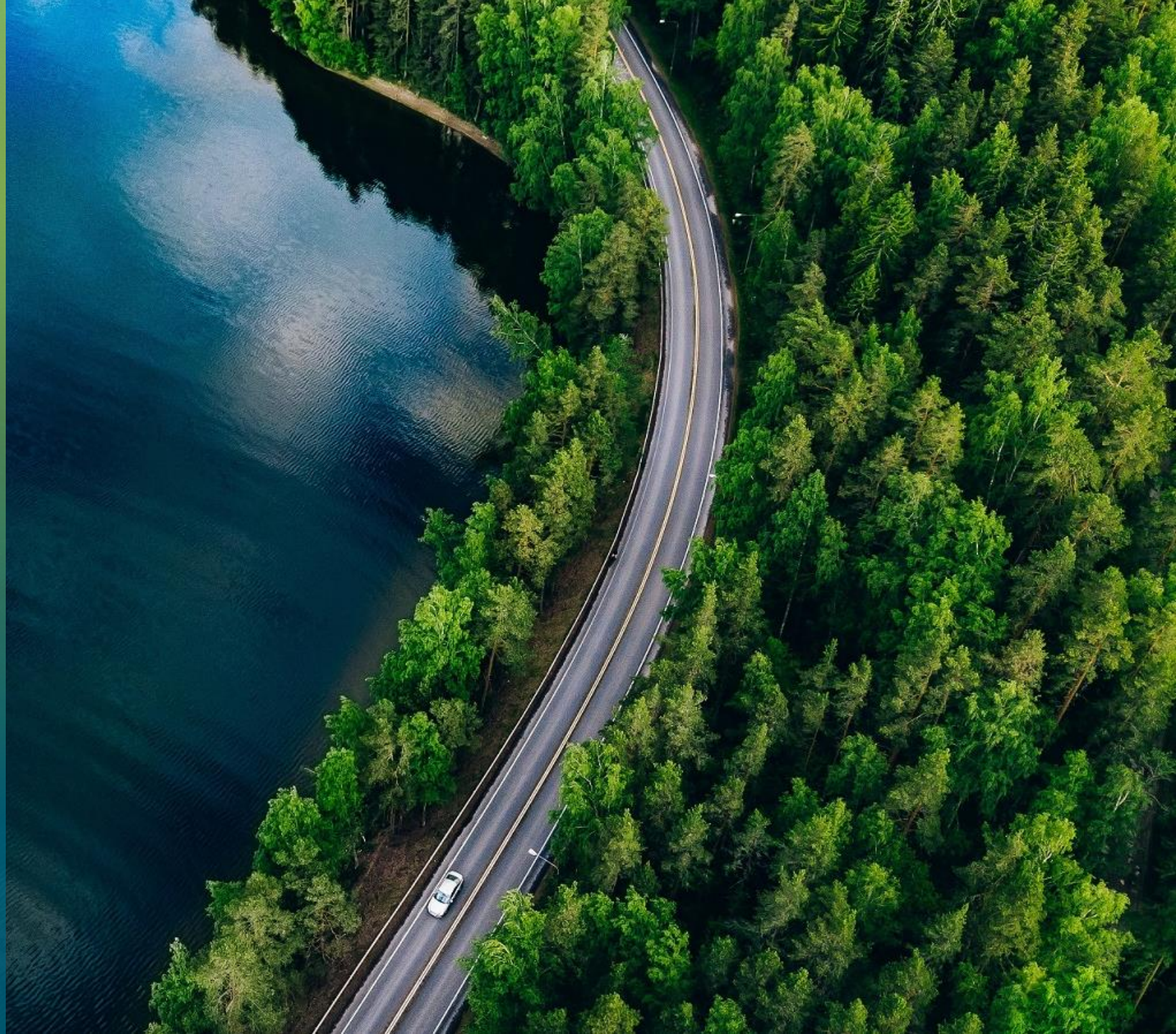




Biomethane for a Promptly and Fast Decarbonization in Transport

Copenhagen, October 2023
Future of Biofuels

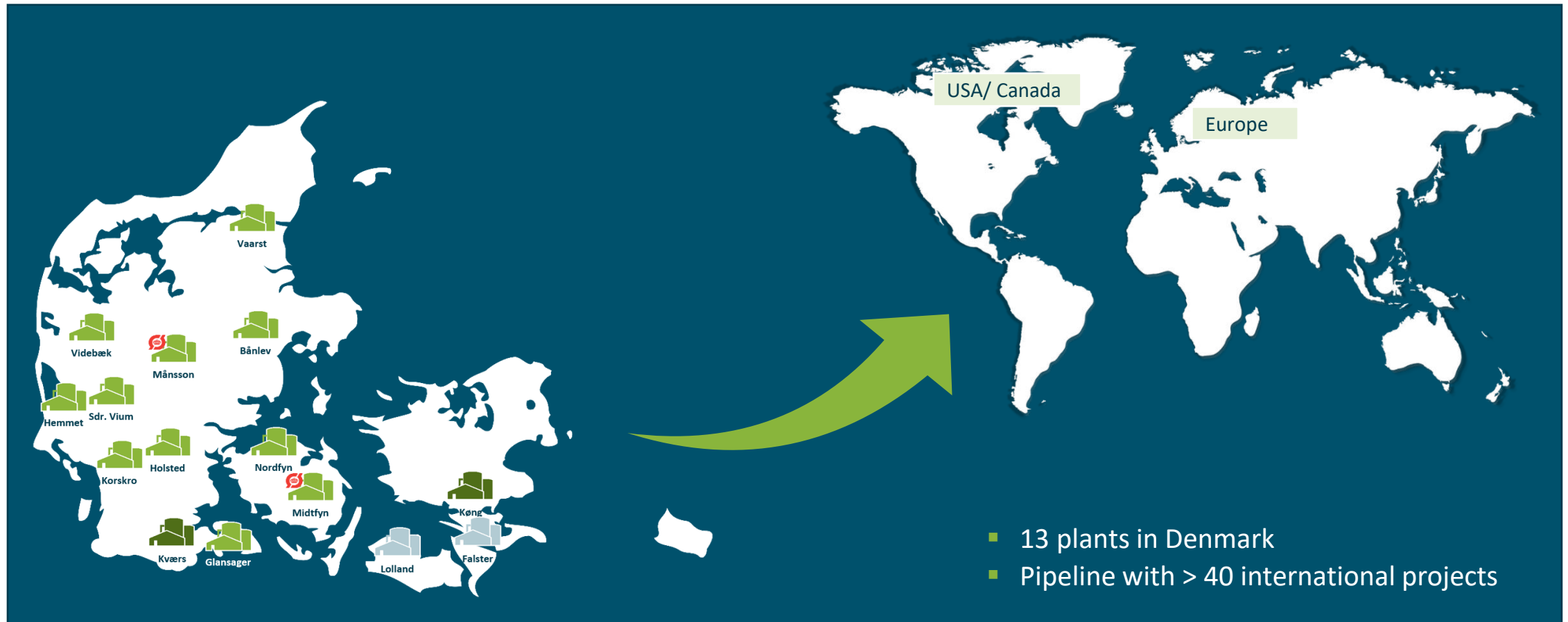


Sun, wind and biological waste...



... are the three natural resources for the production of green energy

Nature Energy focuses on large scale biomethane production



Nature Energy is the largest Biomethane producer in Europe and designs, builds, operates and owns large scale plants running on sustainable feedstock. Since Q1 2023, Nature Energy is fully owned by Shell.

