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cleantech**

Norwegian Centre of Expertise

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Carbon-free fuel for a sustainable future

March 2024





About

AMOGY



ABOUT AMOGY

Company Profile



190+
Employees



Founded:
Nov. 2020



Funding to
date: \$220M



Headquarter
Brooklyn, NY



Other Locations
Houston,
Stavanger, Stord,
Singapore

ABOUT AMOCY

Our Investors

- Funding raised to date: **\$220M**
- Seed: \$3M
- Series A: \$20M
- Bridge: (uncapped note): \$46M
- Series B: \$150M



Our Locations



Amogy Testing Facility (Stord)

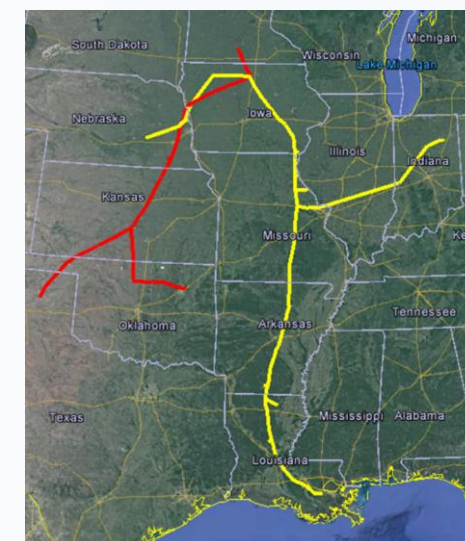
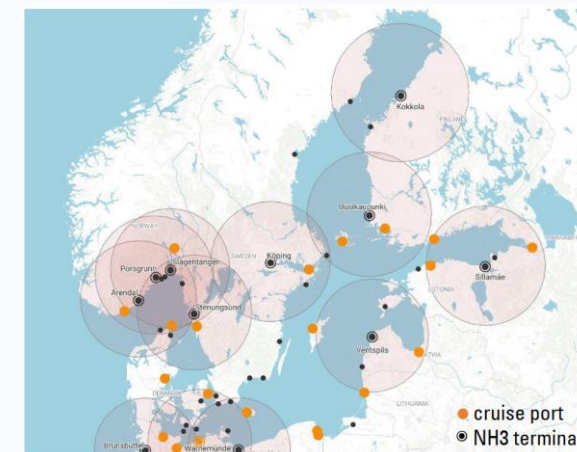
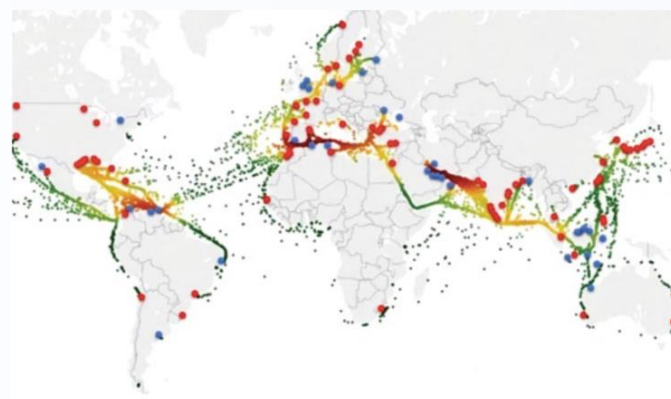
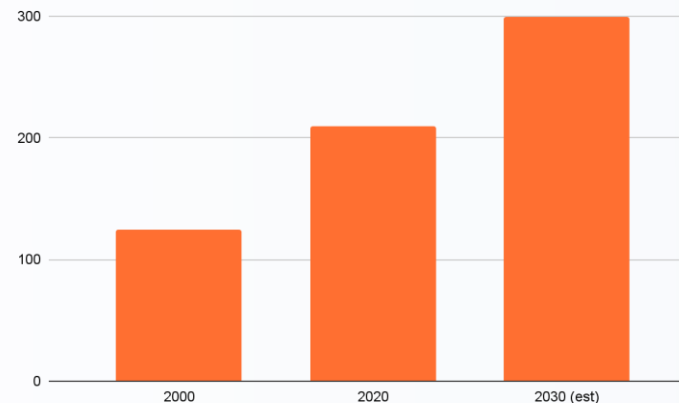
- 120 m² (1300 sqft) test cell + external areas
- Separate control room with room for 10 operators/engineers, including facility and equipment control stations, CCTV and more
- 1 permanent manager, engineers/operators from HQ as applicable
- Capability of testing with Ammonia, Hydrogen and Hydrogen/Nitrogen mix. Other types of fuel such as LNG is also available on the facility
- 2 ea 200kW fuel cells installed for testing of equipment (PowerCell & Ballard).
- Capacity of testing up to 700+ kW electric power production, with delivery to grid infrastructure
- 1500 kW cooling capacity
- Large HVAC system installed, for process air supply and module ventilation
- Electrolyzer on site, with capacity of >16 kg/h and 350 kg storage tank
- 13,000 kg liquid Ammonia storage tank



