



Viridis Bulk Carriers / Azane Fuel Solutions

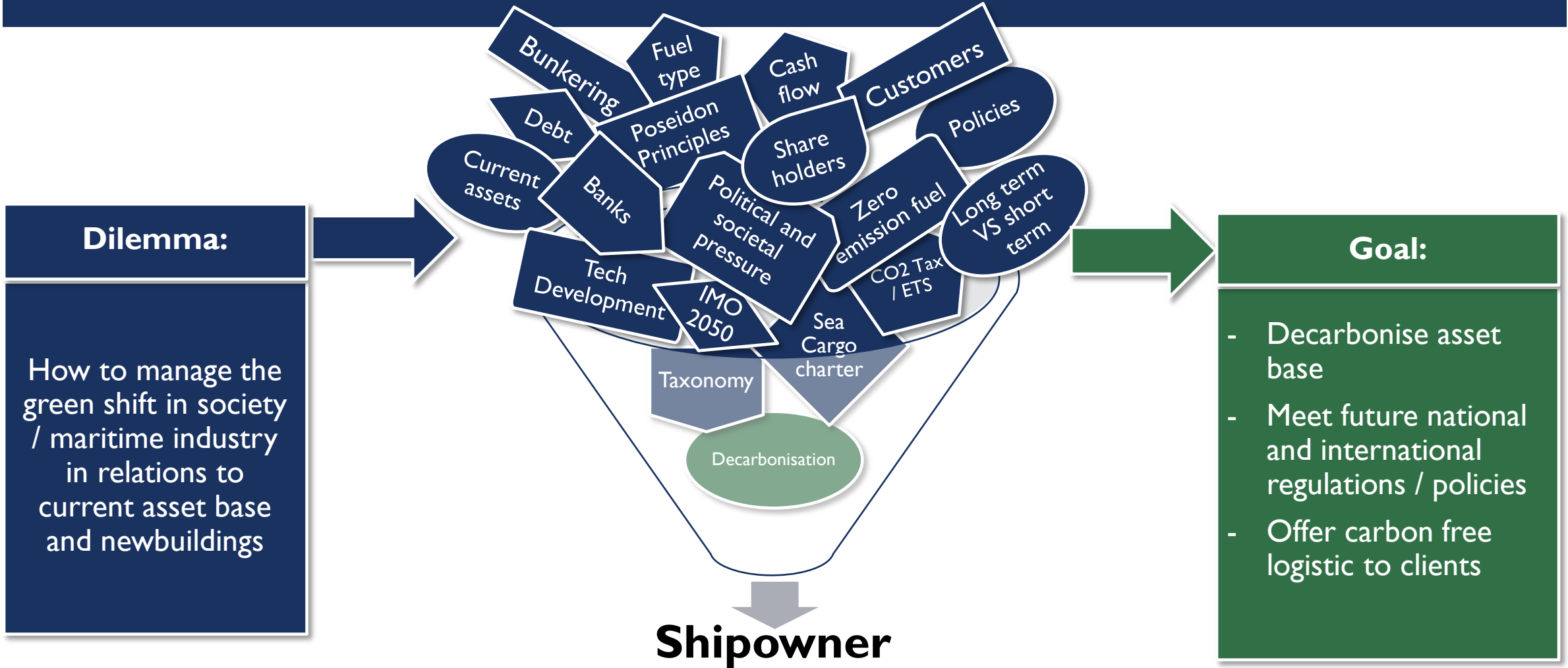
ZERO CARBON SHORT SEA LOGISTICS AND BUNKERING INFRASTRUCTURE

#Klimafrokost – 26 August 2022 – Karl Arthur Bræin

Agenda:

- Viridis Bulk Carriers
 - Flexbulk – NH3 Power
- Azane Fuel Solutions
 - Ammonia Fuel Bunkering Network

A SHIPOWNERS DILEMMA – HOW TO DECARBONISE



THE 3RD PROPULSION PARADIGM SHIFT: BACK TO ZERO EMISSIONS



Sail to Coal:
Mid 1800's

Coal to Diesel:
Early 1900's

Diesel to ZE:
2024+

WHY AMMONIA?