Plants at Industrial Scale – Example Nature Energy Korskro

Biogas production: 36 mill. m³ gas / year

Biomass capacity: 1 mill. tons / year

CO₂ volume: 25.000 tons / year



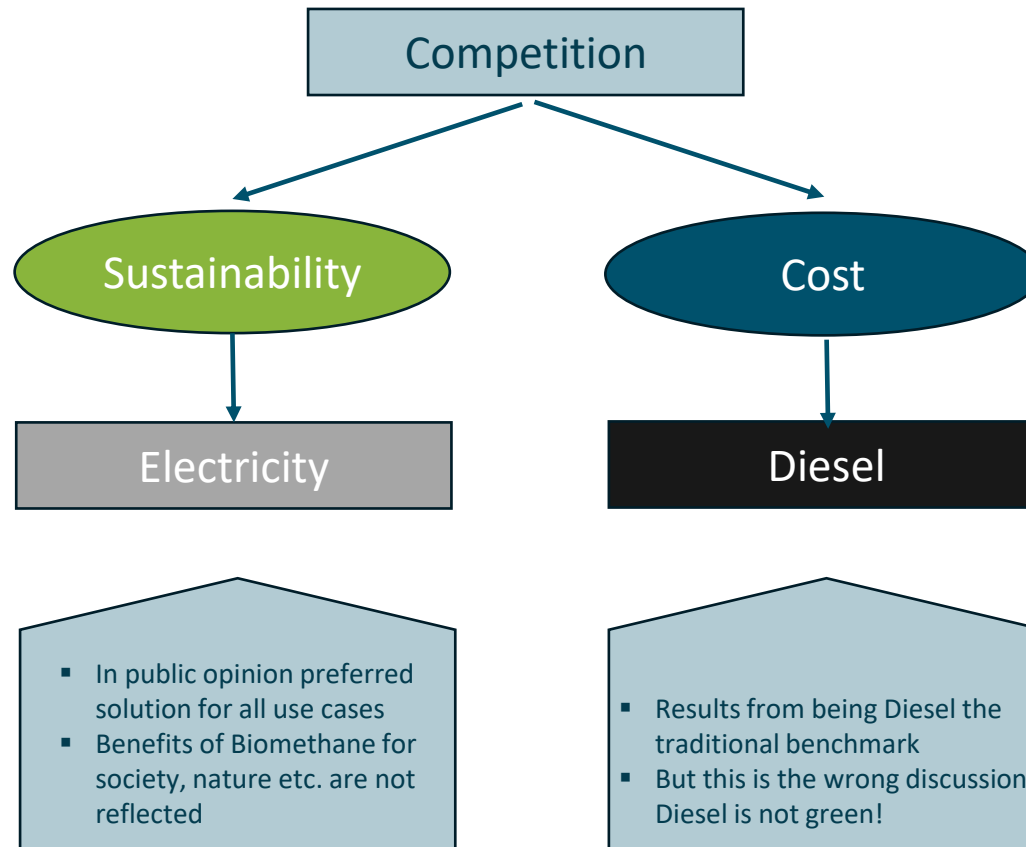
Sites with industrial scale plants offer opportunities for value-adding assets for providing decarbonization solutions

Nature Energy owns/operates 20 CNG filling stations in Denmark



Current challenges in the Danish Transport business

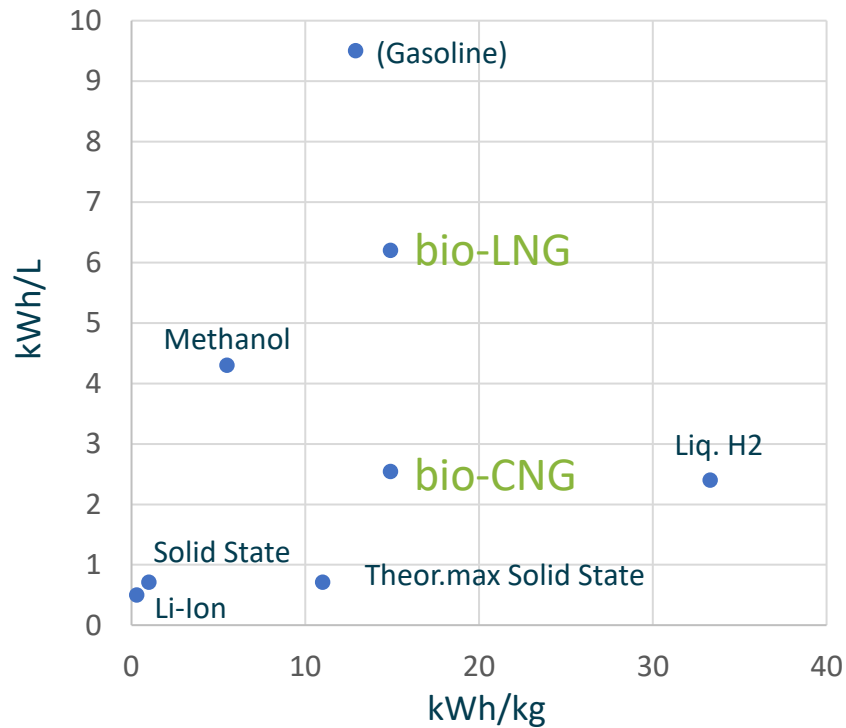
EV currently favored solution in public tenders, but bio-CNG must cope with at least two different competitions



