



# Yara Clean Ammonia



*Enabling the hydrogen economy - lessons learned through a century of producing and transporting ammonia*

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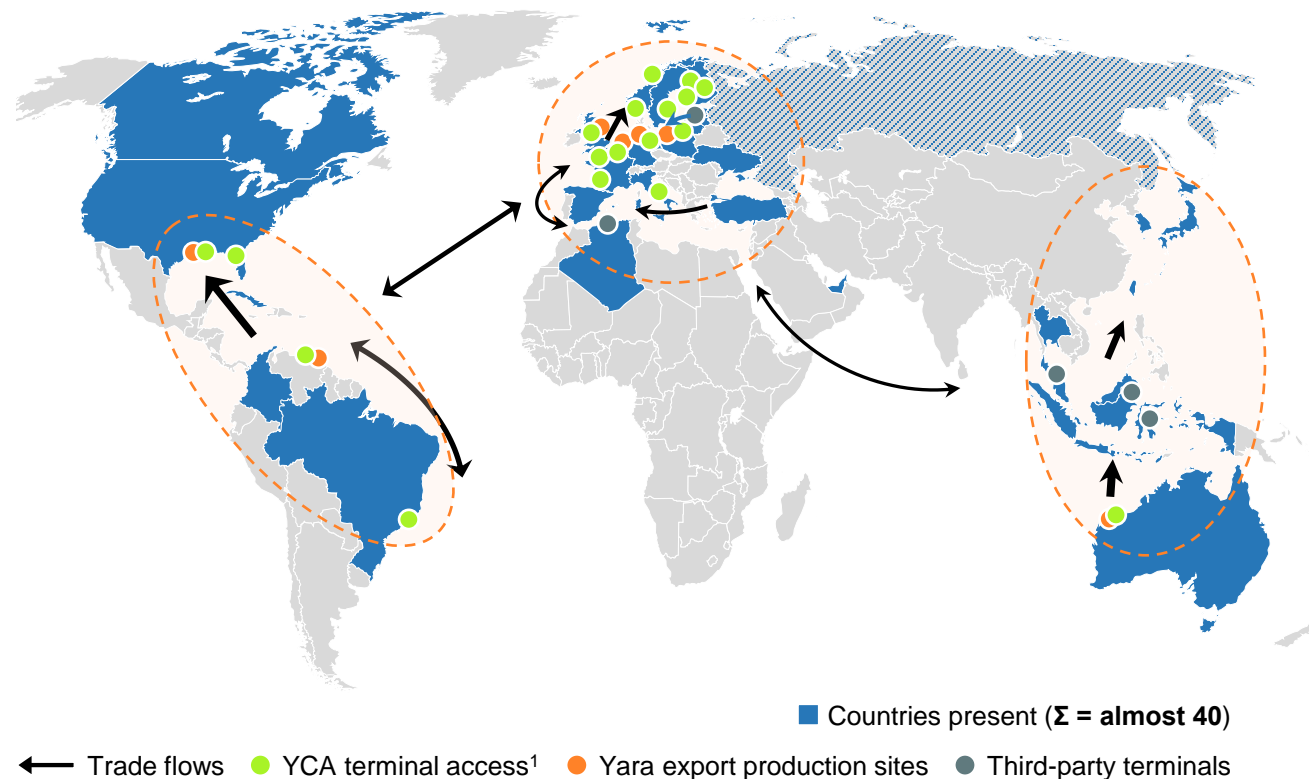
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# YCA has an established global network with access to asset-backed supply

## Overview of YCA's global footprint



## Overview of YCA's global footprint

- ✓ Reliable, asset-backed supply and attractive offtaker
- ✓ Deep industry know-how, market insight and track record of safe handling
- ✓ Specialized fleet of 12 ships
- ✓ Global network of 18 terminals located in key locations<sup>1</sup>
- ✓ Deep-sea connection to key bunkering hubs
- ✓ Scalable platform and business model

#1 global player with >20% market share<sup>2</sup> and leading positions in key regions

