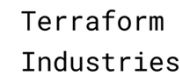




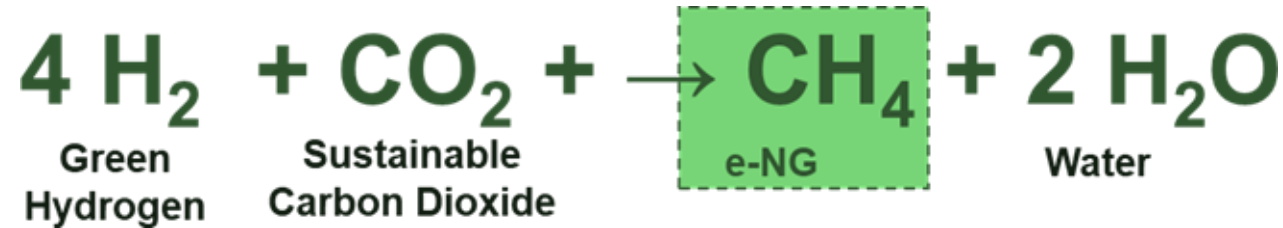
# Scaling e-NG/e-LNG: Global production trends, challenges and integration into maritime fuel pathways

# About the e-NG Coalition

- Alliance of **leading international and national companies** (public and private) working to **accelerate the development and deployment of electric Natural Gas (e-NG)** as a pivotal solution for global energy transition.
- Founded at the end of 2024 by **8 major energy players**, our Coalition is continuously expanding and now counts **23 Members across all segments of the e-NG value chain**, creating a robust network of organizations dedicated to advancing e-NG deployment and market development worldwide.

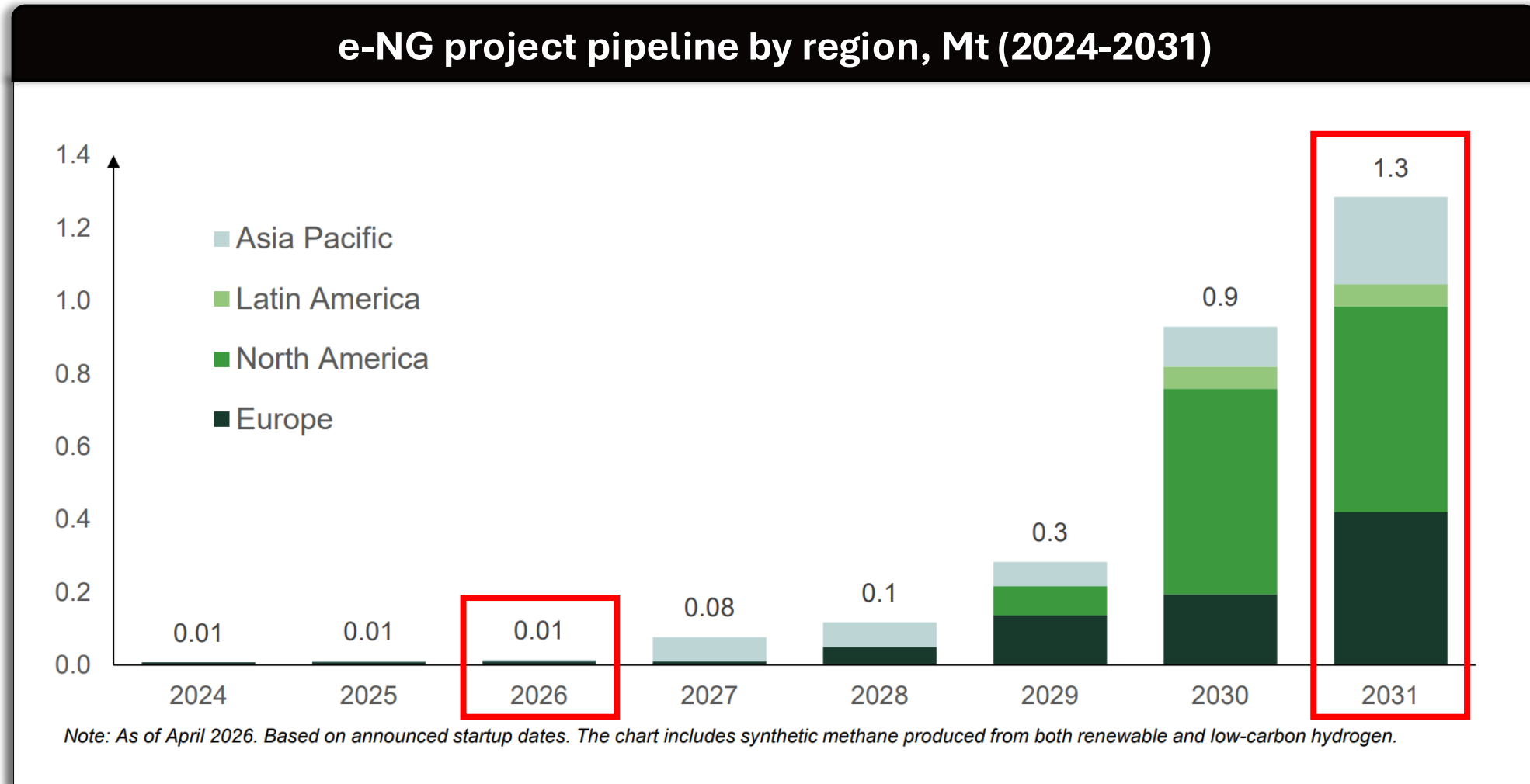


# What is e-NG?



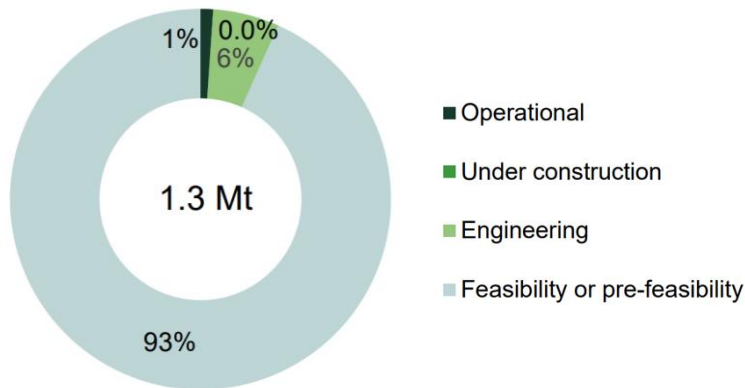
- Electric Natural Gas (“e-NG”) is a molecule entirely produced from renewable or low carbon H<sub>2</sub> and sustainable CO<sub>2</sub>.
- Chemically identical to methane (natural gas) – substitution/blending is possible using existing infrastructure.
- e-NG makes renewable H<sub>2</sub> easily transportable, storable and usable.
- “Drop-in fuel” for hard-to-abate sectors such as industry and transport.
- Complies with the most stringent EU renewable rules for H<sub>2</sub> and its derivatives.
- e-NG will be certified as a Renewable Fuel of Non-Biological Origin (RFNBO) in Europe.