Why Ammonia?

Infrastructure Today

100+ years of scaled industrial use
 ~200 ammonia ports worldwide
 no ammonia-to-power technology



Ammonia-to-vessel: Snapshot

ENOVA

Is a Norwegian government agency promoting sustainable energy through soft funding.

Ammonia and Hydrogen program

Enova just launched (13/12/2023) a dedicated program to support ammonia (and hydrogen) technology on vessels. 2 applications rounds per year starting from March 2024 until 2026. (example timeline below)

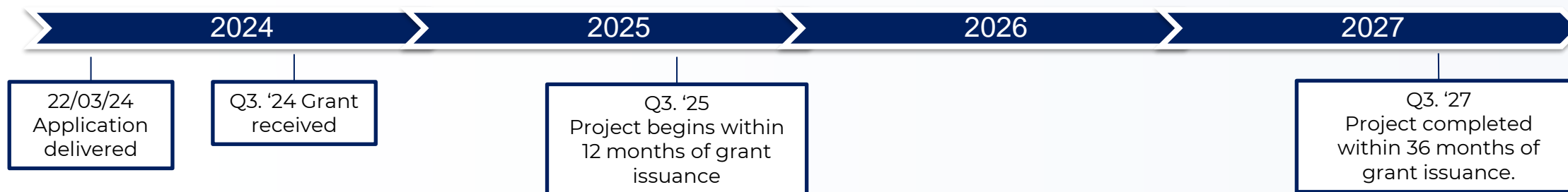
Note: Ammonia Infrastructure

Enova will also launch in 2024 a program dedicated to the Ammonia infrastructure for production, storage and distribution (Bunkering). Both program supporting one another.

HIGHLIGHTS OF THE PROGRAM

- This program targets ship owners, offering up to **80% soft funding for additional CAPEX-costs** when transitioning to ammonia and hydrogen technologies. (New build and retrofit)
- Include systems, batteries, integration, and yard, **up to 300M NOK (or 30M €) per project** for one or more vessels.
- Ship owners must be registered in Norway as a Norwegian company and must be under Norwegian flag.
- Evaluation criteria: **cost-effectiveness** (weighted at 70%) and **project maturity** (weighted at 30%)*.

*Cost-effectiveness being **support funds [NOK]/installed power of main engine(s)[kW]**.
Maturity being **Technology TRL, Comprehensive safety level, financial feasibility**.