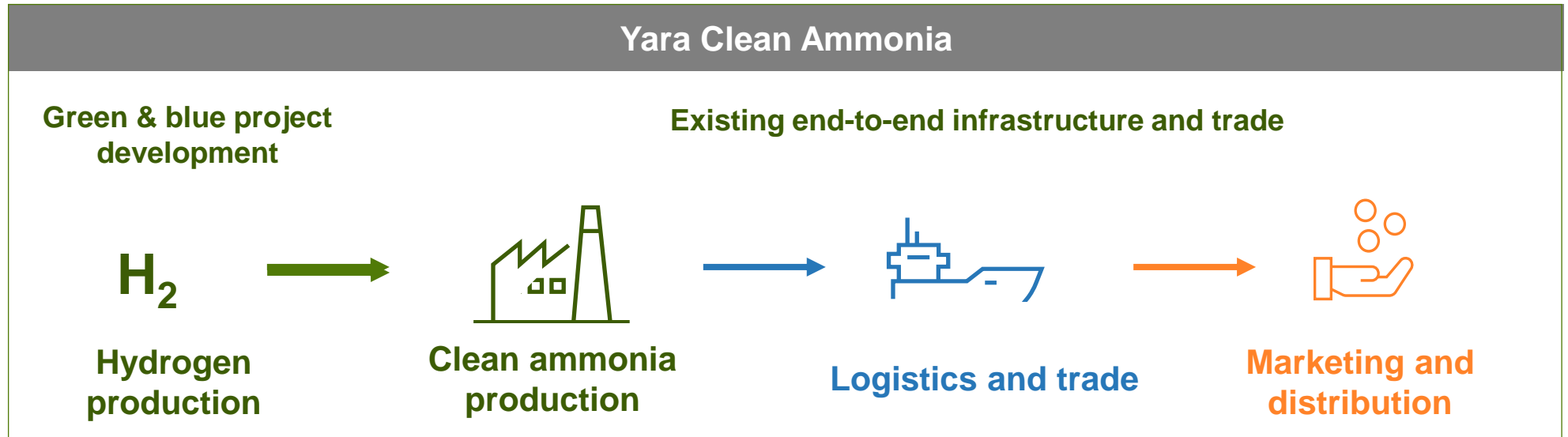


Yara Clean Ammonia

Source: Company information; Argus market study

- 1) YCA has exclusive access, and manages and optimizes use of Yara's ammonia tank infrastructure at terminals through sourcing and supply agreements with Yara
- 2) Based on volumes of traded ammonia in 2021 - Argus market study (2022)

# YCA is a leading global ammonia platform well-positioned to capture the market for clean ammonia



- Upstream partnerships
- Clean energy sourcing

- Projects & technology team
- Existing pilot projects
- Potential full-scale projects (e.g. Porsgrunn)