# Projects are advancing globally but very few reach final investment decision due to the lack of secured demand and regulatory certainty (1/2)

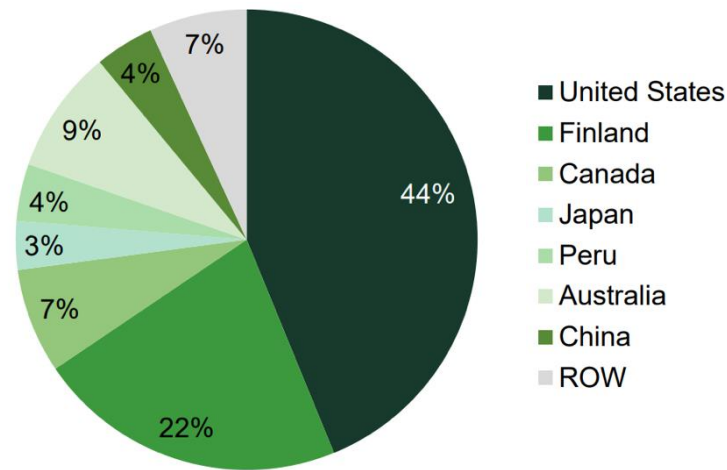


# Projects are advancing globally but very few reach final investment decision due to the lack of secured demand and regulatory certainty (2/2)

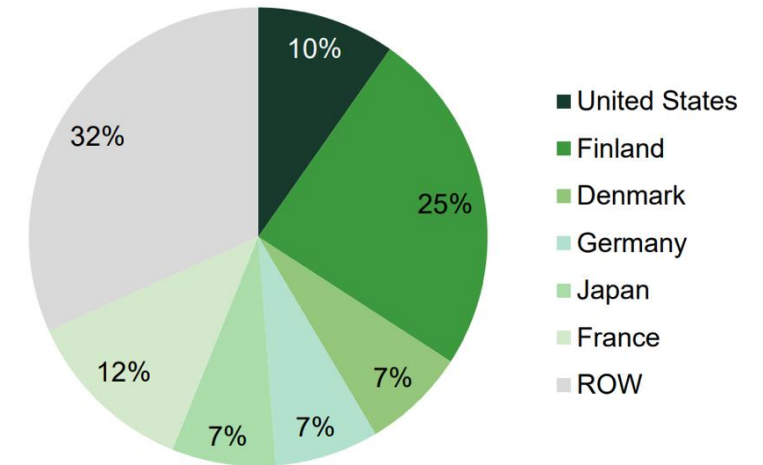
**e-NG project pipeline by status (2031)**



**e-NG project pipeline by country, by capacity (2031)**



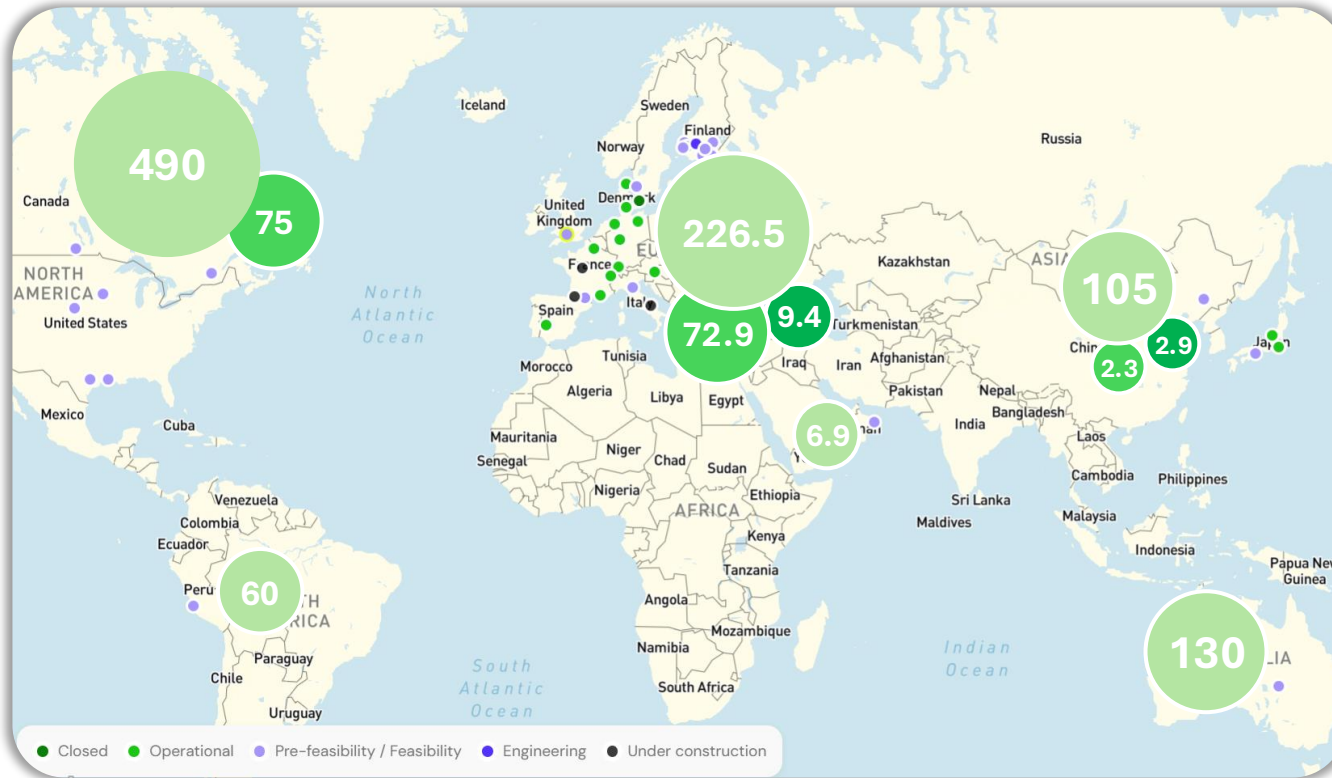
**e-NG project pipeline by country, by # of projects (2031)**



- Although there is **growing activity in regions like North America and Northern Europe**, most projects remain at an **early stage**.
- The **main bottlenecks** are the **absence of off-take agreements, limited willingness to pay, and regulatory uncertainty**.
- At the same time, there are positive signals, such as **increasing interest through matching platforms and early agreements**.

