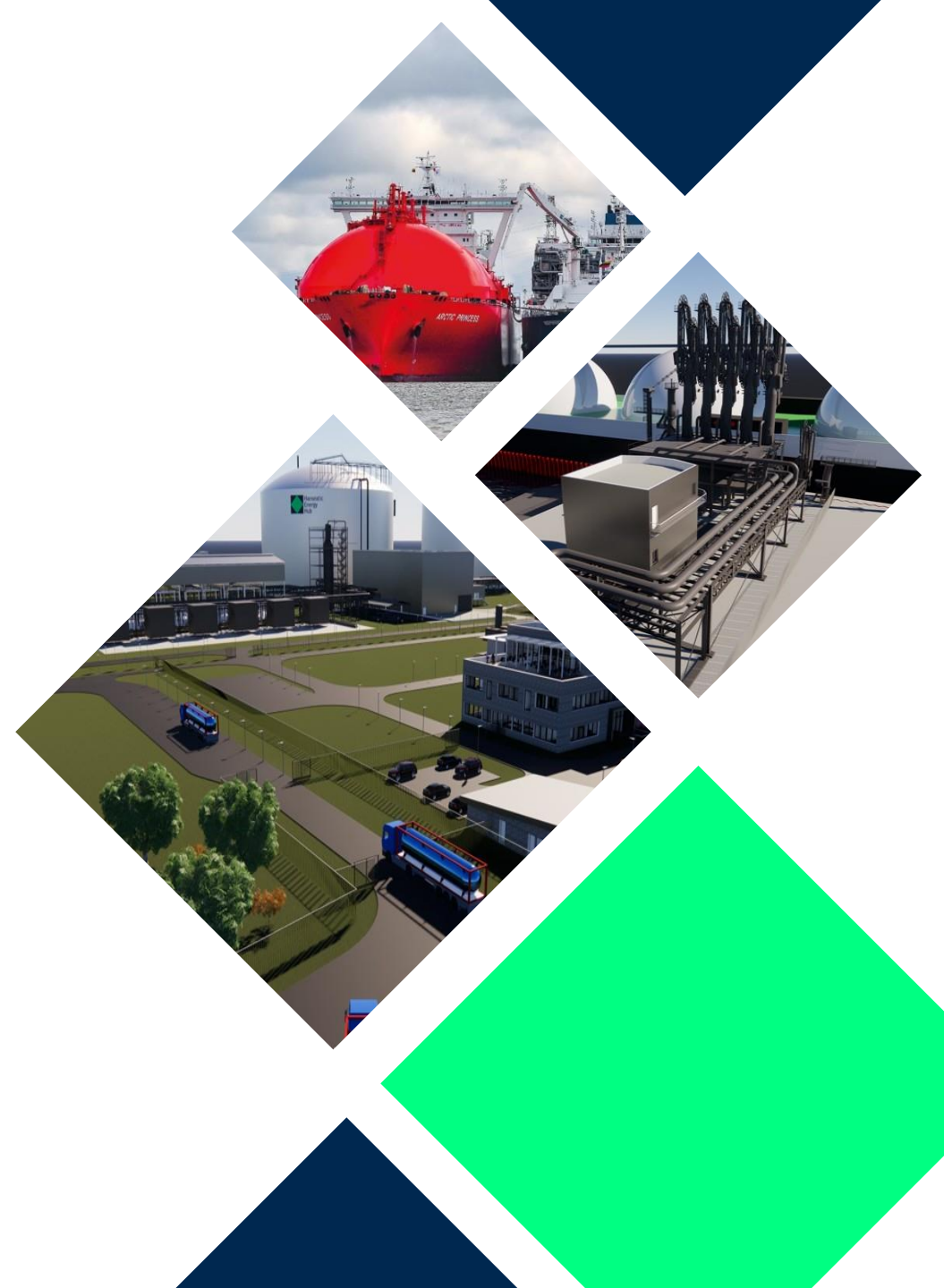


Hanseatic
Energy
Hub

Hanseatic Energy Hub

A future-flexible modular system for the green energy transition

March 2023



Welcome to Stade!



