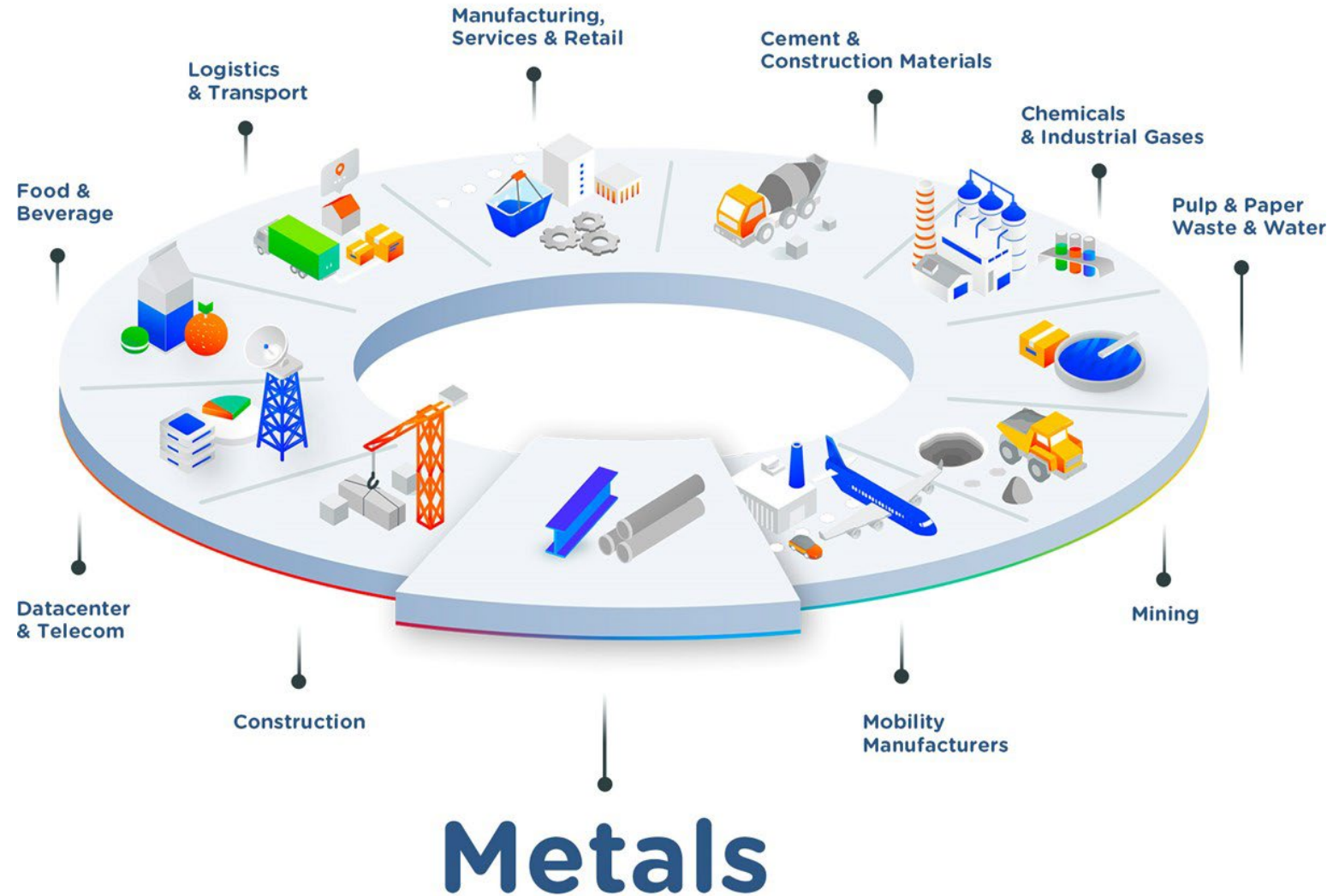


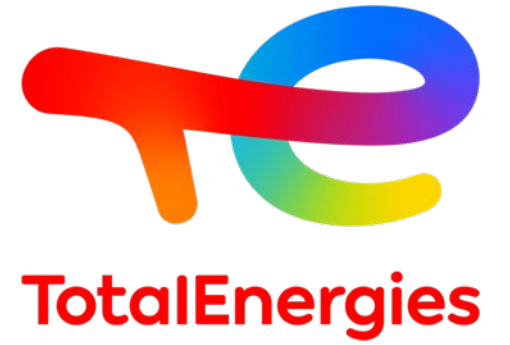
February 2022 — Results and Outlook

** Biofuels, biogas, hydrogen and e-fuels/e-gas
* Production & sales

OneB2B Solutions

A team dedicated to your energy transition journey





How do we see Steel decarbonization ?