Biomethane is well positioned in the portfolio of sustainable transport

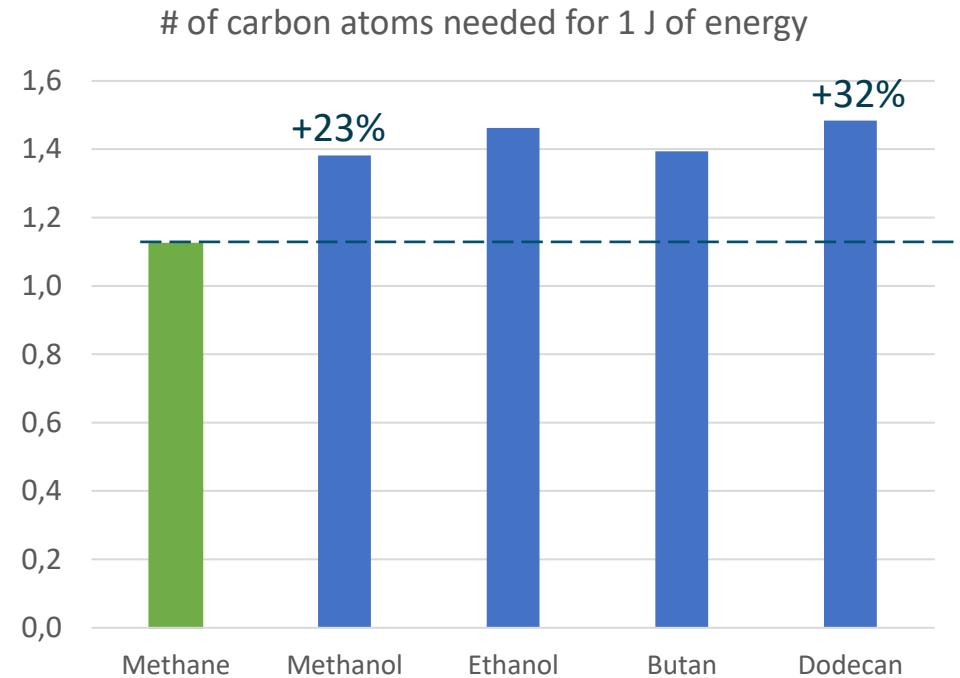
Physical properties confirm the advantages of bio-CNG and bio-LNG

High energy density makes biomethane attractive for relevant use cases¹⁾



- No one-size-fits-all approach can deliver the required, soon decarbonization
- Especially Biomethane in form LNG offers advantages for long range and heavy-duty transport

High compatibility for a future with shortage of biogenic/circular carbon²⁾



- Methane delivers the highest energy amount per used carbon molecule and thus will have lowest carbon purchase cost

1) Based on "Why the Carbon-Neutral Energy Transition Will Imply the Use of Lots of Carbon; Mertens, Belmans, Webber 2020 and own updates. 2) Calculated for higher heating value. Dodecane represents C12 as main component in SAF

New Nature Energy project – use of bio-LNG in our own truck fleet

High technical requirements can be met by using bio-LNG:

- Nature Energy in Denmark is using a truck fleet to transport the manure to the facilities and to return the fertilizers
- 40 trucks, running 400 km per day, 56t weight
- Load profile also includes pumping of the manure and off-loading the digestate – this was not possible with CNG trucks
- LNG trucks meet the technical requirement
- Project in 2024 at the plant Videbæk – switch from Diesel to bioLNG and improving the carbon footprint of the produced Biomethane