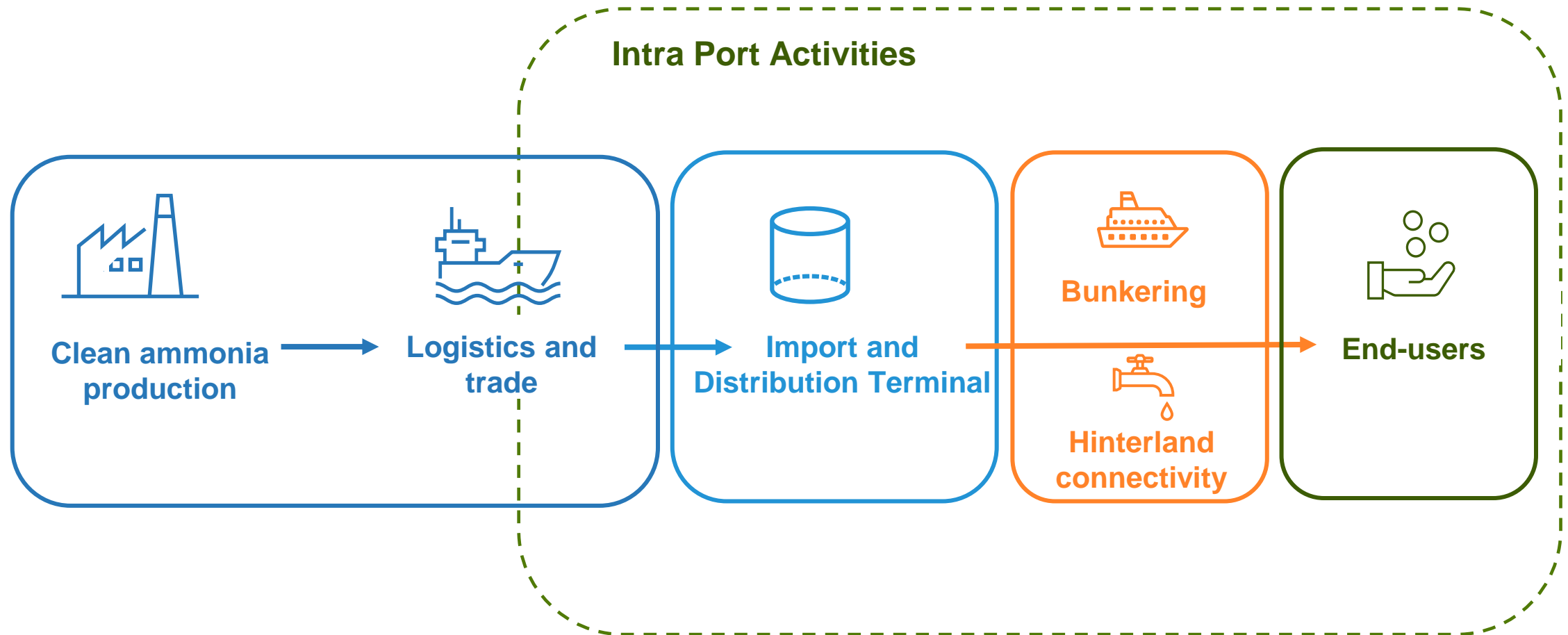
- Existing Yara Ammonia Trade & Shipping<sup>1</sup> unit
- Q1 2022 results:
  - Revenues ~3 BUSD
  - EBITDA ~159 MUSD
  - > 20% market share

- Marketing & customer development
- Application development



# Ammonia Supply and Bunkering Value Chain

Ports a central node in the maritime ecosystem



# HESQ performance at Yara International

## Leader in safety practices



- The ESG Benchmark EcoVadis 2021 Scorecard was published on August 23, 2021. This year, Yara advanced from Gold to Platinum status for its sustainability performance.



- Recognizes outstanding performance in safety, health and environment (SHE) in fertilizer production



- Supported by a consistent Safe By Choice approach, Yara's leading performance in safety is demonstrated by a Total Recordable Injury rate among the lowest in the fertilizer industry.

# Collaboration Agreement with Pilbara Ports Authority

- **Leverage existing ammonia production and trade flows in Pilbara**
- **Fast track ammonia as a zero-carbon fuel in the region**
- **Clarify required bunkering infrastructure to enable switch to zero-carbon shipping**
- **Establish frameworks to ensure safe ammonia bunkering operations**

July 28, 2022

Yara Clean Ammonia and Pilbara Ports Authority team up to assess ammonia as a shipping fuel

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Pilbara Region Moves Towards Ammonia Bunkering

Perth, 28 July 2022

Yara Clean Ammonia and Pilbara Ports Authority (PPA) have signed a Collaboration Agreement to jointly facilitate the uptake of clean ammonia as a marine fuel in the Pilbara region in Western Australia.