EQUINOR dual fuel - AMMONIA New Build Offshore vessel tender

- **Issued:** 23 Jan 2024
- **Due date:** 26 April 2024
- **Commencement:** 2026-2027
- **Duration:** **10- or 15-years** firm + 5 x 1-year
- **Deck size:** Min 950m2
- **Fuel:** Dual fuel - MGO-Bio Diesel/Ammonia
- **Battery notation:** Battery/Shore- power
- **ENOVA:** Owner must apply for ENOVA "NH3 to vessel" grant
- **Evaluation Criteria:**
 - Cost and commercial aspects including offered rates
 - Fuel consumption and emissions
 - Technical solution
 - Health, Safety and Security (HSE), including human rights and cyber security
 - Execution plan and Organization of the work
 - Capacity and availability


equinor

PSV tender in market targeting ammonia fuel

- Intention is clear and aligned with strategy
 - Zero emission PSV fleet
- Ammonia as energy carrier – Technology open
 - Significant emission reduction
- Safety is a prerequisite
- Fit for purpose PSV
 - Breaking new ground on energy efficiency
- Sharing risk: 10/15-year term charter
- Enabler for kickstarting a maritime H2 value chain?

Equinor vil ha forsyningsskip med ammoniakk som drivstoff

Equinor inviterer offshoreleverandører til å gi tilbud på forsyningskip som går på ammoniakk. Det er i så fall snakk om nybygg.



Equinor har gått i beredskap med å satse på å utvikle en flåte av forsyningskip som går på ammoniakk i løpet av 2030-årene. Fått fra: Teknisk Ukeblad 5. feb 2024

* -Equinor with ammonia PSV tender* - Teknisk Ukeblad Feb 5, 2024



Our **Technology**

AMOGY

OUR TECHNOLOGY

Liquid Ammonia-to-Power Technology

Ammonia is an energy-dense, renewable fuel that's easy to store and transport as a liquid and leverages existing global infrastructure

AMOGY's technology unlocks ammonia's potential as a hydrogen carrier, providing high-efficiency conversion in a small package

The heart of Amogy's technology

Core chemical process

Amogy's best-in-class catalyst materials enable the cracking of ammonia into hydrogen and nitrogen at lower reaction temperatures with high durability, reducing heating and maintenance requirements

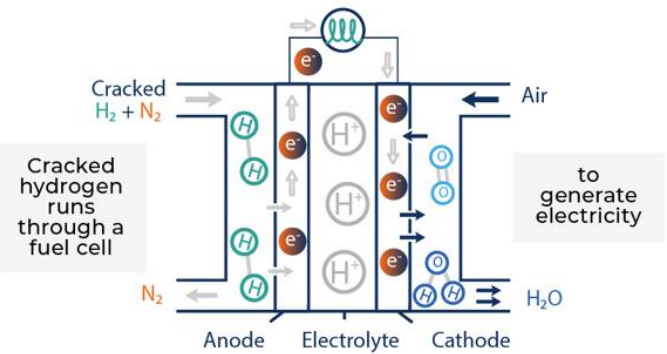
2 MECHANICAL POWER



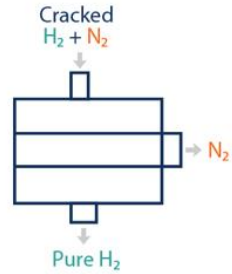
Cracked hydrogen is used to improve the combustion of ammonia in engines

CAN GENERATE

1 ELECTRICAL POWER



3 CHEMICAL POWER



Separating cracked nitrogen from the cracked hydrogen generates "pure" supply of hydrogen