Project linked to our liquefaction project in Frederikshavn

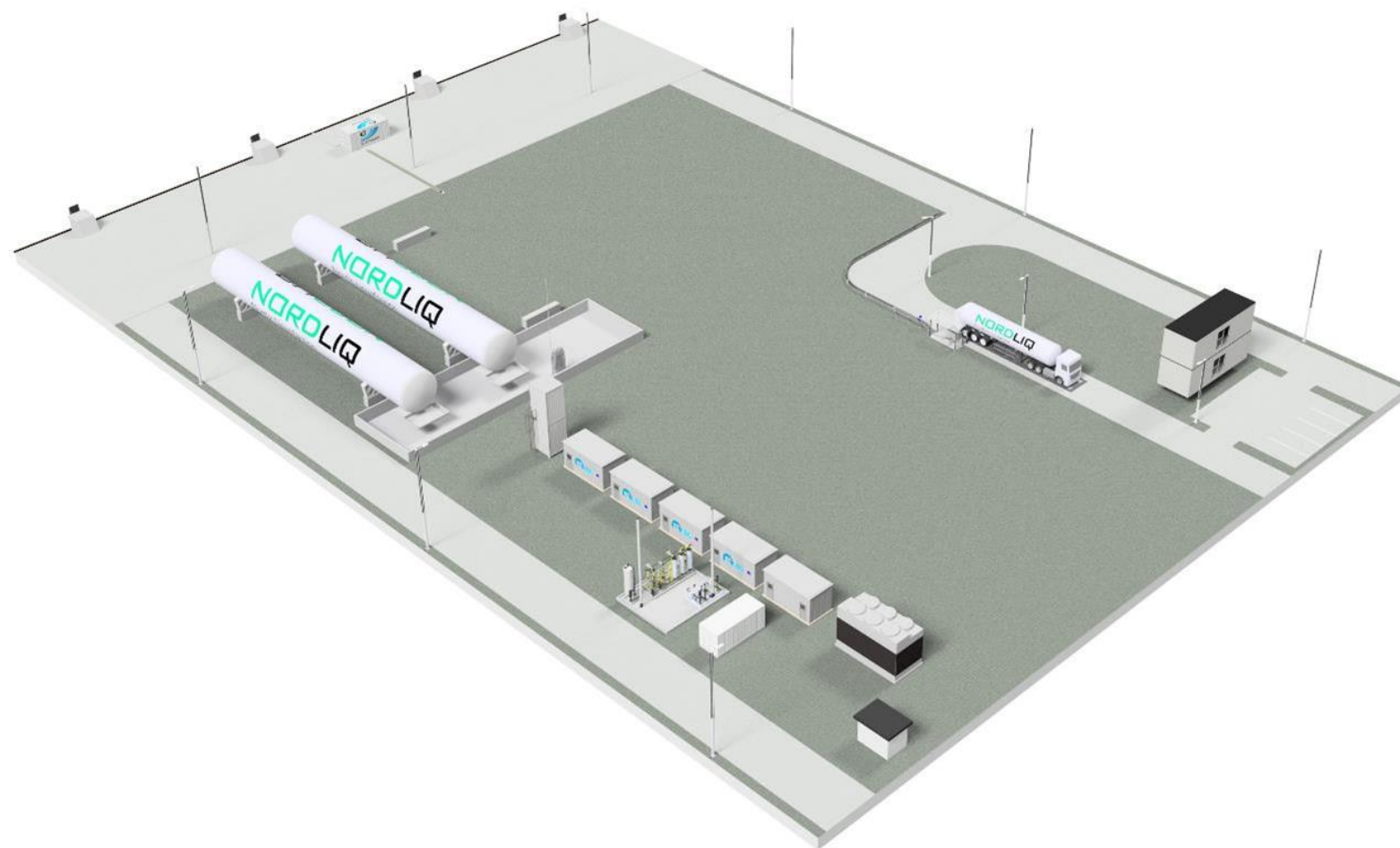
Joint project in the port of Frederikshavn with MAKEEN Energy

- Target segments are trucks and maritime
- Start-up in Q3 2024



The Liquefaction Plant

- 60 tons/day capacity
- 400 tonnes LNG/LBG storage
- Truck loading
- Direct bunkering via pipeline
- Natural gas grid balancing
- Site prepared for expansion