Yara Clean Ammonia

# Key highlights

- 1 Clean ammonia represents a **massive opportunity on top of a structurally robust market for conventional ammonia**
- 2 **Supportive ammonia market dynamics** expected to significantly **increase cross-regional trading activity**
- 3 **The #1 global ammonia midstream platform**<sup>1</sup> with significant barriers to challenge YCA
- 4 Access to **robust upstream projects** to further develop YCA's integrated value chain position
- 5 **Profitable and scalable business model** with attractive economics and growth prospects from clean ammonia
- 6 **Experienced and performance-oriented organization** with strong backing from Yara





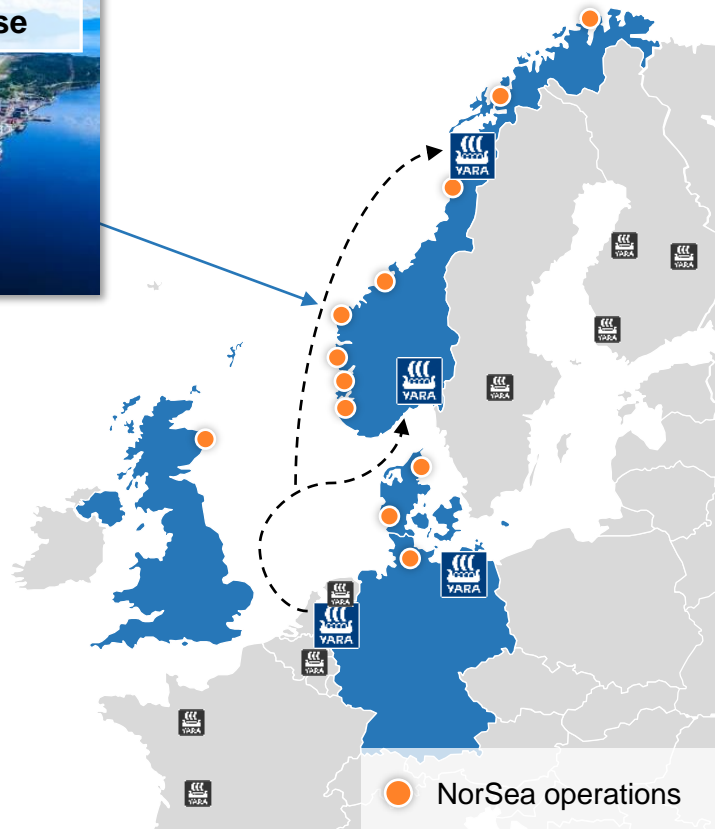
Thank you for your attention!



Yara Clean Ammonia

# MoU with NorSea to establish a new, secure supply chain for ammonia bunkering

## Overview of the NorSea network



## Key highlights

- NorSea and YCA have signed an MOU for to **establish ammonia bunkering infrastructure for the North Sea**
- **NorSea is the largest logistics operator for North Sea activities**, with over 10,000 landings per year, including all large oil and gas players in the region
- The first green ammonia bunkering is **targeted to start in 2024**
- At the outset, **the scope includes all NorSea bases in the North Sea**

### NorSea involvement

- **NorSea will operate** the bunkering terminals
- *Commercial and ownership strategy to be defined*

### YCA involvement

- **YCA will supply clean ammonia** to terminals and handle **safety aspects**
- YCA will, in close cooperation with partners, **develop and scale the logistics** to ensure sufficient supply