Amogy Milestones



Drone

Jul 2021 | 5 kW | 38%



Tractor

May 2022 | 100 kW kW | 40%



Class 8 Truck

Jan 2023 | 300 kW kW | 40%



Workboat

2024



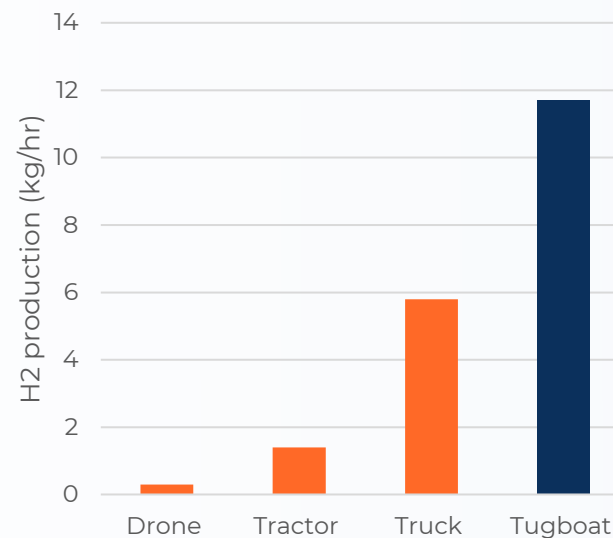
Maritime Demonstration: Tugboat

World's first carbon-free, ammonia-powered tugboat vessel

- Name: NH₃ Kraken
- Electrical power: powered by modular 200 kW Amogy system, automated control
- Vessel length: 100 ft
- Demonstration date: mid-2024



Further technology scale-up



Key learnings as the first customer

- ✓ User-friendly **integration** interface design
- ✓ System **marinization**
- ✓ **Safety** features
- ✓ Driving **regulatory** changes

- PRODUCT

Your Amogy Solution

Our technology converts ammonia into a clean energy source with zero emissions at the point of use.