# More than 90% of projects are still in early development

>40 projects of e-NG (2026)



Capacity  
(kilotonnes/year)



Operational



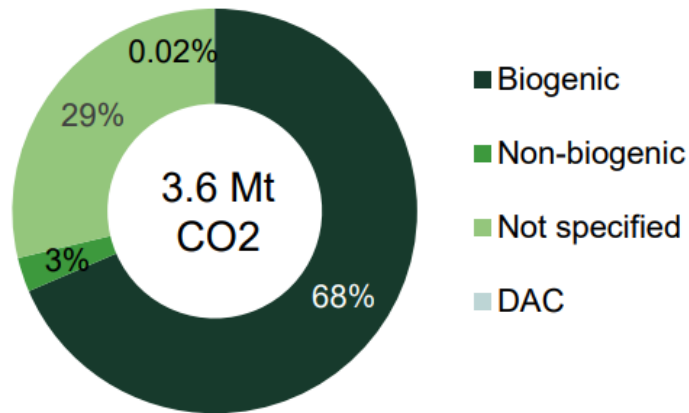
Under  
construction



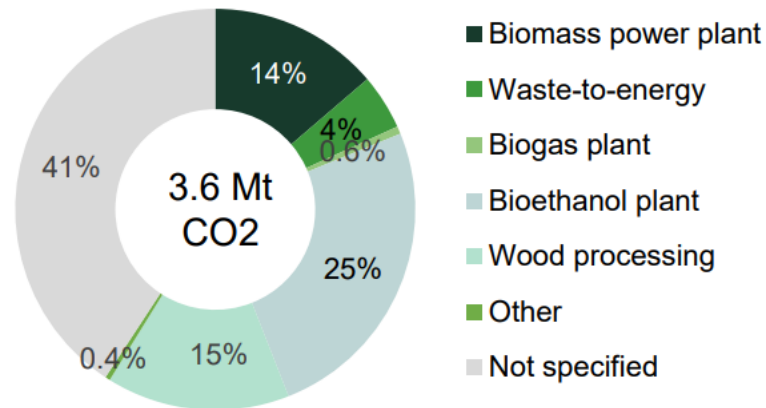
Pre-feasibility /  
feasibility

# e-NG projects opt for biogenic CO2 and >80% of e-NG projects plan to use renewable H2

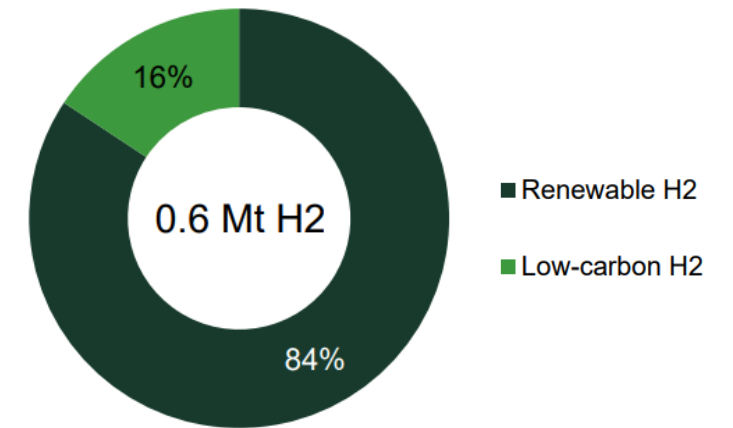
**CO2 utilization capacity of e-NG projects by CO2 type (2031)**



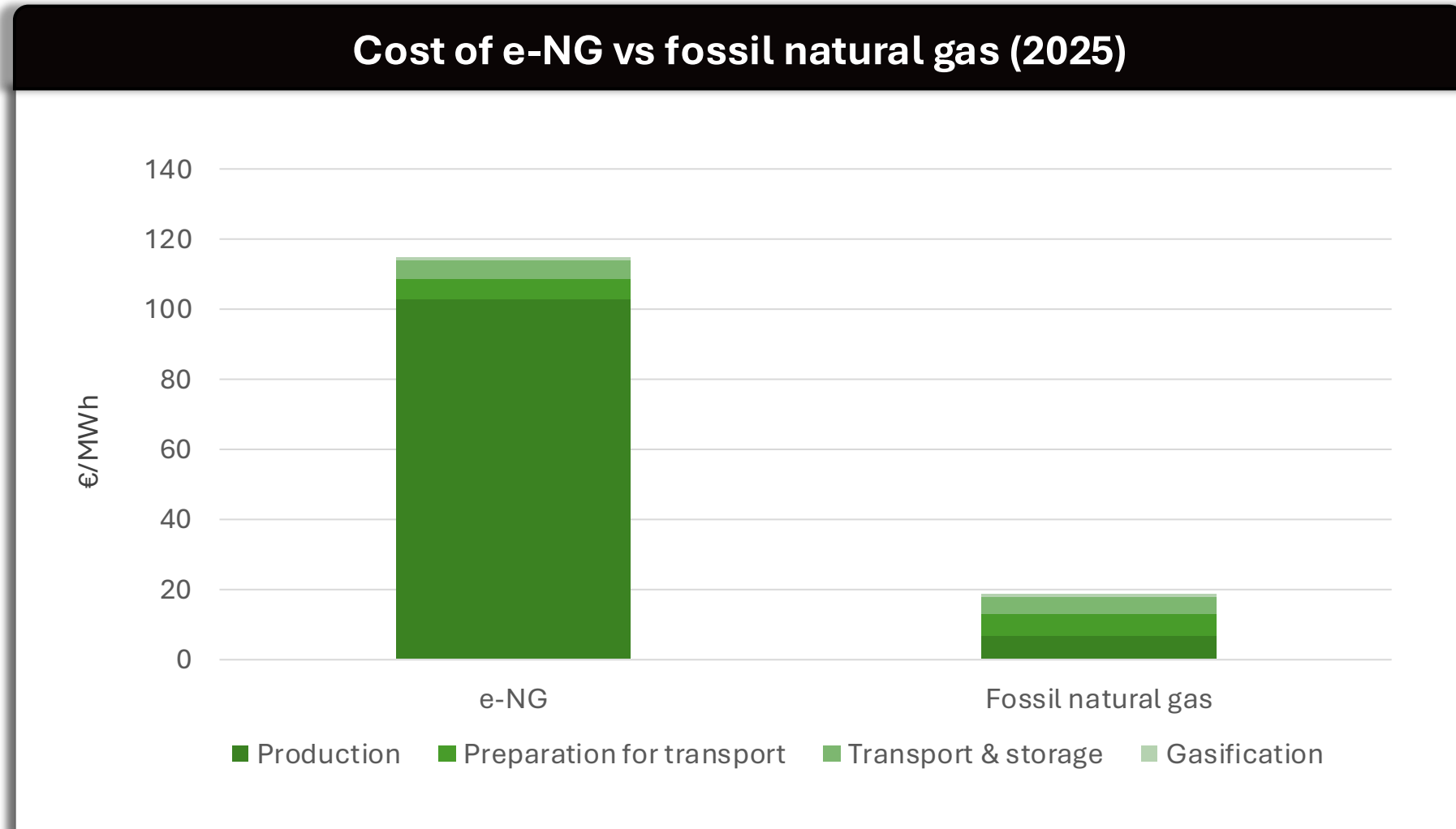
**CO2 utilization capacity of e-NG projects by CO2 source (2031)**