- *Operations*
- *Commercial*

- *Technology*
- *Construction*

# The Castor Initiative in Singapore

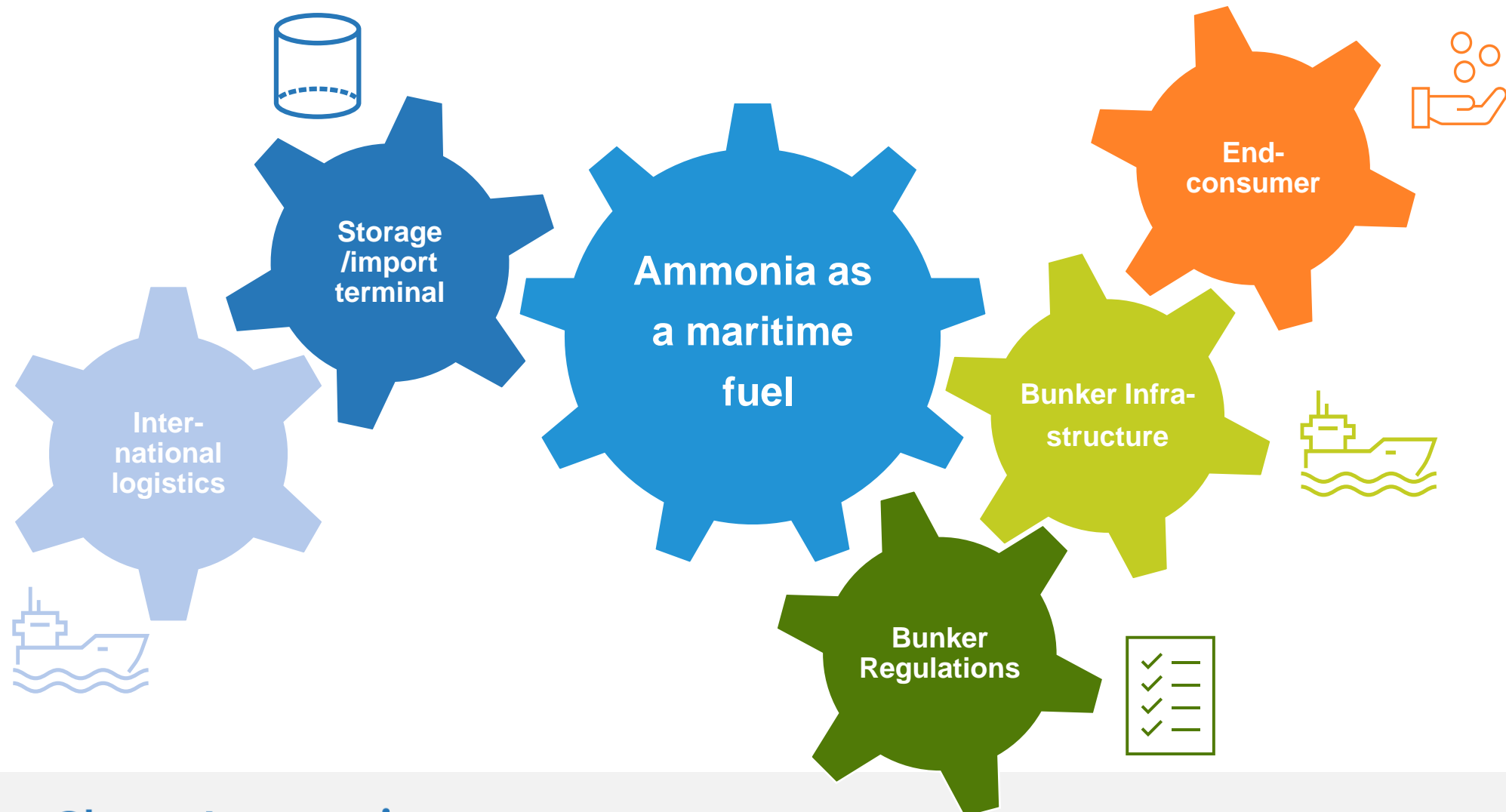
## Castor Initiative



- Design, build, and commission the **world's first ammonia-fueled liquid bulker** in 2025
- Complete representation from all areas of the maritime ecosystem
- Study and develop operational procedures for use of Zero-Carbon Fuels
- Partners: **LR, MISC Berhad, MAN Energy Solutions, Samsung Heavy Industries (SHI), Yara International ASA, Maritime and Port Authority of Singapore (MPA)**
- **TotalEnergies** joined in December 2022