AMOGY POWERPACK – 200 kW Ammonia-to-Power Module

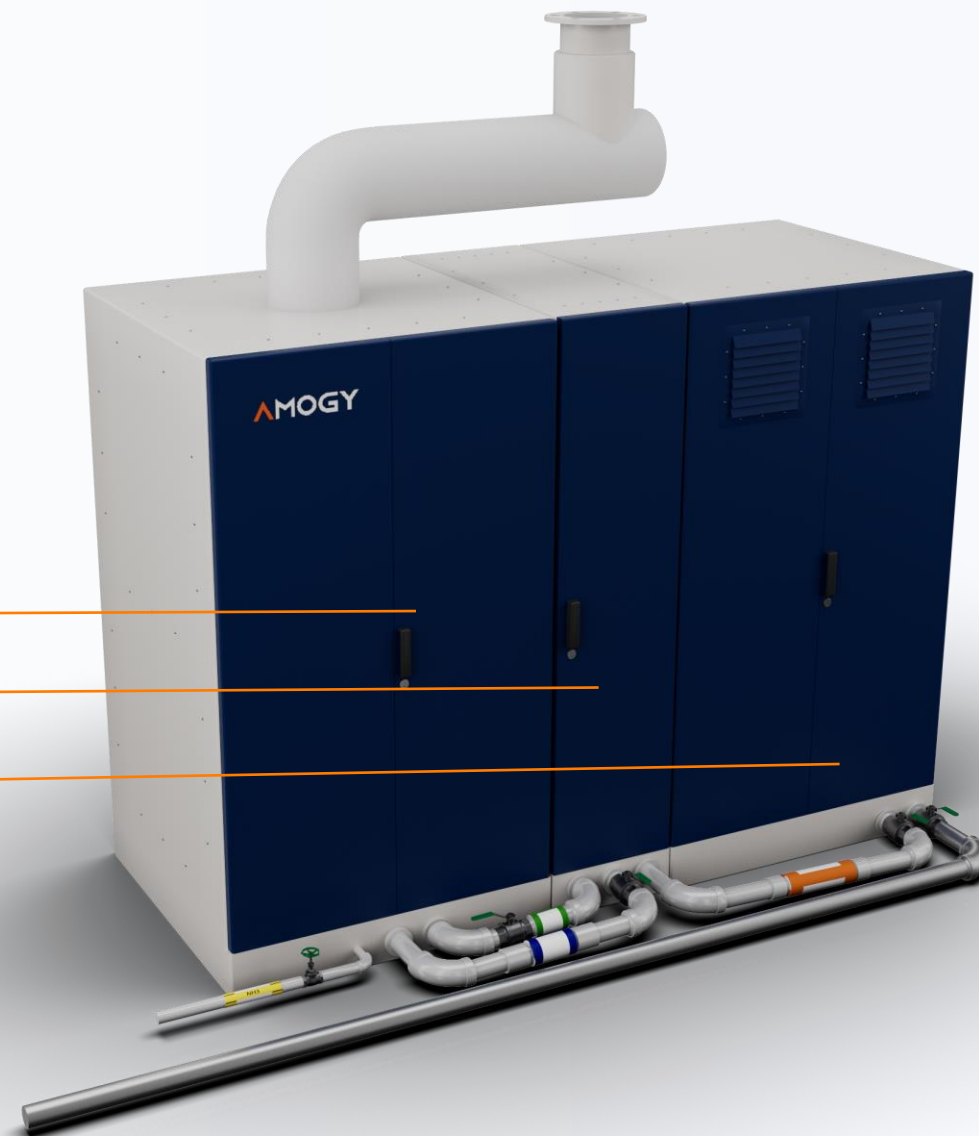


Engine rooms

REACTOR MODULE

ADSORBER MODULE

FUEL CELL MODULE



Download our [Technical Datasheet](#).

— FIRST PRODUCT

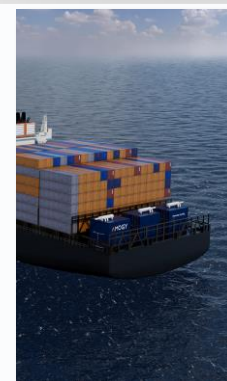
First Product: Powerpack

Complete ammonia-to-electrical power solution

- Modular, scalable 200 kW unit
- Containerized 400 kW option for on-deck/ outdoor installation
- Zero onsite CO₂ emissions

Download our [product datasheet](#).

COMPONENTS



— APPLICATION

VERSATILE APPLICATION

Maritime Shipping

- Propulsion: offshore supply, short-sea cargo, other hybrid vessels
- Auxiliary power: deep sea cargo, inland and bunker barges



Power Generation

- Shore power
- Remove EV charging
- Diesel generator displacement



Thank You

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VP Commercial



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[®] ***hyke***

DESIGNED AND MANUFACTURED IN NORWAY



POWERED BY  EKER GROUP

The Hyke logo, featuring the word "hyke" in a stylized, lowercase font with a registered trademark symbol.

THE STORY...

Most of the world's cities are located by rivers and coastlines. From the Seine in Paris to the Nile in Cairo, waterways have served as a vital medium for the transportation of goods, people, and livestock. Today, as cities grapple with increasing congestion and limited land availability, we at Hyke believe it is critical to shift more transport back to the water. Doing so will free up space on land and make waterfront locations more accessible to all.

The Eker Group logo, featuring a red square with a white stylized 'E' and the text "EKER GROUP" in a bold, sans-serif font.

**EVERYBODY
LOVES THE
WATERFRONT...**

...BUT HOW TO GET THERE?

The development around ports and waterfronts in cities worldwide has been impressive, but there's often a challenge to keep the infrastructure up to speed with the rest of the city.

As cities grow, there's a higher demand for housing and businesses near the water, transforming old industrial port areas into modern neighborhoods. However, this transformation exposes issues with outdated roads, public transportation, and connections that struggle to handle the increased activity.

One way to handle this development is to facilitate better transportation on canals and maritime areas. The integration of modern transport options, improved accessibility, and environmentally friendly infrastructure will be crucial to achieve a balance between urban development and maritime areas.



A COMPLETE WATERBORNE MOBILITY SOLUTION



All-electric vessels



Docking & charging stations



Smart navigation technology



Operator applications

DRIVING THE TRANSITION THROUGH DESIGN



Modular configuration

Our smart city ferries are multi-purpose for all applications. We offer lower- capacity vessels for flexible deployment and docking systems compatible with standard jetty modules for easy adoption.



Born electric

Our all-electric ferries feature automatic wireless charging, built-in solar, and an optional battery for efficient, zero-emission operation.



Smart solutions

Integrated sensor packs monitor the surroundings, enabling features like automatic docking and charging to increase operational efficiency and safety.