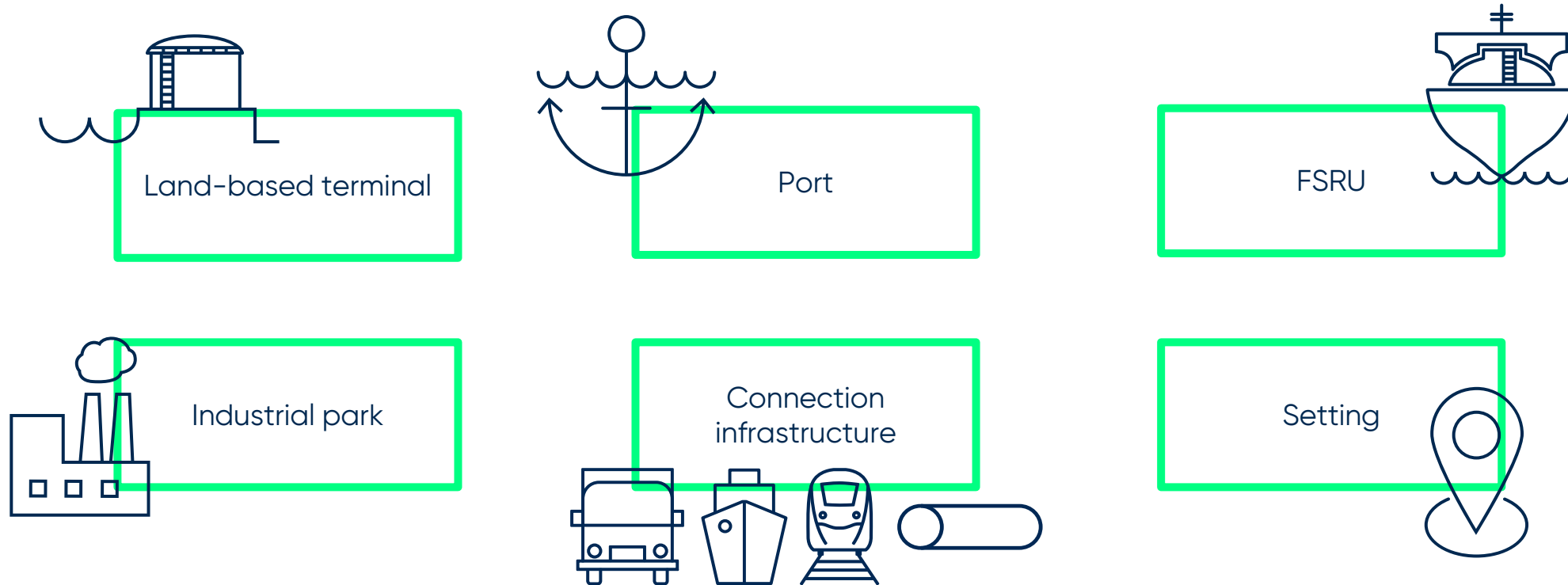
Hanseatic Energy is an import terminal that secures Germany's supply of LNG and green gases while preparing for the market ramp-up of hydrogen.





We're future-flexible!

The terminal, port, industrial park and connecting infrastructure are designed so that the conversion to hydrogen can be carried out in a modular fashion analogue to building block systems.

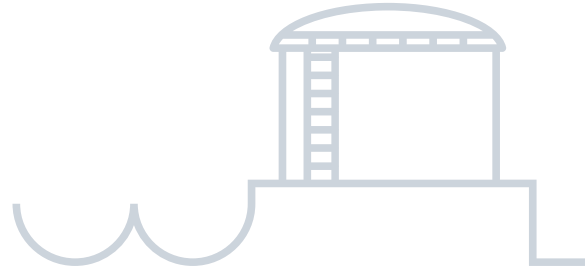


Technical and commercial flexibility



MODULE: LAND-BASED TERMINAL

Zero-emission terminal



- First expansion stage for LNG, Bio-LNG and SNG
- Up to 13.3 bcm/a capacity for LNG and a peak capacity of 21.7 GW