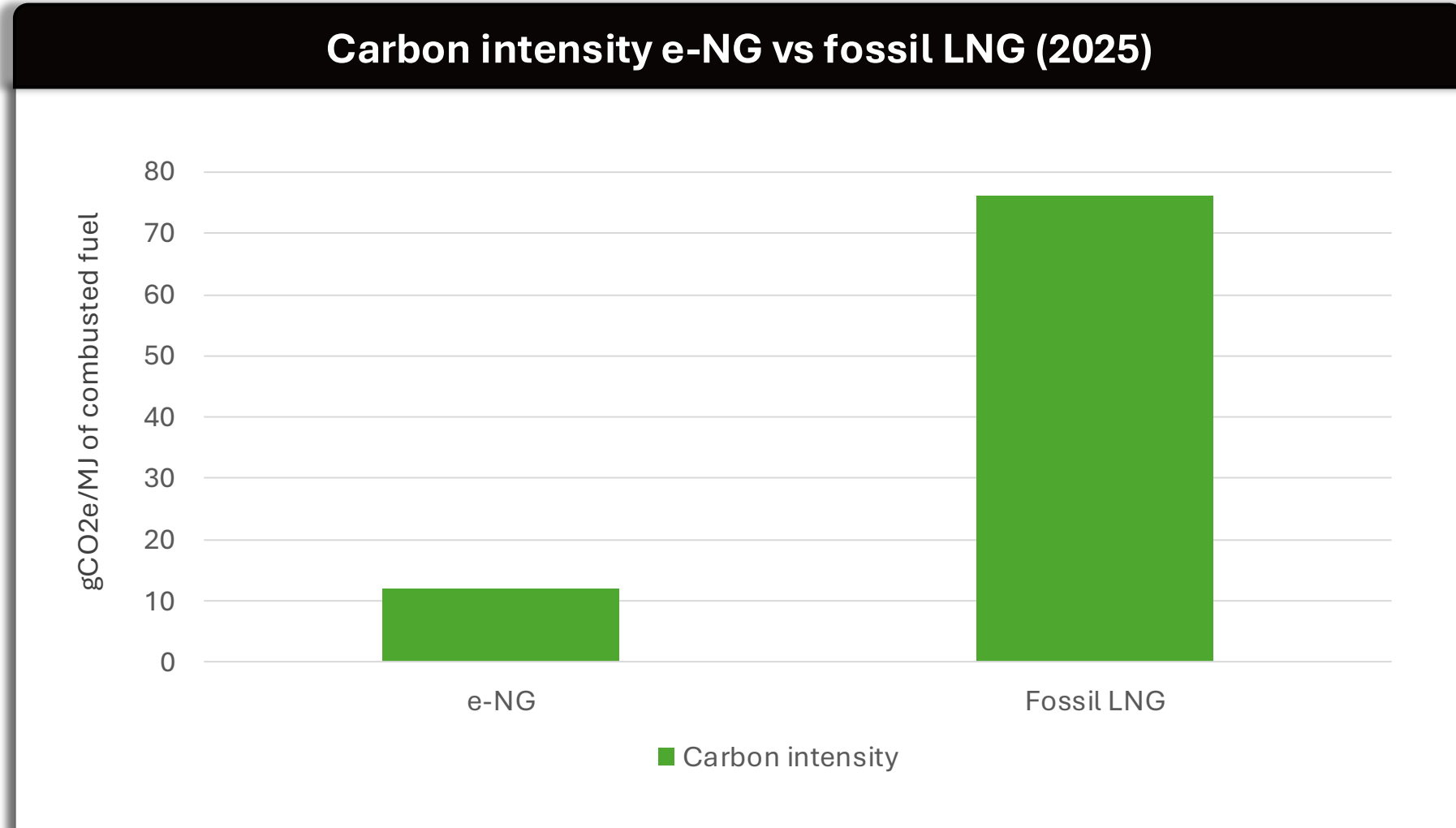
**H2 utilization capacity of e-NG projects (2031)**



