



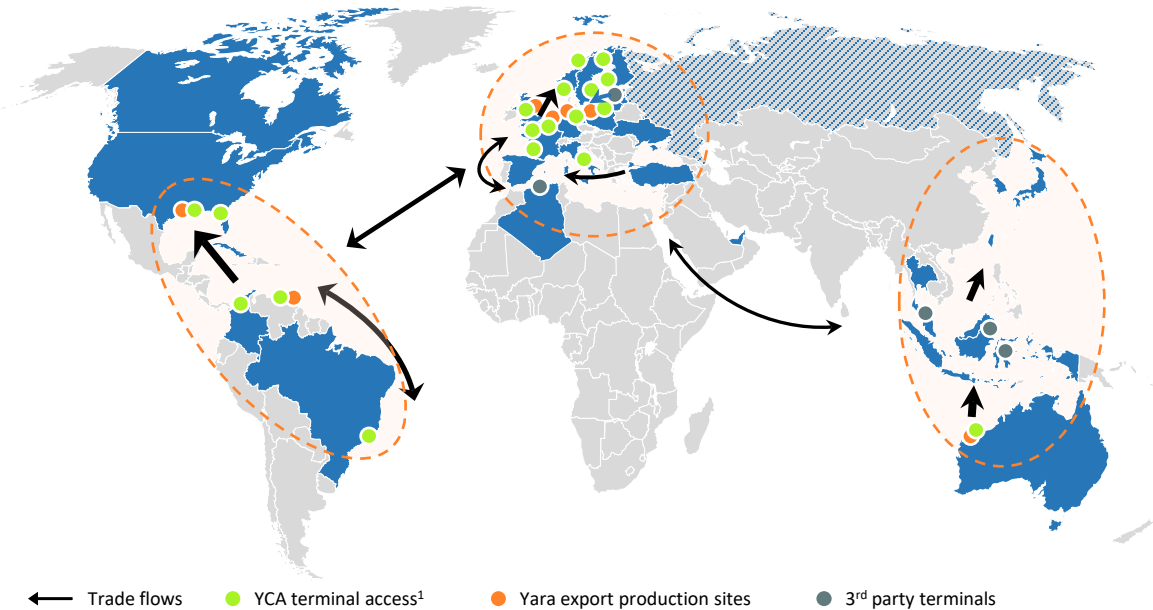
Yara Clean Ammonia



Innovation and Norwegian renewable energy was the foundation of Yara in 1905





Yara Clean Ammonia is the world's largest ammonia distributor




4.1mT
Ammonia transported and sold Q1 2022 LTM


>20%
Market share of merchant/traded ammonia in 2021¹


#12
Owned and leased purpose-built ammonia vessels


#18
Terminal access in key locations³



Ammonia can speed decarbonization of several market segments

Shipping fuel



50% higher **energy density** than liquid hydrogen¹



Easier to scale than hydrogen, e-methanol and synfuel



Can be **stored at higher temperature** than hydrogen, lowering cost



Competitive all-in cost through existing infrastructure and know-how

Power generation



Alternative for countries with **unfavorable renewables conditions**



Economically favorable over carbon capture



Enables continued use of more **flexible producing assets**



Supports **continued use of relatively new plants**

Agriculture/Industrial



Fertilizers account for a very **large share of the emissions of food and agricultural products**



Green fertilizer can provide up to **30% CO2 reduction** on a loaf of bread at a marginal cost increase of ~1%²

Grey \Rightarrow Green

Green fertilizer requires **no infrastructure/value chain changes**

Long-term potential: Hydrogen carrier



Mature in transport, infrastructure and know-how



Lower long-distance transportation cost vs. hydrogen



Better **characteristics for storage** vs. hydrogen



More **energy dense** vs. hydrogen

Source: Company information; Arkwright market study 2021

1) Source: "Reversible ammonia-based and liquid organic hydrogen carriers for high-density hydrogen storage: Recent progress", International Journal of Hydrogen, 2019

2) At 1% extra cost on a loaf of bread, clean ammonia can deliver a 15-30% reduction

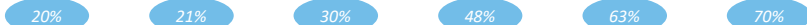
Rapid growth in the use of ammonia as a shipping fuel is expected to create a USD 87bn market by 2050