Ammonia-ready

- Material selected for tanks and pipelines considers later uses by ammonia
- Foundations statically inspected
- Commercial long-term contracts with option for ammonia
- Possible to ramp up ammonia in parallel thanks to smaller tanks



Securing energy supplies in the short term

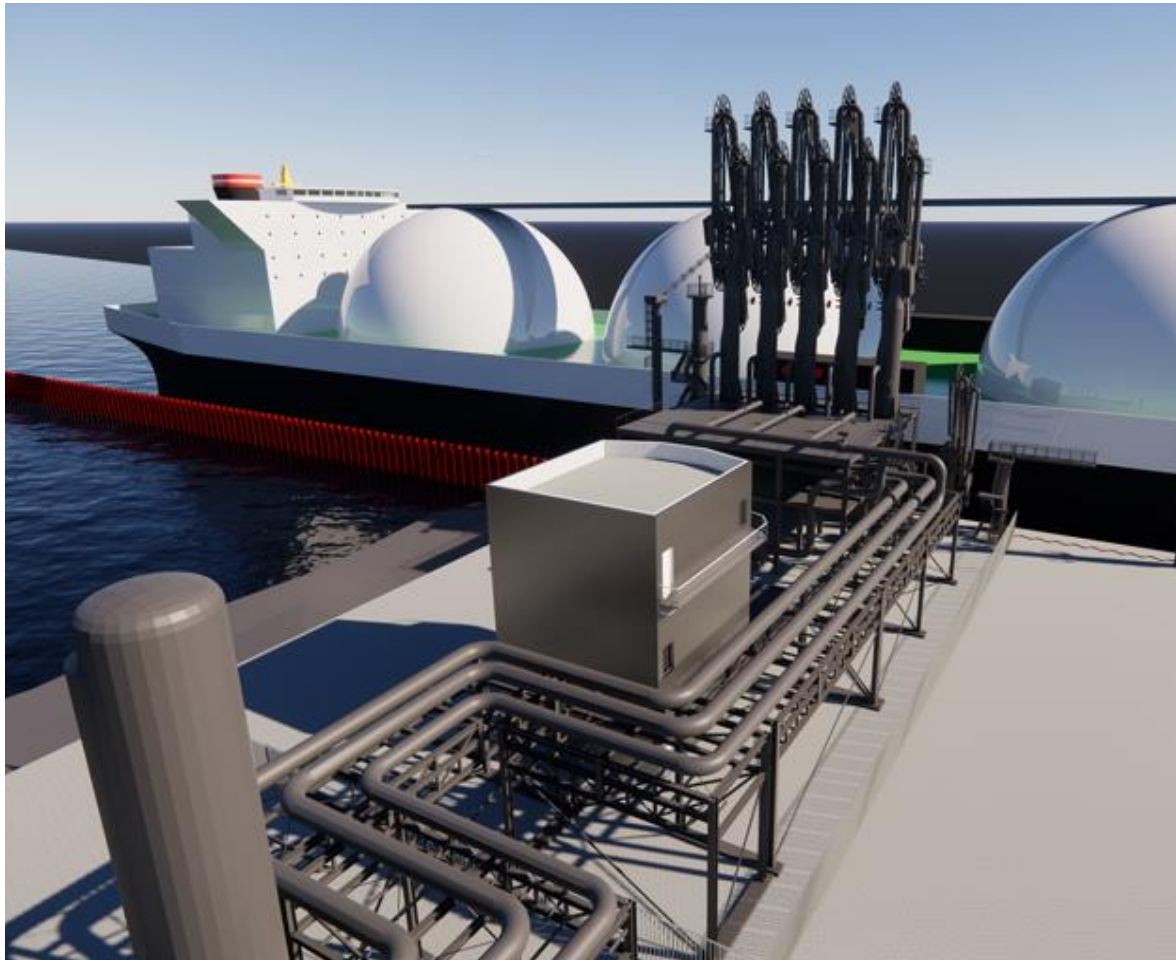
TEMPORARY MODULE: FSRU



- "Transgas Force" from Dynagas, 7,5 bcm
- From end of 2023 until the land-based terminal is commissioned
- Utilizes the already existing infrastructure
- Connection via a very short connecting pipeline
- Nautically simulated and fully suitable
- Not H2-compatible