Decarbonizing the Steel Industry



Blast Furnace



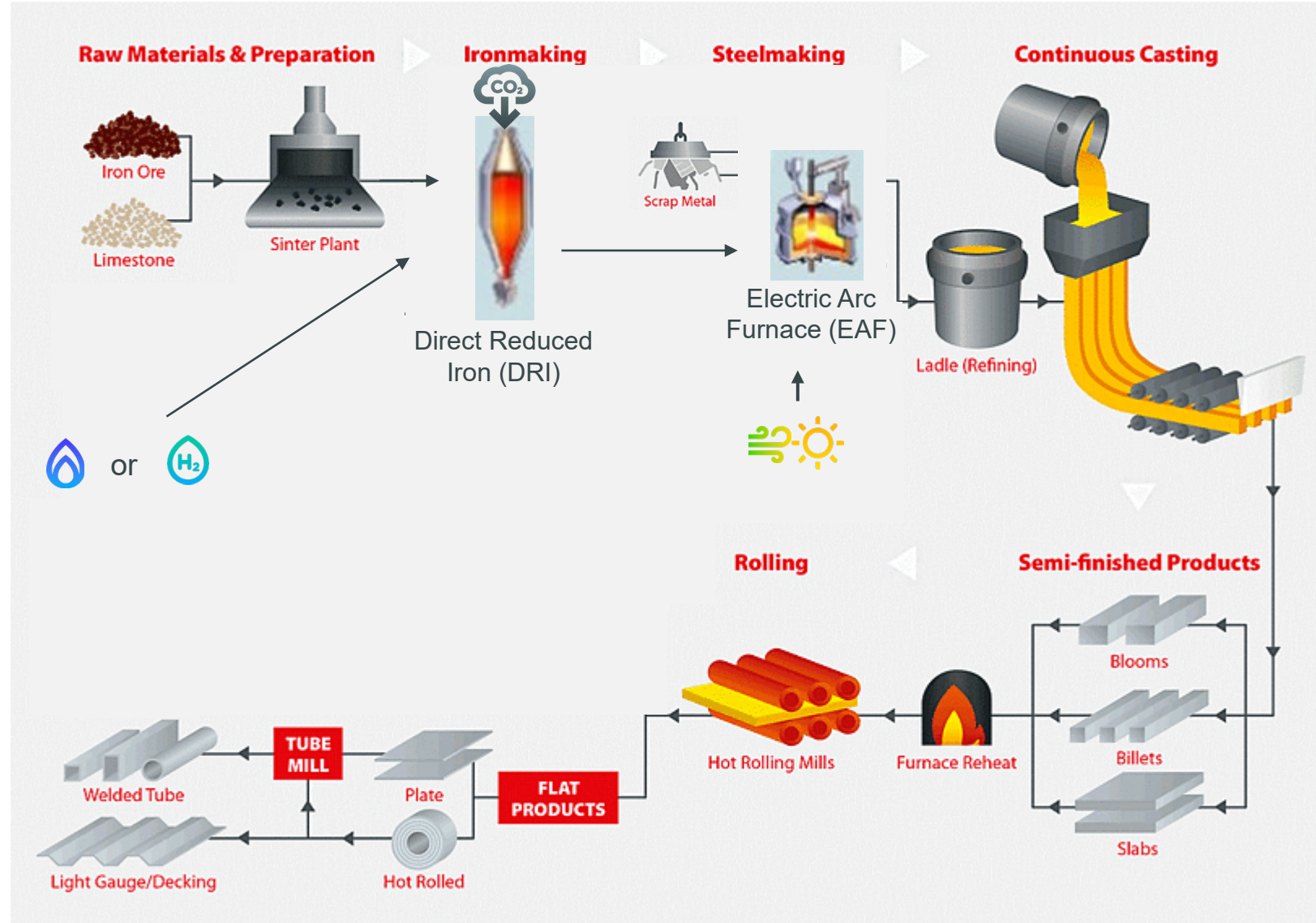
-30% by 2030

1 B\$ for 2 Mta

6 TWha from 2 to 1 t_{CO2}/t

120 kta from 1 to ~0 t_{CO2}/t

2 TWha





Our solutions: Renewable Electricity



Solar

- Solar
- Carport
- Rooftop
- Ground-mounted



Wind

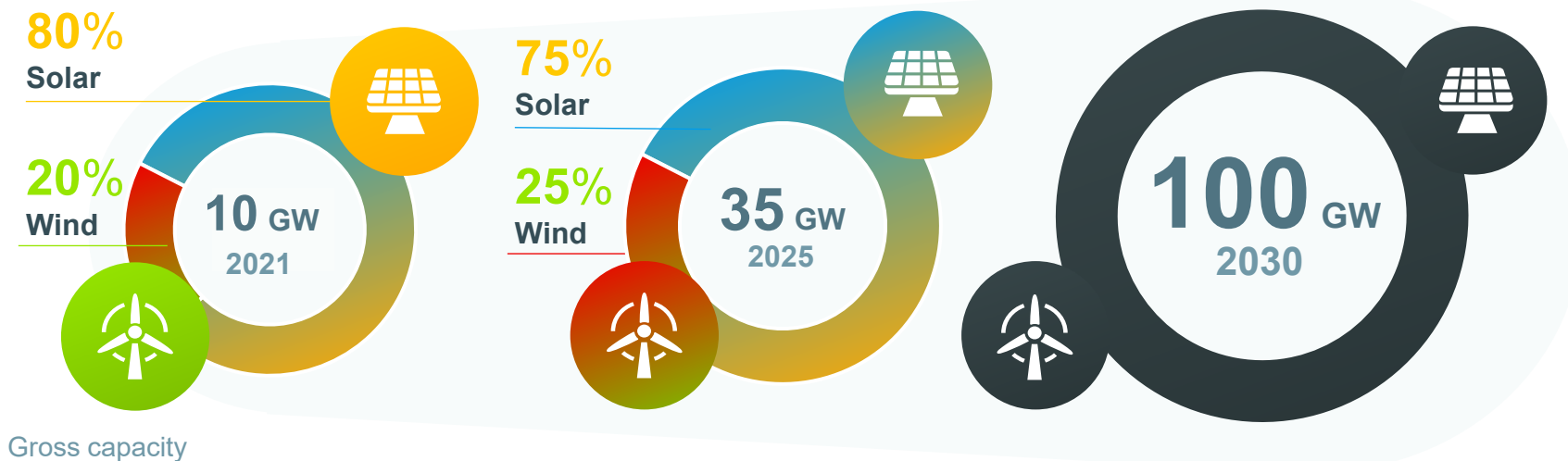
- Wind
- Onshore
- Offshore
- Floating



Energy Storage

- Solutions to support renewables deployment

Becoming a major global player in Renewables by 2030 (top 5)



Gross capacity

Renewable electricity available through Power Purchase Agreements (PPAs)

- Provides long term visibility on volume and price
- Combines wind & solar in various geographies with energy storage targeting baseload supply