# Ammonia Supply and Bunkering Ecosystem





## Yara is executing a 4-way strategy towards securing clean ammonia supply around the world



**RETROFITTING**  
existing capacity



**BUILDING**  
new capacity



**DEVELOPING**  
partnerships



**ESTABLISHING**  
offtake agreements

# Growth potential from solid upstream projects, building on YCA's leading midstream position

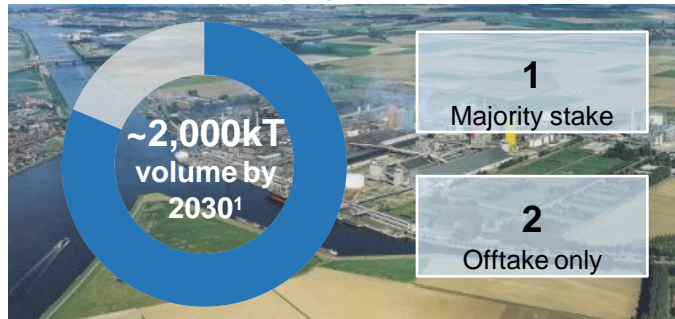
## Blue ammonia

Robust pipeline with solid project economics and profitability without need for further subsidies

### Key regions



### Selected project candidates



Well-positioned with a maturing project hopper and additional long-term opportunities

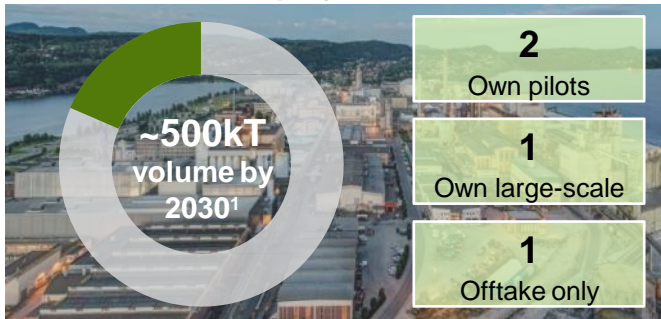
## Green ammonia

Early mover strategy where government support will be required – lower costs in the future will increase competitiveness

### Key regions



### Selected project candidates



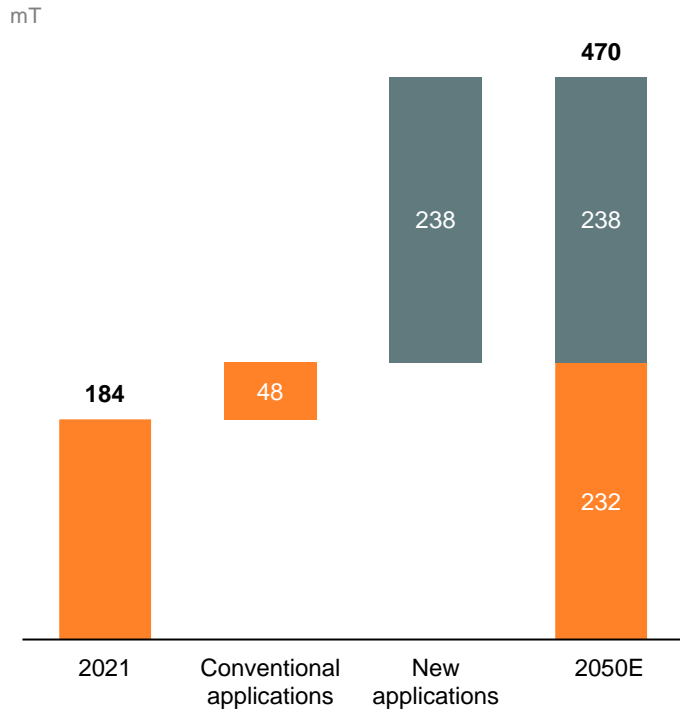
## Well-positioned to succeed

- ✓ Access to existing production assets that can be converted to blue or green at lower costs compared to greenfield investments
- ✓ Knowledge and experience built through Yara's almost 100 years of ammonia track record and over 8 mT ammonia capacity
- ✓ Market leading position makes YCA the preferred offtaker and partner for Yara and other third-parties, in turn enabling new projects