Modern energy port for liquefied gases

MODULE: PORT



- Completion 2023
- Large jetty allows tankers up to Q-Max size
- Small jetty for bunker ships
- Parallel use for LNG & ammonia possible
- Nautical simulation successfully completed

Enabling the energy transition and industrial transformation



MODULE: INDUSTRIAL PARK



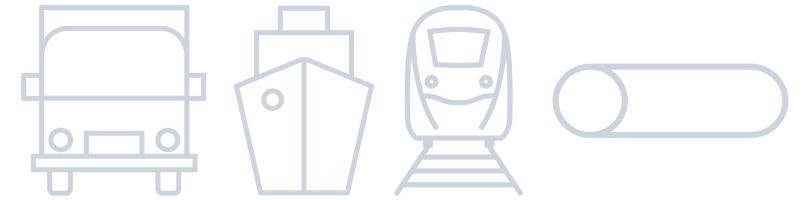
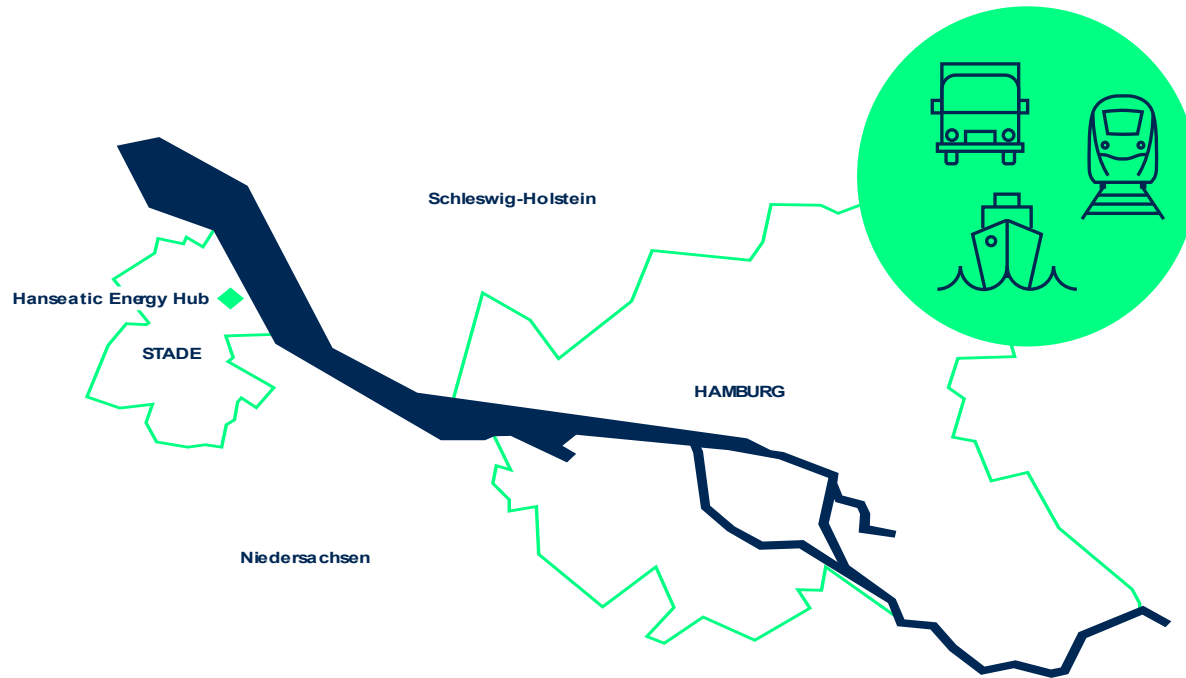
- Existing industrial and port location with considerable demand for energy and raw materials
- Dow a leader in Germany in the production and use of electrolysis hydrogen
- Over 50 years of on-site expertise in handling liquefied gases
- Potential sites for ammonia crackers
- Green offshore power: 380kV grid connection