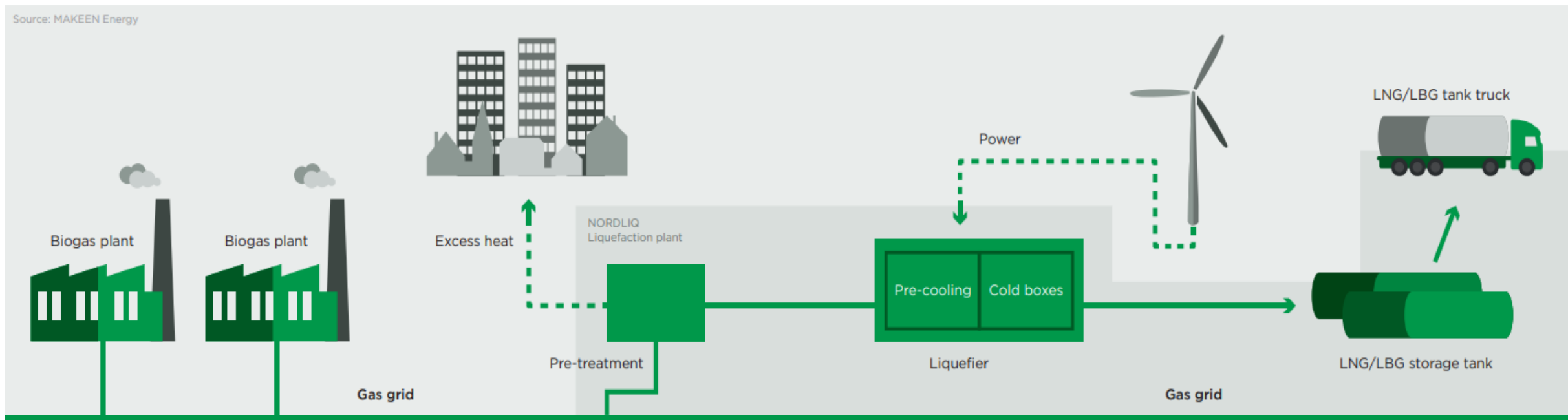


Centralized liquefaction from the grid as an efficient set-up

- Connected to gas grid
 - Pre-treatment (H₂O/TNT removal, CO₂ reduction)
 - Pre-cooling/cold box
 - Storage
 - Loading (trucks or ships)
-
- 24/7 operation
 - Start/stop in 30 min
 - Fully automated

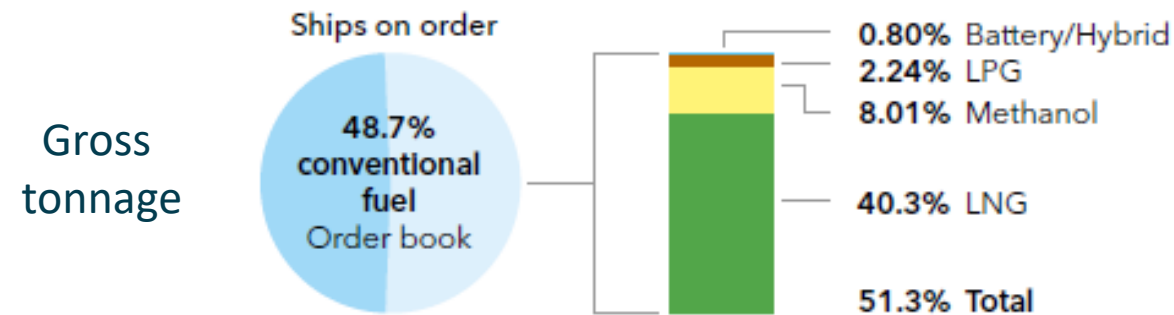
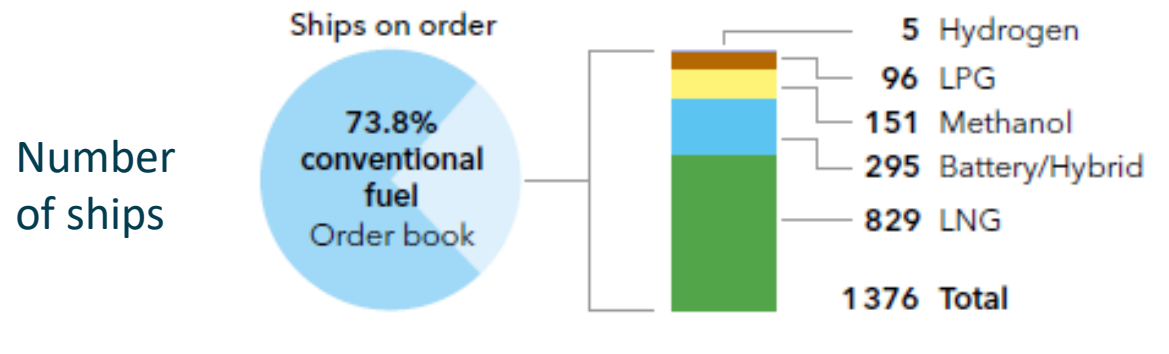
NORDLIQ
Nordic Liquefaction