Ammonia demand outlook in the shipping fuel segment

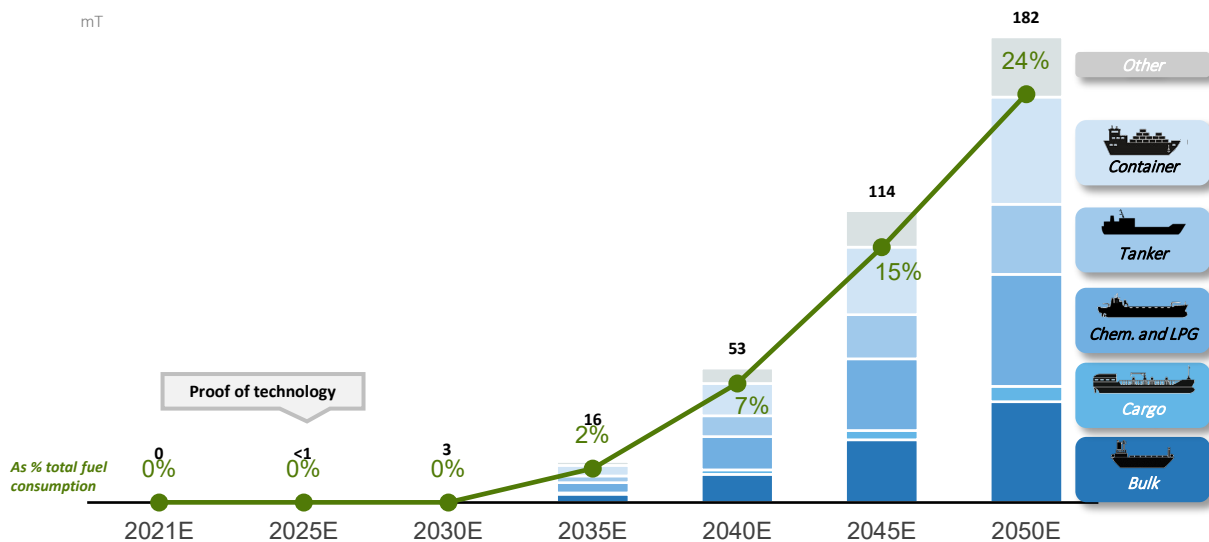
Ammonia fueled vessels in fleet ('000)¹



Ammonia blend-in rate



mT

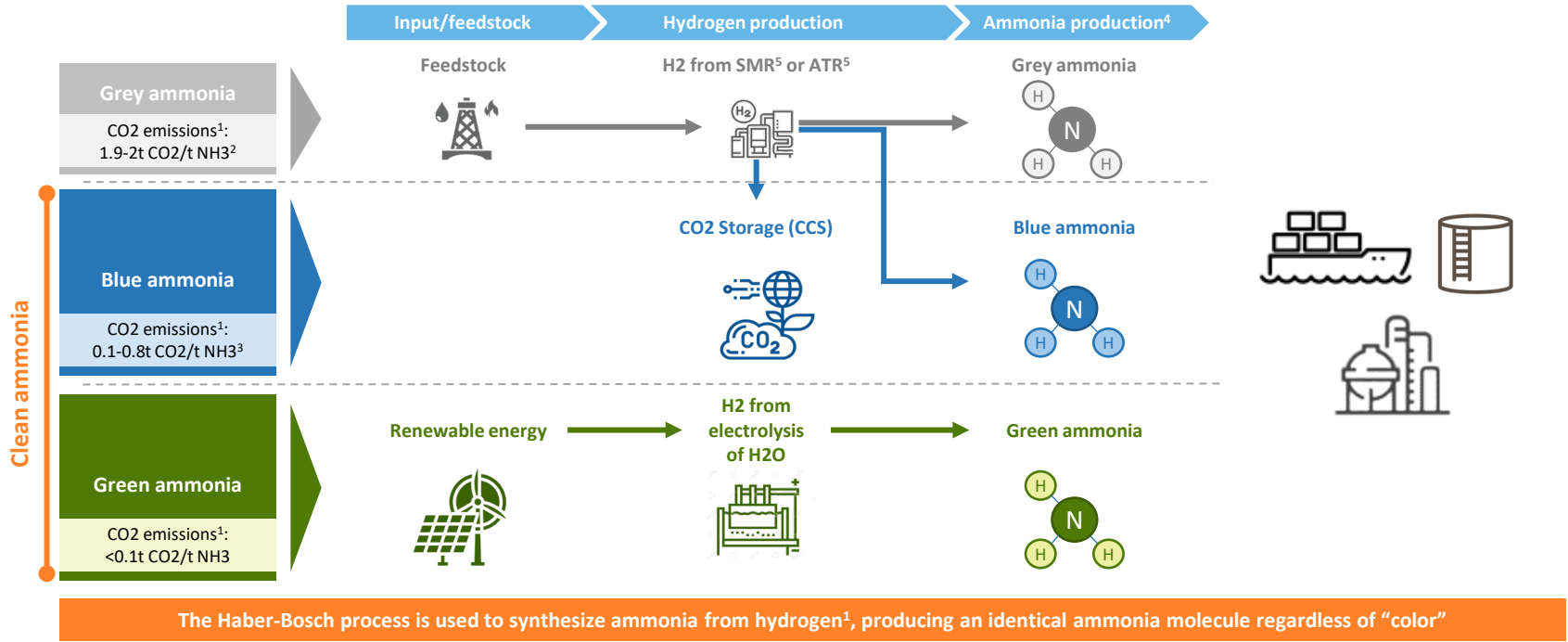


Key drivers

- Current toolbox **insufficient to reach IMO's emission reduction targets** – a clean fuel alternative is required
- Likely inclusion of shipping in the EU ETS **increases price of fossil fuels**
- Ammonia scores best across clean fuel KPIs and will be particularly **important for deep-sea shipping**
- Engine **commercial readiness** and **fuel availability** expected **second half of this decade**
- Retrofit adoption of c. 10%** gradually from 2028 driven by selected segments
- Market take-off of newbuilds towards 2040 and 2050** with 50-60% adoption



Yara will re-use plant and logistic infrastructure to produce decarbonized ammonia



Source: Company information; Arkwright market study 2021

- 1) Indirect emissions (Scope 3) from natural gas and embedded assets are not included in the values
- 2) Fertilizers Europe Carbon footprint calculator
- 3) IRENA Innovation outlook: renewable ammonia