Multimodal connection of gas and hydrogen



MODULE: CONNECTION INFRASTRUCTURE



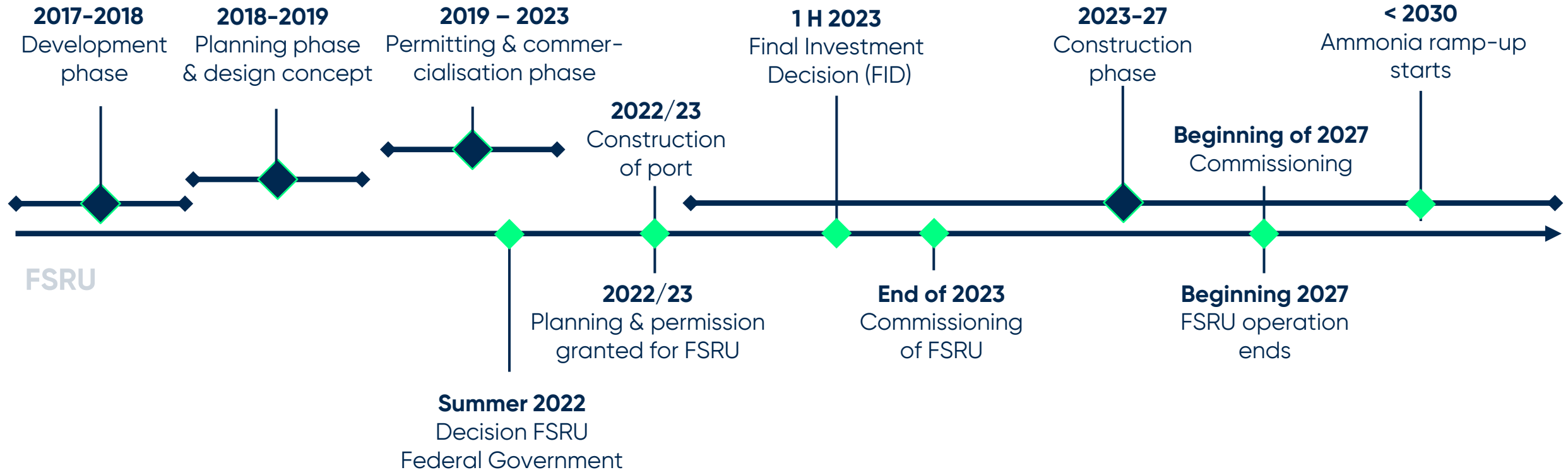
- Short distance to the German gas transport network, with connection to large-scale consumers
- Proximity to Hamburg port means ideal location for bunkering services.
- Also offered: truck- & rail-loading
- The European hydrogen network (H2 backbone) is being built in the immediate vicinity