Carbon free

Inherently carbon free when produced from renewable energy



Energy-rich

45-50% higher energy density than liquid hydrogen



Safe

Easier to produce, distribute and store than hydrogen



Well-established

Globally traded commodity with 130+ ports having ammonia import/export infrastructure in place



Abundant

Comprised of Nitrogen and Hydrogen, among the earth's most plentiful resources



Versatile

Demand stretches far beyond shipping fuel (e.g. fertilisers, power generation, hydrogen carrier), incentivising significant investments

VIRIDIS BULK CARRIERS

SHORT SEA BULK DEVELOPMENT SINCE 2020

- An optimal joint venture structure from ship concept to operations



Commercial,
nautical /
cargo
technical lead

amon
MARITIME

Project
manager and
technical lead



Finance lead

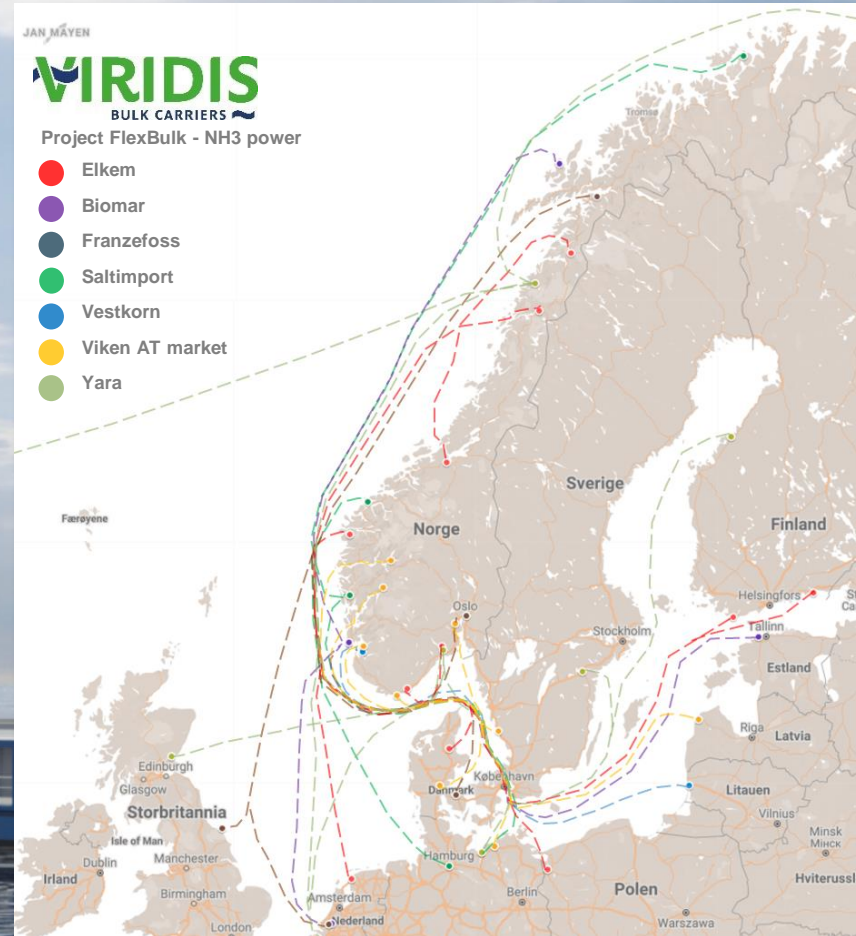
- Project development since 2020 in close collaboration with leading technology suppliers and Clients
- Will develop, build, own and operate zero carbon bulk carriers – without sacrificing operational capabilities like range / endurance