- Complemented with on-site PV installations for self-consumption

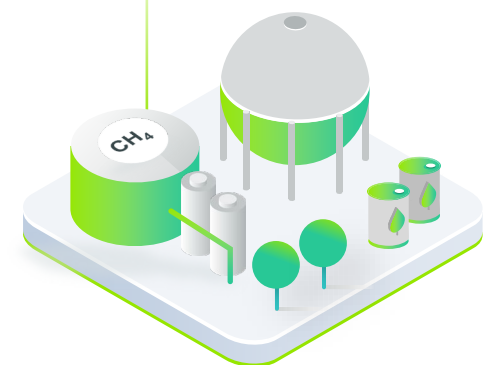




Our solutions: Biogas



Develop a worldwide presence in Biogas



2
TWha
biomethane by
2025



20
TWha
biomethane by
2030



#1 in France

(>10% market share)

TotalEnergies Biogaz France

- 700 Gwha production capacity (7 plants)
- 400 GWha in development

Leverage French expertise to expand in Europe

- Ambition: 400GWha in operations

~0,7
TWha

by 2025
in Europe



**Partnership
with Clean Energy**

JV 50/50 with Clean Energy

- **Integrated strategy:** production, distribution of bioCNG et bioGNL
- **Develop biogas production** in milk facilities