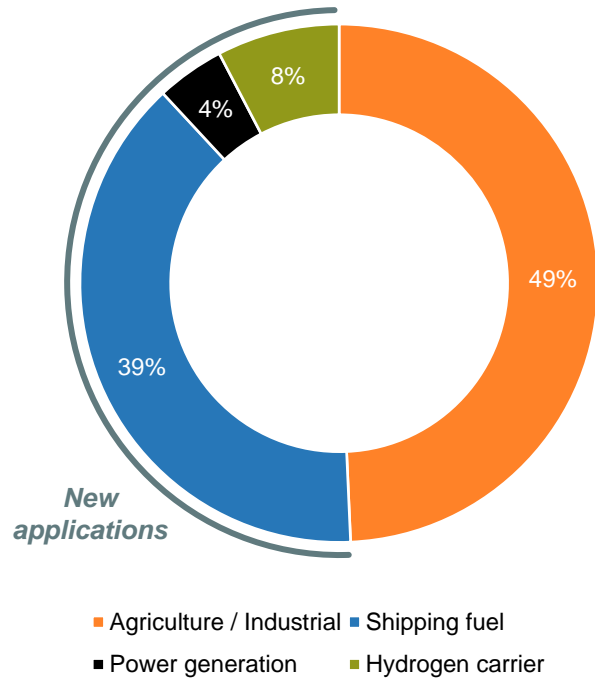
# Significant expected ammonia demand driven by a mix of conventional and new applications

Ammonia market growth to 2050E



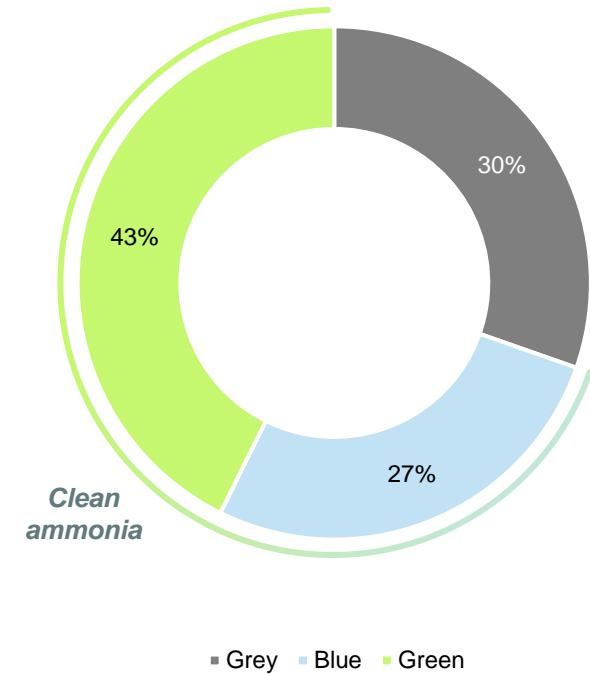
The demand for ammonia is expected to grow significantly to 2050