Clear course for supply security



Timeline

Land-based Terminal

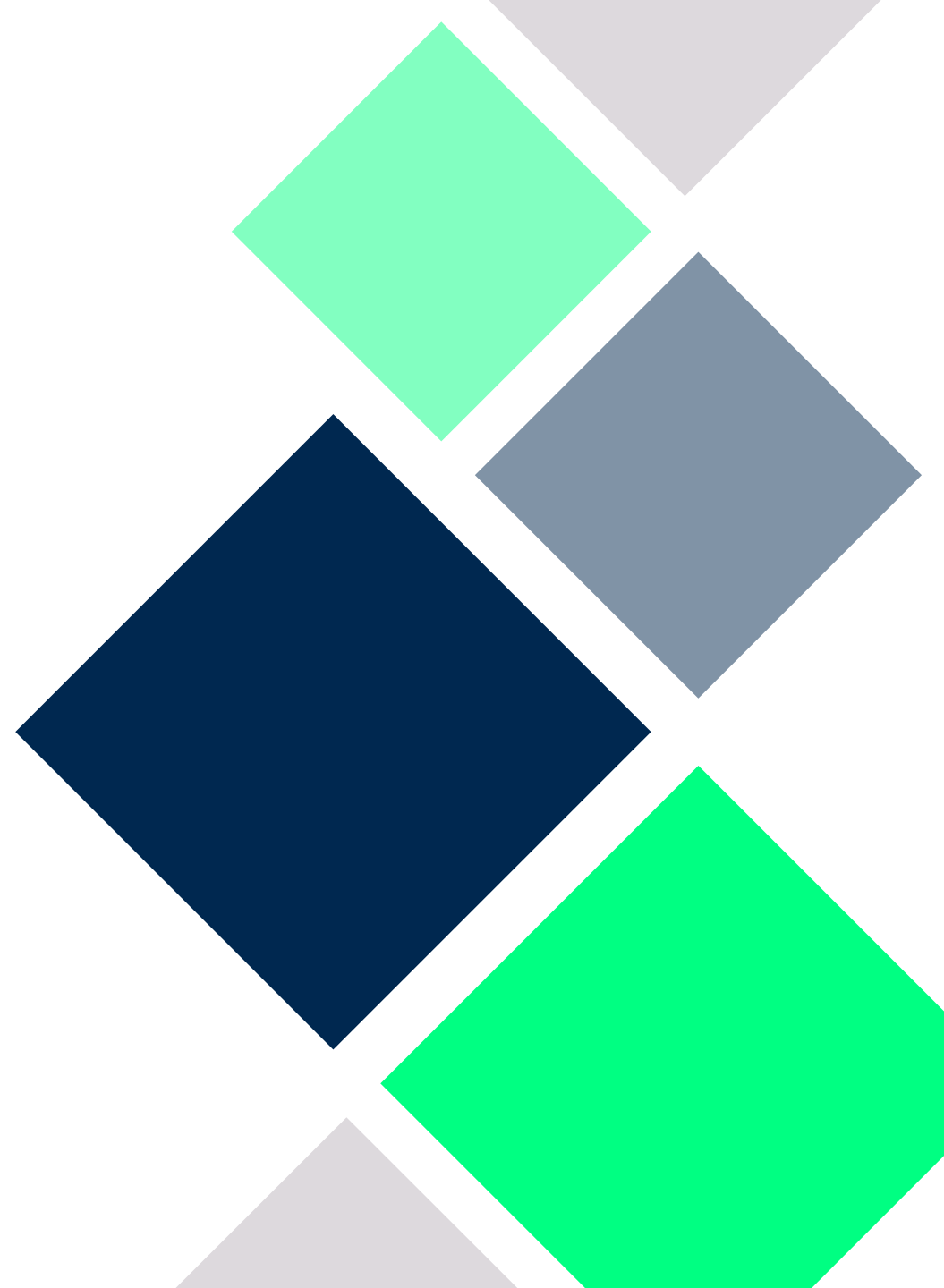




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Thank you

for your attention



Back up

Ammonia: A reliable carrier for transporting hydrogen



Multiple applications

Conversion back to hydrogen

CO₂-neutral fuel

One of the most important raw materials for industry

Cost-efficient:

Total costs in 2030 for production and transport by sea

Hydrogen

22-35 USD/GJ (2.6-4.2 USD/kg)

vs.

Ammonia

14-27 USD/GJ (260-500 USD/t)

Well established:

Handling, transport and storage proven over many years.

More than 20 million tonnes of ammonia are already transported today over long distances by ship.



Energy infrastructure shouldn't be too tightly calculated

In line with the recognised N-1 criterion, risk assessments should also take the failure of the main supply route into account as a possible scenario.

3. Shortage caused by Russian import halt and Europipe II fallout cause significant shortages in most scenarios

Balance in Core Europe markets and LNG utilisation under N-1 scenarios with optimised intra-EU flows