**While current e-NG costs are ~120 €/MWh, these costs are expected to decrease by 2× by 2030**

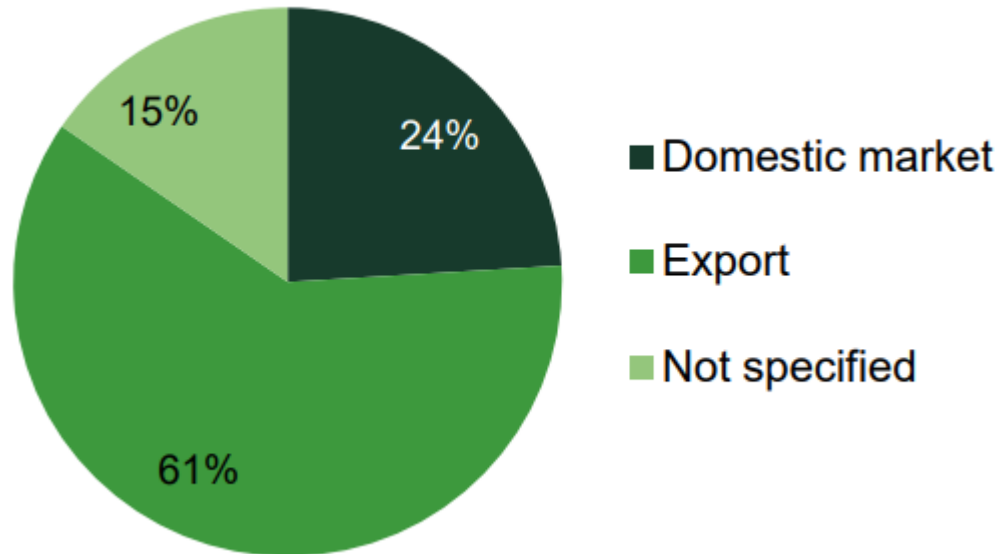


# When considering avoided emissions, the carbon intensity of e-NG is ~73 to 85% lower than conventional LNG

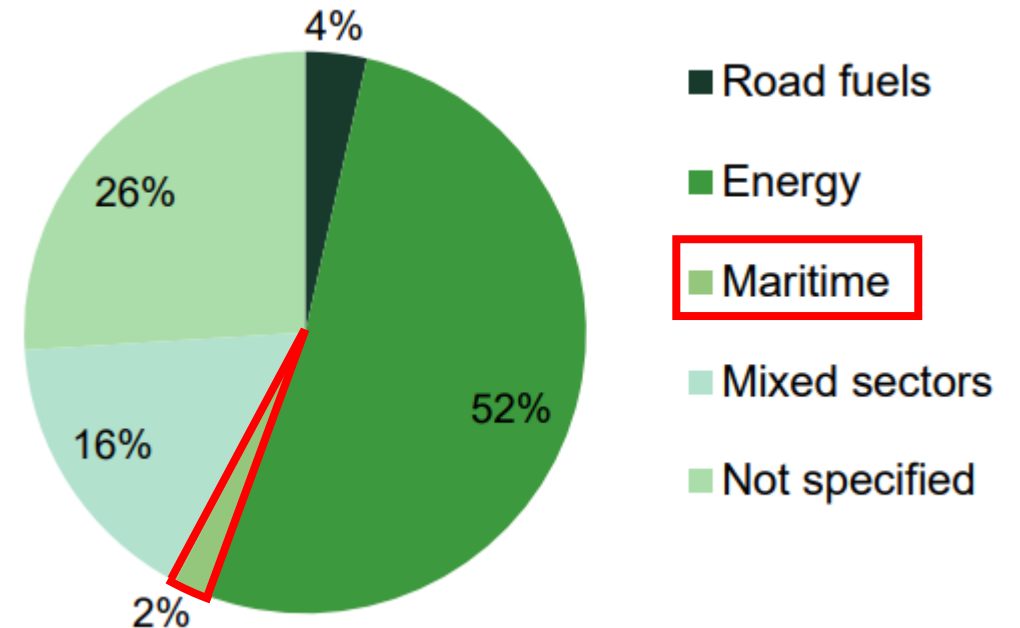


# Projects are increasingly focused on exporting to Europe and Japan for energy, road fuels, and maritime use from

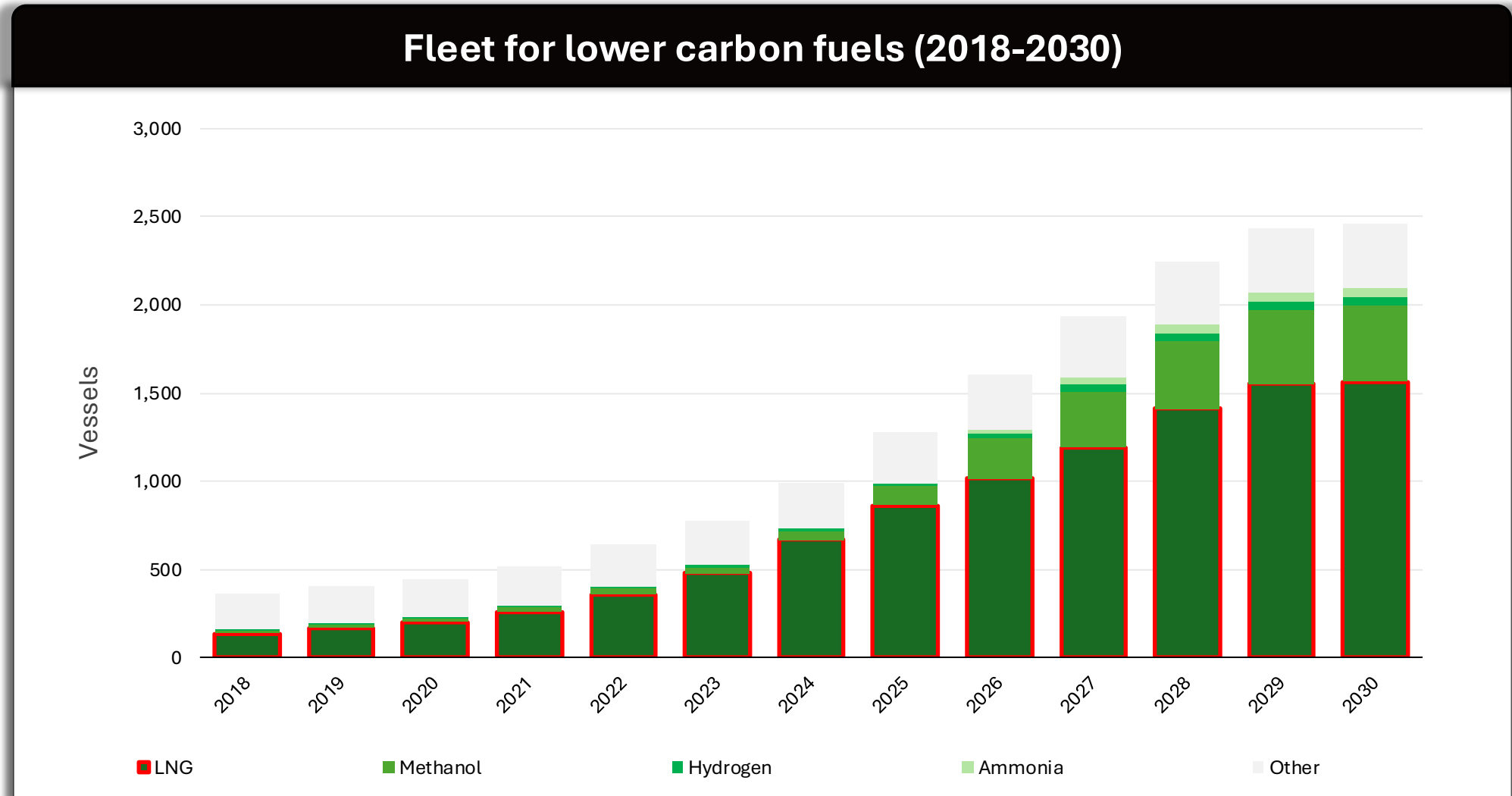
## Synthetic methane by target market, 2031