2050E ammonia demand by application



~50% of 2050E demand expected to come from new applications

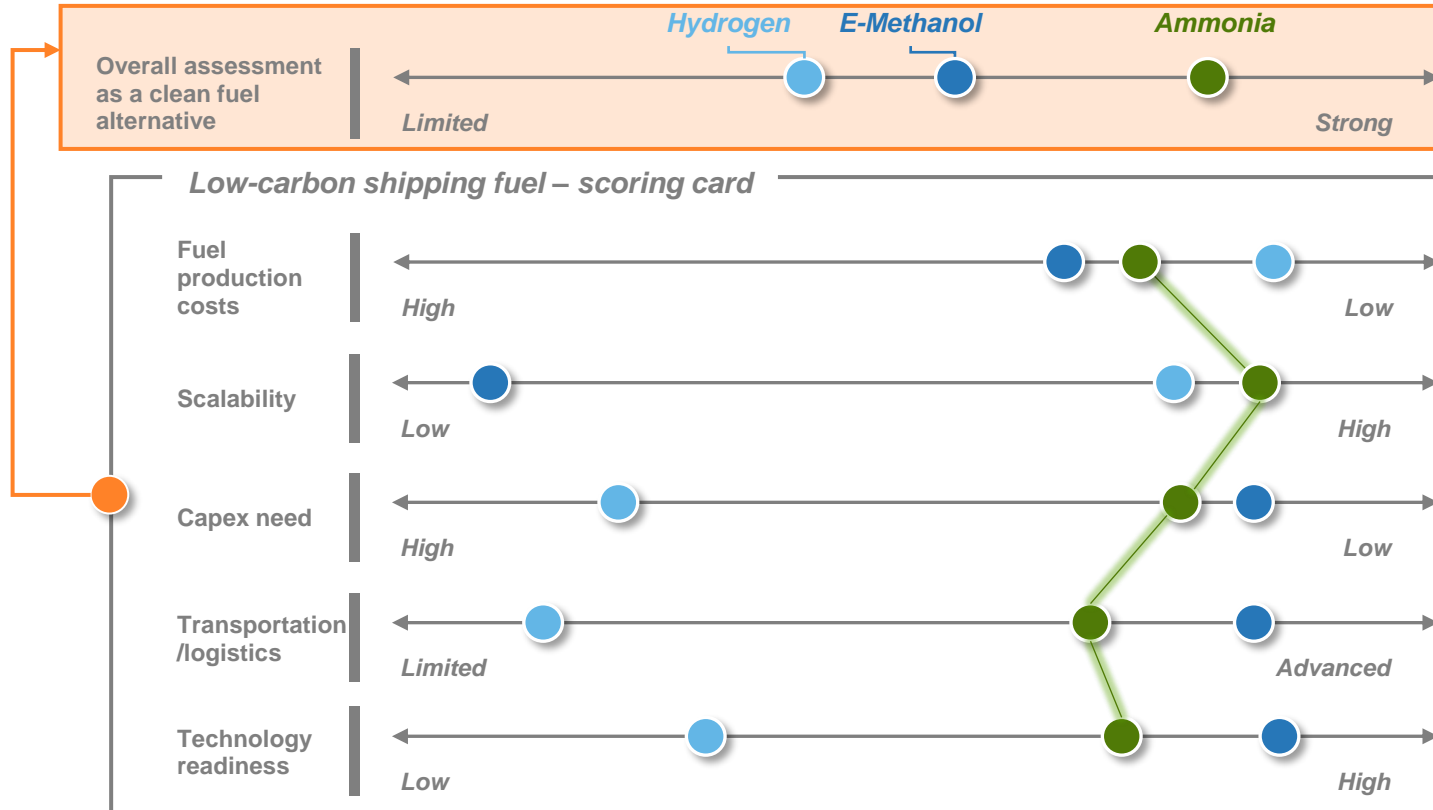
2050E ammonia supply by type



Majority of supply expected to come from blue and green sources

# Ammonia is the most promising solution for clean fuel in deep-sea shipping

## Comparison of shipping fuel alternatives



### E-Methanol

- E-Methanol is not a zero-carbon fuel, as it emits CO<sub>2</sub> when combusted
- Methanol will only be emission-free if the carbon going into e-methanol is captured from a source where it would otherwise be emitted or captured after combustion; this is very expensive and difficult to scale
- In light of its low scalability, there is limited incentive for large-scale adoption

### Hydrogen

- Lower energy density disadvantageous for longer-distance shipping
- Limited existing infrastructure vs. ammonia
- Hydrogen fuel cells are not expected to be available at commercial scale before 2028/2029, while ammonia engines should be available from 2024/2025

“Ammonia (green and blue) is the most promising carbon-free deep-sea fuel in the long run” – DNV





# Certification to ensure transparency & trust in supply chain



- Piloting the Zero Carbon Certification Scheme for the ammonia from our **solar-powered electrolyser project in Pilbara.**



- Taking part in various industry associations to work towards a **globally harmonized hydrogen and ammonia certification system**



- Developing a **chain of custody and carbon footprint system** to guarantee the preservation and calculation of clean attributes throughout Yara's entire supply chain.