~1,3
TWha

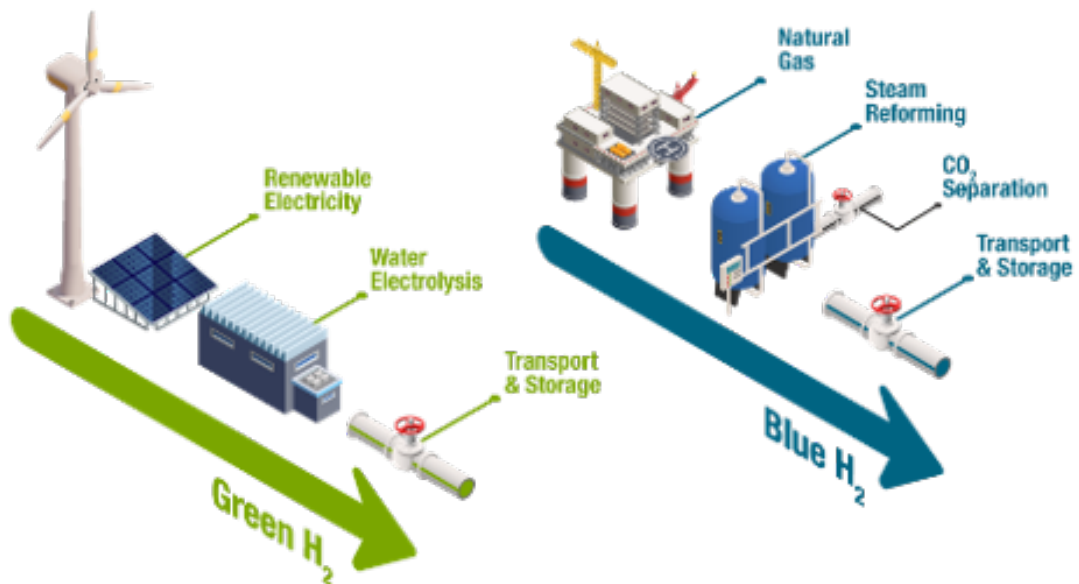
by 2025
In US

- Seamless transition from Natural Gas
- TotalEnergies EU ambition supported by REPowerEU (325 TWha by 2030)
- Reporting status in GHG Protocol yet to be clarified





Our solutions: Low Carbon Hydrogen



Decarbonizing our refining operations and third party off-takers



Masshyla project : biggest low carbon hydrogen production site in France in our La Mede biorefinery (120 MW) supplied by renewables assets and french electricity mix

- Natural Gas substitution as reducing agent and where electrification is not possible
- First target is to decarbonize H₂ consumed in our refining operations (>300 kta)
- Third party off-takers to be supplied from domestic operations and imports (India, US, Australia, South America, Africa)
- Point of attention remains the stringent RFNBO criteria





Our solutions: Carbon Capture & Storage (CCS)



TotalEnergies is building a world-class carbon storage portfolio across the North Sea

Targeting ~10 MtCO₂/y storage capacity by 2030 (50 to 100 MtCO₂/y in 2050) globally



UK

Northern Endurance Partnership
(TotalEnergies 10%)

→ 4 MtCO₂/y by 2026



Netherlands

Aramis (TotalEnergies 25%)
CO₂ storage (TotalEnergies 60%, operator)

→ Phase 1, up to 5 MtCO₂/y by 2026

→ Phase 2, up to 8 MtCO₂/y by 2030



TotalEnergies storage projects

Northern Lights

Luna

North Sea

Bifrost

NEP

Aramis

Norway

Sweden

United Kingdom

Denmark

Germany

Netherlands

0 100 km



Norway

Northern Lights (TotalEnergies 33%)

→ Phase 1, up to 1.5 MtCO₂/y by 2025

→ Phase 2, up to 5 MtCO₂/y by 2030

Aug 22 2023
Luna – New acquisition of exploration licence adjacent to Northern Lights



Denmark

Bifrost (TotalEnergies 80%)

→ Phase 1, up to 5 MtCO₂/y by 2030

→ Phase 2, up to 9 MtCO₂/y by 2031+

- Off-setting solution for hard-to-abate process/scope 1 emissions
- Mid-stream infrastructure to co-develop
- First industrial projects with near commercial operations dates

Decarbonizing is a global challenge for all value chains



Estimate in 2050 in EU boundaries

	% of global emissions	Green electricity ¹	Low carbon H ₂	Carbon Capture & Storage
Steel	9%	>100 TWha	>3 Mta ²	>45 Mta
Aluminium	4%	>40 TWha	tbd ³	>4 Mta
Cement	8%	>30 TWha	tbd ³	>80 Mta
Chemicals	5%	>165 TWha	>10 Mta ²	>50 Mta

¹ excluding electricity needs for H₂

² 180TWha (steel) and 660TWha (chemicals) additional green electricity required to produce low carbon H₂

³ no structural requirement in decarbonization roadmap

Early movers will be favored as demand may outpace capacity build-up



Thank you for your attention!

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