VIRIDIS BULK CARRIERS

SHORT SEA BULK DEVELOPMENT SINCE 2020

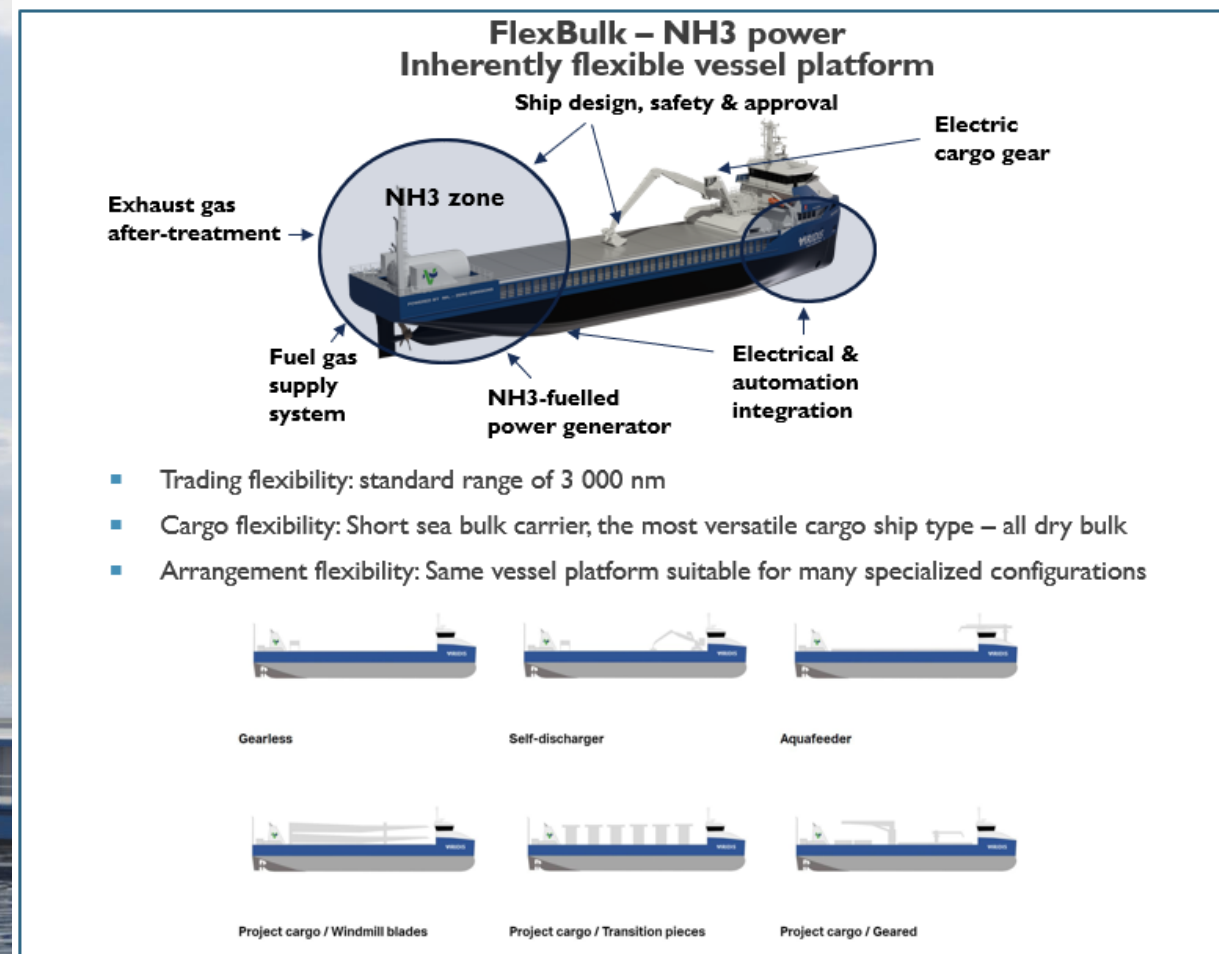
- Established the **Flexbulk - NH3 Power** consortium
- Developing technical solutions and optimized cargo transportation network for 7 clients
- Next generation short sea bulk carrier
- Targeting an initial 5 ships, with plans to grow the fleet further
- Pilot-E R&D and investment grant from Norwegian government December 2021
- Consortium member of “Ammonia Fuel Bunkering Network”, which will establish the world’s first ammonia fuel bunkering network in Scandinavia



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~6 000 tonnes of CO2 reduction per ship / per year (based on 1 875 tonnes of MGO per year) = equal to about 3000 cars