- 4) Combining hydrogen with nitrogen from the air
- 5) SMR = Steam Methane Reforming, ATR = Autothermal Reforming

HEGRA – green ammonia at Herøya



The single **largest climate endeavour in Norwegian history**

Green hydrogen will cut **800.000 ton CO2** emissions from Yara's plant in Herøya

Green ammonia production will provide fossil free fuel for **the maritime industry and power production**



Yara Clean Ammonia

YCA partners with first movers to develop the value chain

In order to be able to supply Green Ammonia as a fuel, YCA is involved in several projects to develop and build a bunkering network and the required logistics.

YCA is involved in pilot projects within most shipping segments to use Ammonia as fuel either for newbuild or retrofit.



SHIPFC



- World's first vessel to use Ammonia FC
- Vessel will start operation in 2024
- YCA shall deliver Green Ammonia

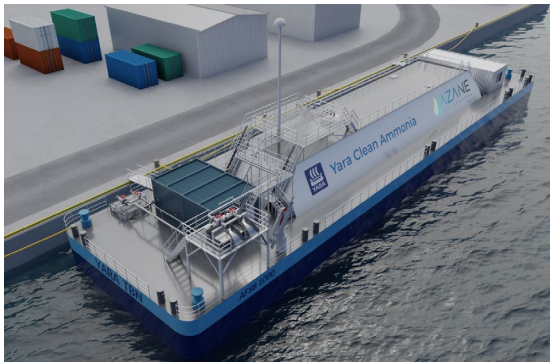
Viridis Bulk Carriers



- Ammonia fueled Short Sea Bulk
- 7 cargo owners as partners incl YML
- YCA shall deliver Green Ammonia



Norway can use its domestic market to launch a full clean ammonia value chain



Yara Clean Ammonia