## Synthetic methane by target sector, 2031

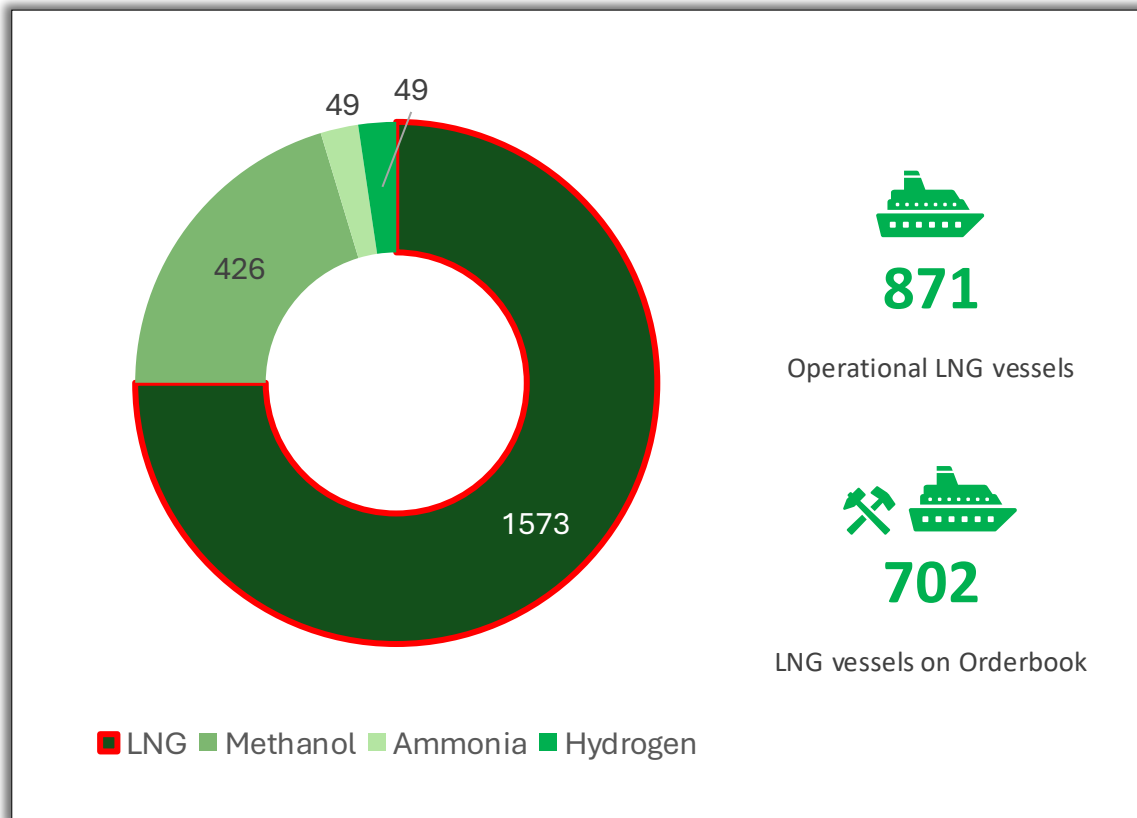


# e-LNG is fully compatible with the extensive existing LNG infrastructure and fleet (1/3)

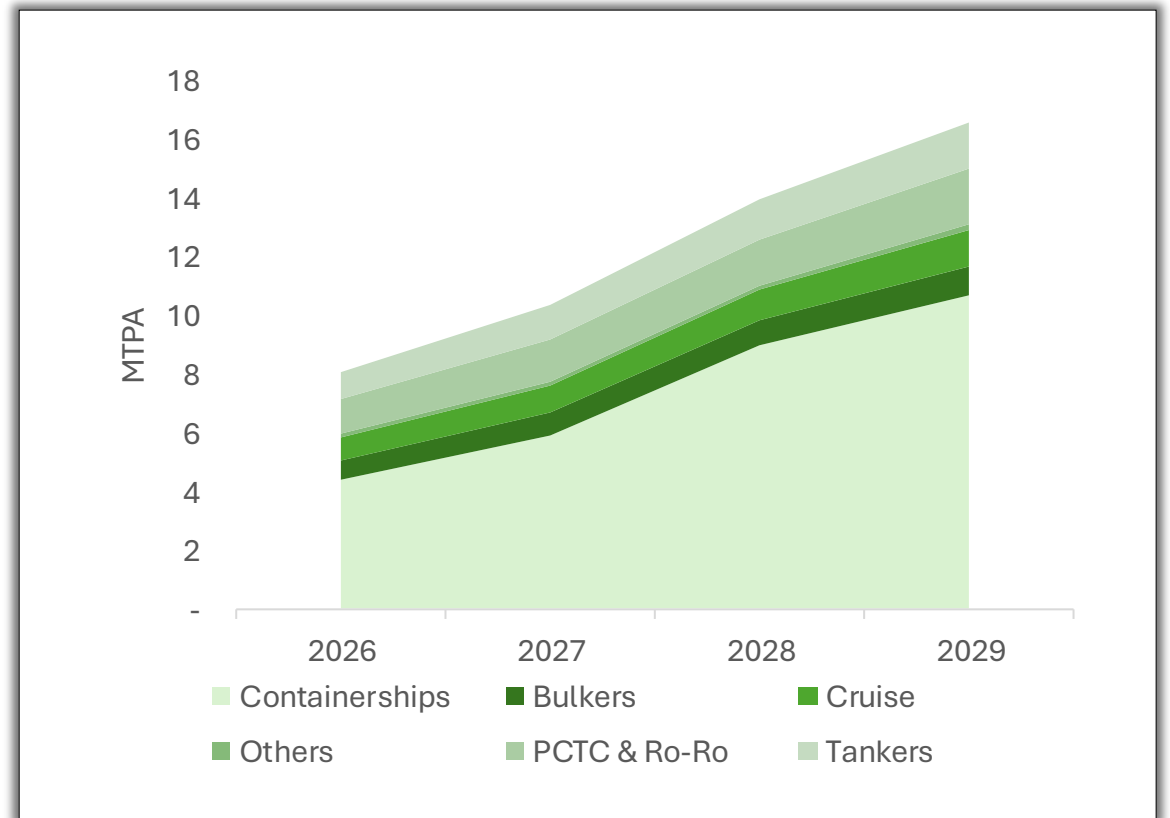


# e-LNG is fully compatible with the extensive existing LNG infrastructure and