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Finansavisen



Støtte til utslippsfri frakt

TU Maritim



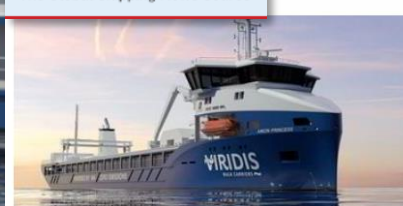
+ Pilot E-midler setter fart på ammoniakkskip

OFFSHORE ENERGY

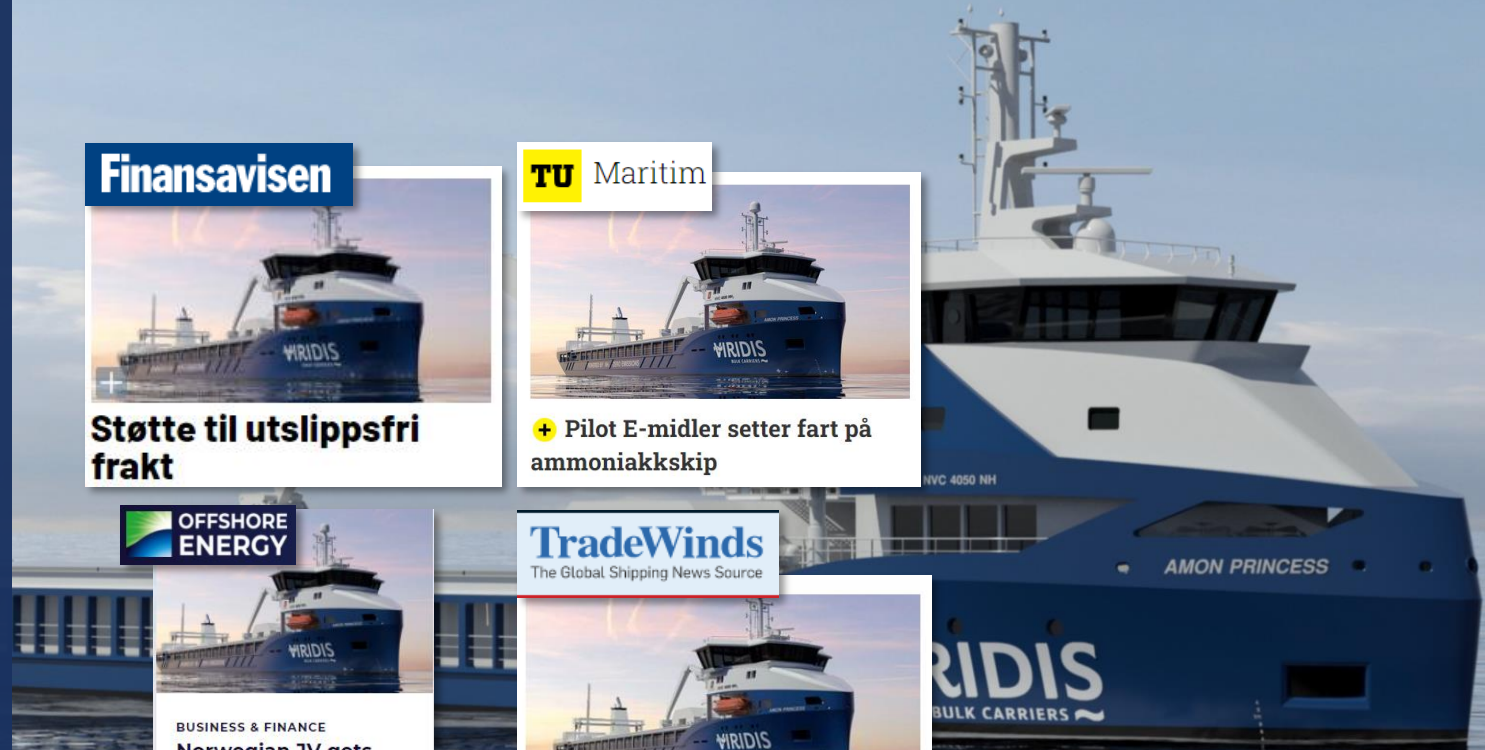


BUSINESS & FINANCE
Norwegian JV gets govt funding to build ammonia-fueled ships

TradeWinds
The Global Shipping News Source



Viridis gets Norwegian cash boost for ammonia-fuelled bulker plan



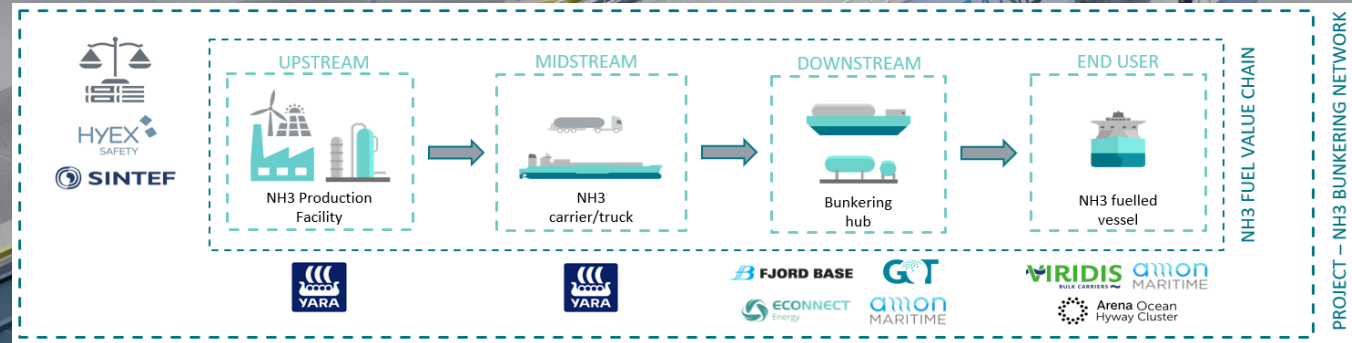


- A joint venture between ECONNECT Energy and Amon Maritime
- Will develop and sell turn-key cost efficient, scalable ammonia fuel bunkering terminals - as a key step to enable carbon-free shipping