Source: MAKEEN Energy



Order books for ships showing huge potential for bio-LNG

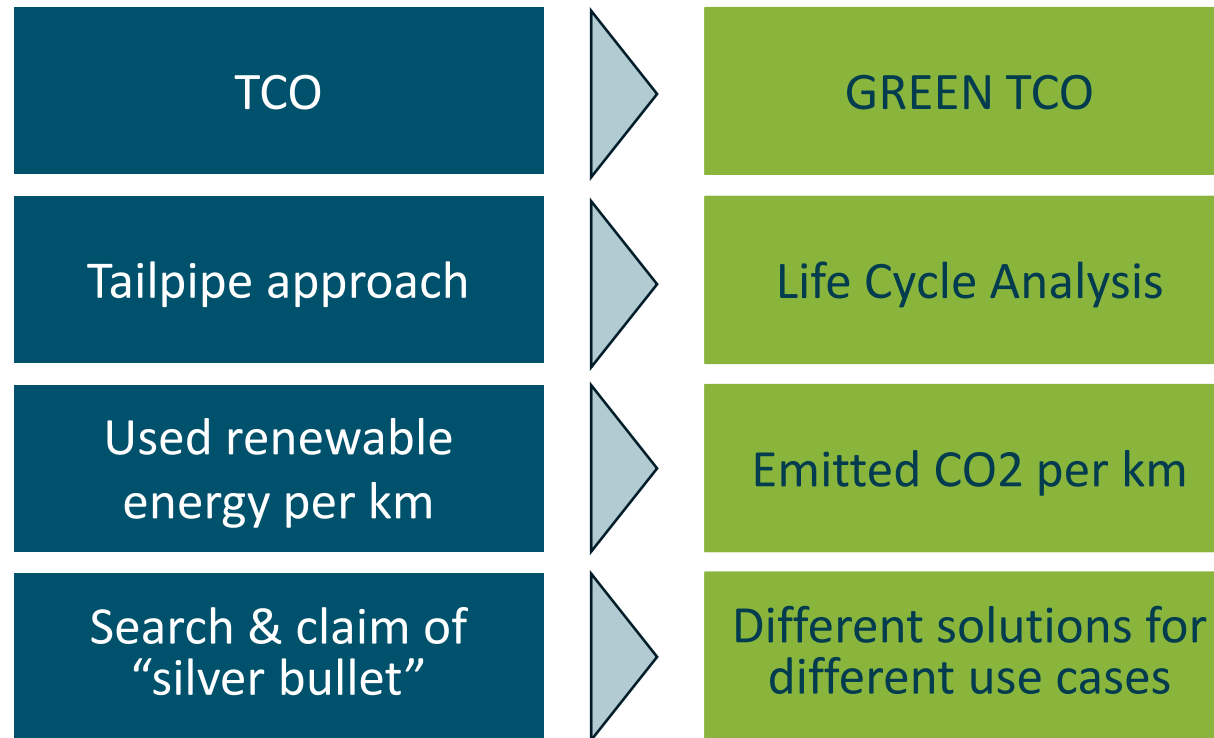
LNG has with 21% of the total tonnage the highest share of climate-friendly fuels



Price gap between green and fossil will drive the transition

Challenges to be met for Biomethane as a transport fuel in the future

Examples for necessary shifts in the recognition:



Fast decarbonization is the key to fight the climate change
– Biomethane can contribute already today on scale -

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