fleet (2/3)

## LNG has the largest alternative fuelled fleet (2025)



## Recent orders bring another 1.4 mtpa to LNG Bunker Demand (2026-2029)

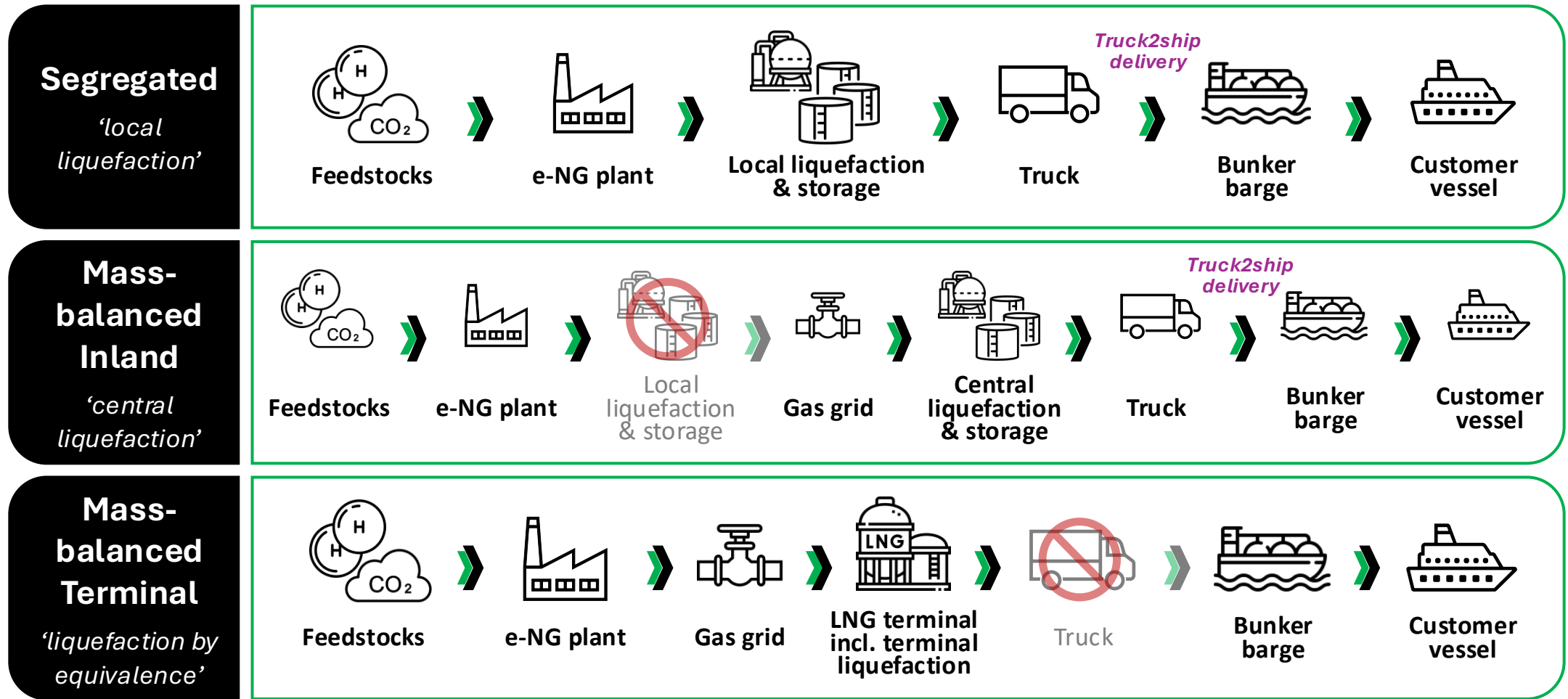


# e-LNG is fully compatible with the extensive existing LNG infrastructure and fleet (3/3)

>160 LNG terminals (2025)