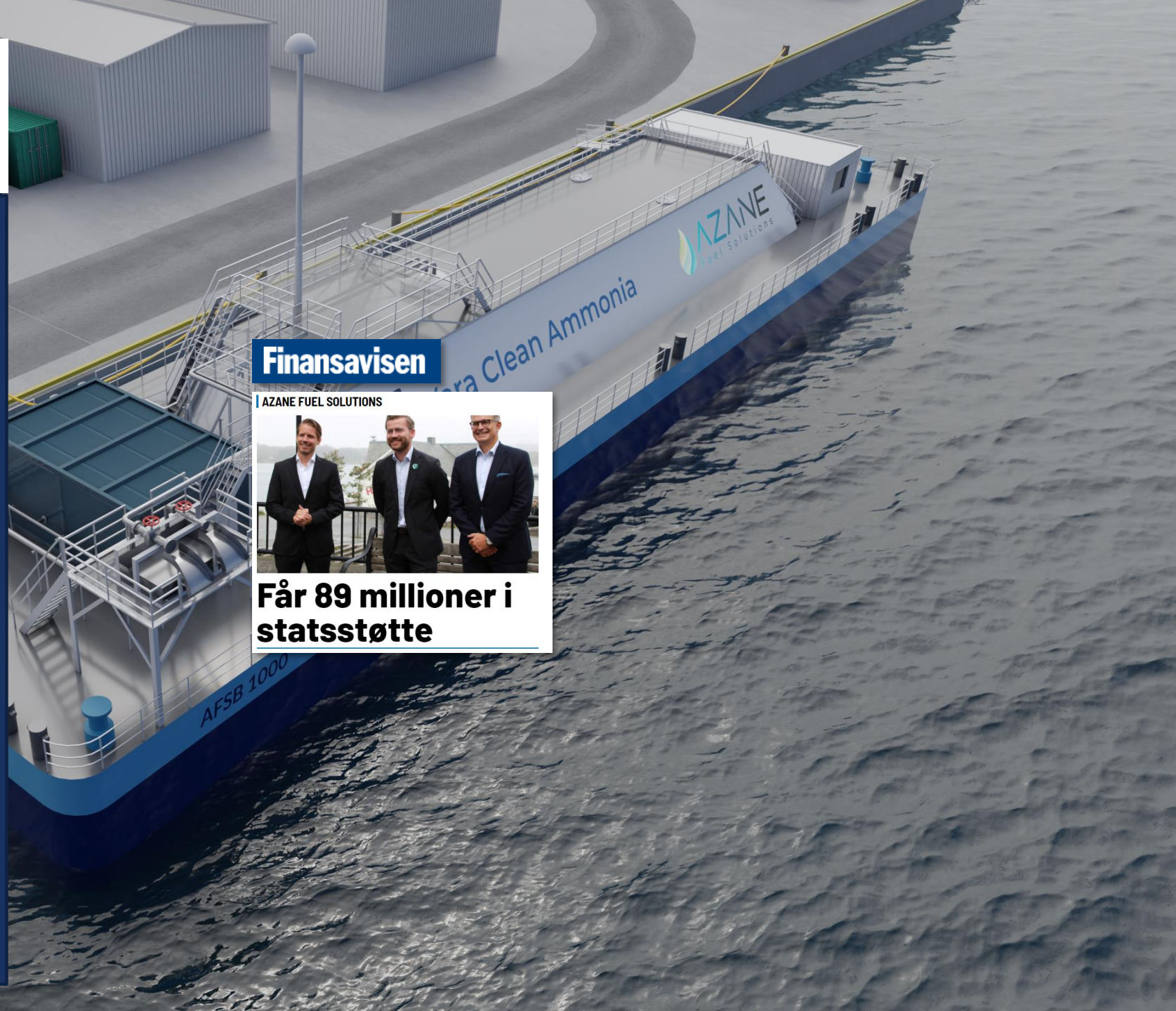
AMMONIA FUEL BUNKERING NETWORK

- Project development since 2020 in close collaboration with the entire ammonia fuel value chain in project consortium – solving the “chicken and egg” dilemma
- Green Platform R&D and investment grant from Norwegian government in August 2021
- Pre-order for up to 15 ammonia bunkering terminals from Yara announced 01.04.22
- Terminal received DNV Approval in Principle August 2022
- Construction start H2 2023
- Making sure ammonia fuel will be available for Viridis’ FlexBulk project, as well as other shipowners from Q4-2024



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Finansavisen

AZANE FUEL SOLUTIONS



**Får 89 millioner i
statsstøtte**

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Finansavisen



Bestiller 15 grønne fyllestasjoner for skip

OFFSHORE ENERGY



BREAKING NEWS

BUSINESS DEVELOPMENTS & PROJECTS
Yara orders world's 1st green ammonia bunkering terminals

2 hours ago

TradeWinds

The Global Shipping News Source



Yara ups green ante with order for world's first ammonia bunker stations

HANSA

INTERNATIONAL MARITIME JOURNAL



Yara ordert weltweit erste Bunker-Terminals für grünes Ammoniak

AMMONIA ENERGY ASSOCIATION



Yara & Azane Fuel Solutions to establish a carbon-free ammonia fuel bunker network

By Julian Atkinson on April 06, 2022

Yara has pre-ordered fifteen of Azane Fuel Solutions' ammonia bunker terminal units. Once delivered, the pair will work to establish a carbon-free ammonia fuel bunker network in Scandinavia. Also this week, Ammon Maritime (a founding partner of Azane Fuel Solutions), launched a new ship management company that will specialize in ammonia-fueled vessels.

Continuous Reading

WHAT DO THE MARITIME INDUSTRY NEED?

Politicians and charterers decides the speed of the green shift

Predictable policies → **Don't move the goal post!**

Balance between the carrot and the stick

Facilitate / support investments in:
green vessels, shore power, fuel infrastructure and fuel production

CfD contracts is important to create price parity with traditional fuels/mitigate market uncertainty

CO2 must be priced 'properly' to bridge the gap on fuel price

Emissions differentiated port dues

GET IN TOUCH

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www.Viridisbulkcarriers.com



www.AzaneFS.com