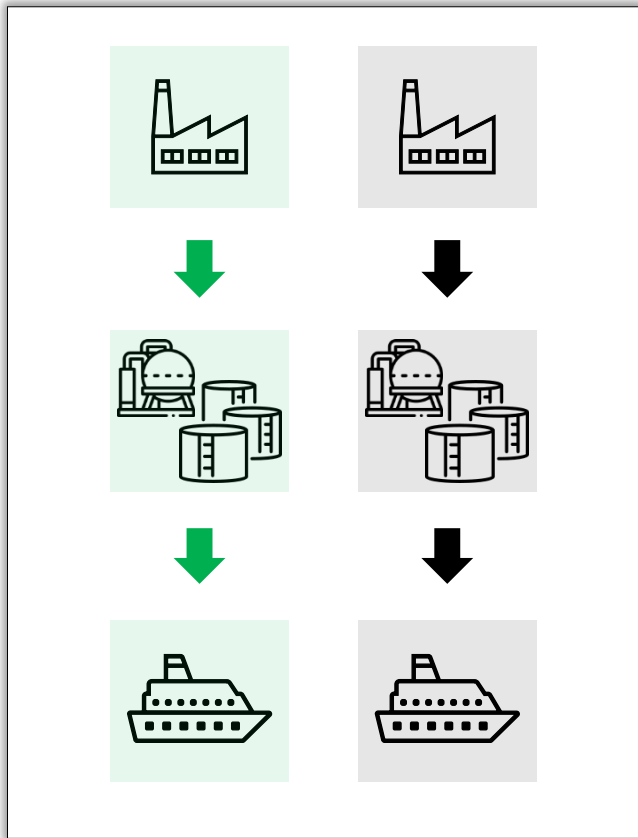


# Liquefaction by equivalence is existential for the scaling of e-LNG in the shipping sector in Europe

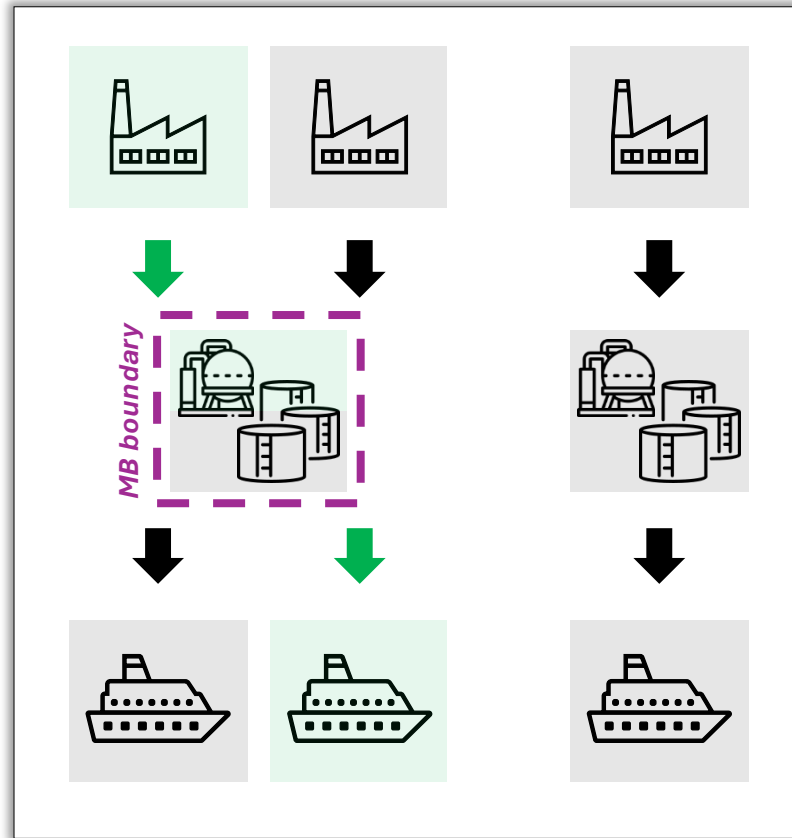


# Chains of custody such as Mass Balance or Book & Claim are essential to unlock the full potential of e-NG

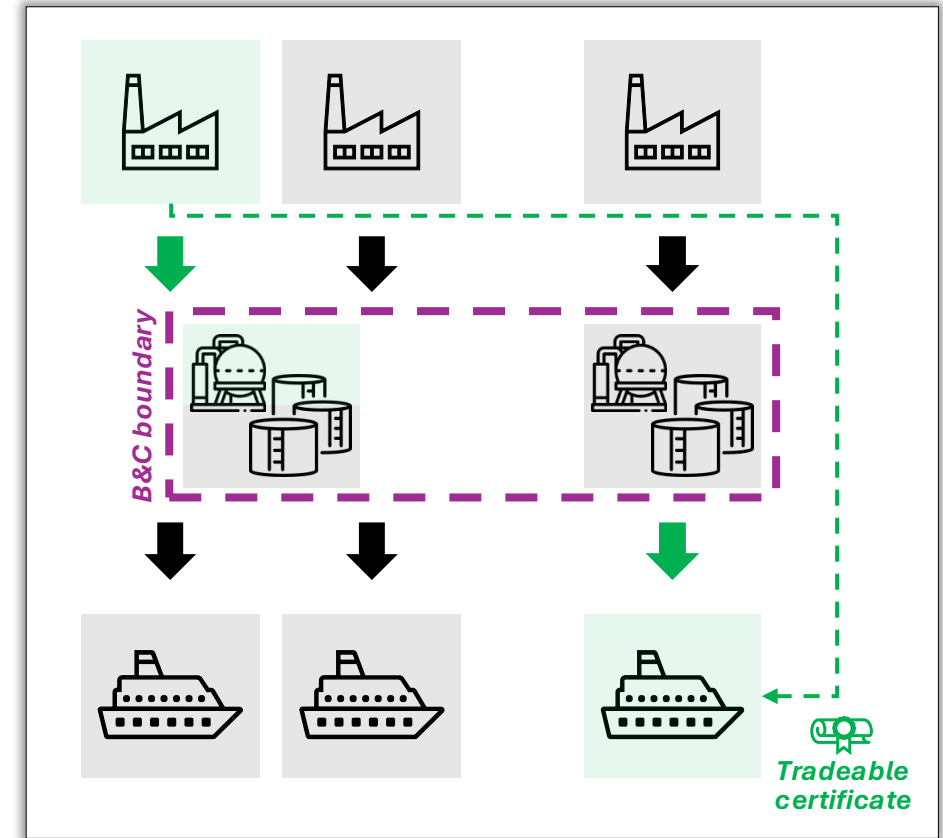
## Physical segregation



## Mass Balance



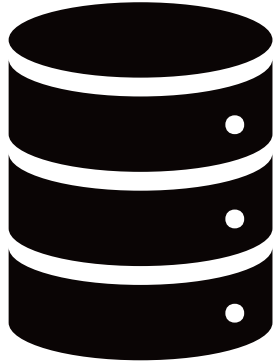
## Book & Claim



Renewable

Fossil

# The **Union Database** will be a key enabler for the deployment of e-NG



The UDB is a **global traceability tool** with the aim to trace **consignments of renewable fuels** and the respective raw materials used for their production - from the **point of origin** of the raw materials to the point where fuels are put on the EU market for **final consumption**

The UDB provides a robust traceability framework for renewable fuels, enabling producers worldwide to **verify sustainability claims, access international markets**, and support the development of **transparent and reliable global supply chains**

The UDB module for **RFNBOs / e-NG** will only be developed **after 2026**, once liquid fuels and biomethane are consolidated

# Conclusion: while the e-NG ecosystem is progressing, scaling will depend on regulatory clarity and recognition mechanisms

## Key regulatory pillars



Certification & traceability (e.g., UDB)



Accounting & reporting frameworks



EU implementation



Maritime developments

## Key regulations impacting e-NG uptake



### European Union

- Post-2030 RED framework
- IR 996/2022 (UDB + 3<sup>rd</sup> countries)
- FuelEUM, heating quotas, industry
- Carbon accounting & cross border flows



### IMO & International

- SFCS, LCA, default values
- Global Fuel Standard negotiation
- Voluntary Market – GHG Protocol
- COP31, Sustainable Fuel Pledge implementation



### Asia

- Japan
- Korea
- Singapore



### North America

- USA
- Canada

## What remains to be addressed



Recognition in reporting frameworks



Regulatory clarity



Harmonization to unlock investment & scale

Key driver of future demand, provided the regulatory framework is clarified



# Thank you!

For questions:

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