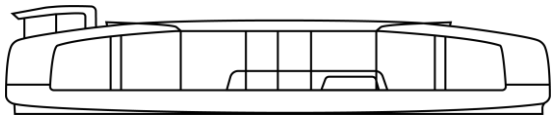
Accessibility for everyone

The ferry gangway has barrier-free access, providing a smooth boarding and disembarking experience for those with mobility aids or bicycles.



Designed for sustainability and scaling

Our electric ferries feature a standardized design that is ready for mass production, enabling consistency for urban areas to grow their network faster.





Take a Hyke!



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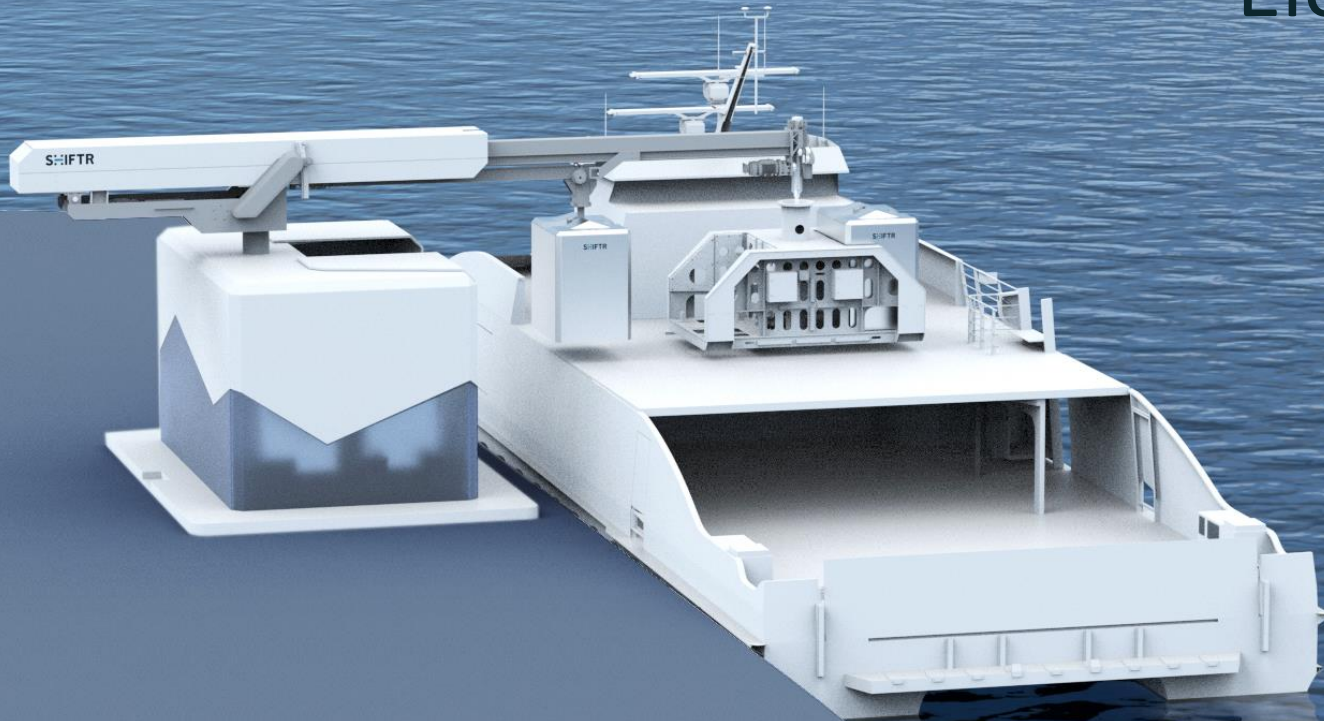
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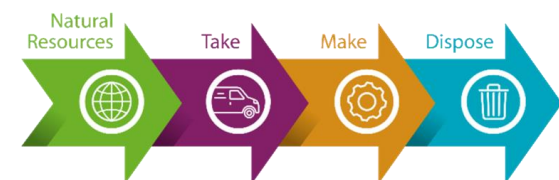
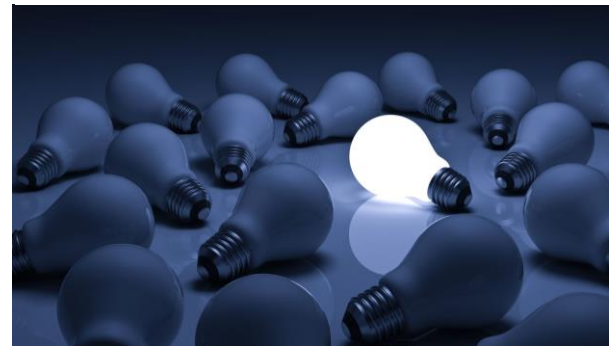
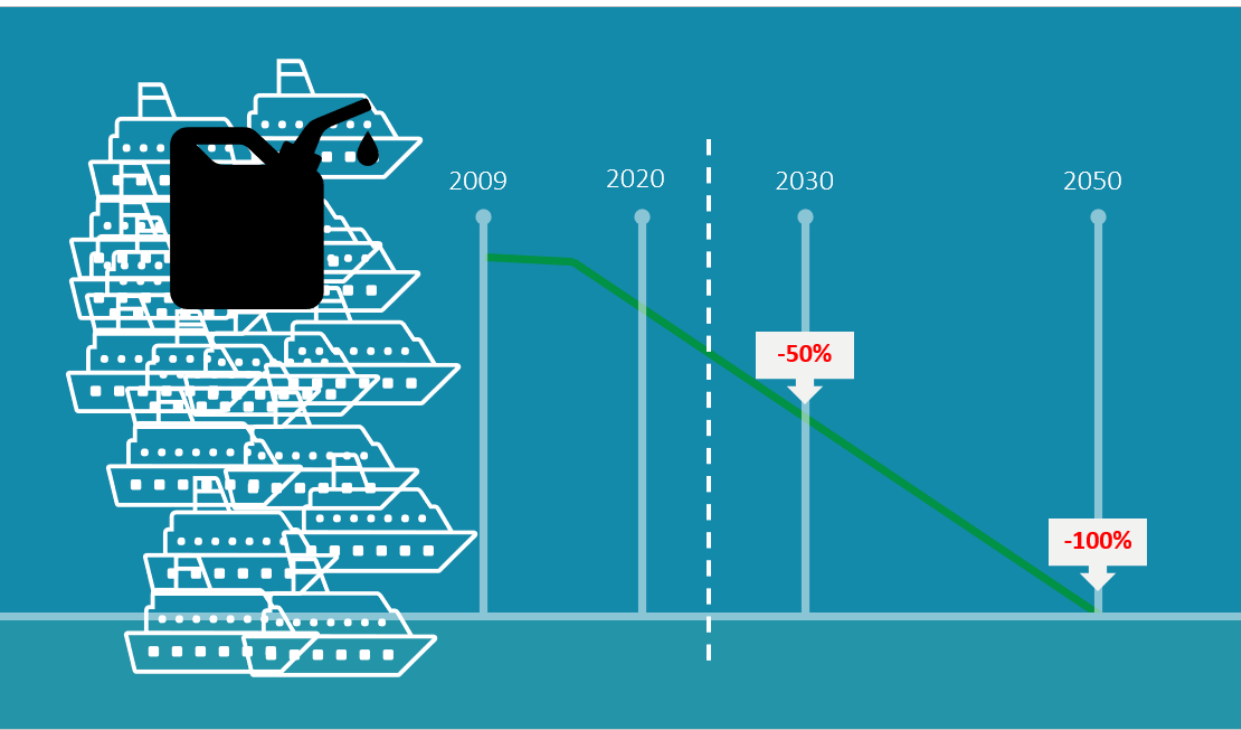
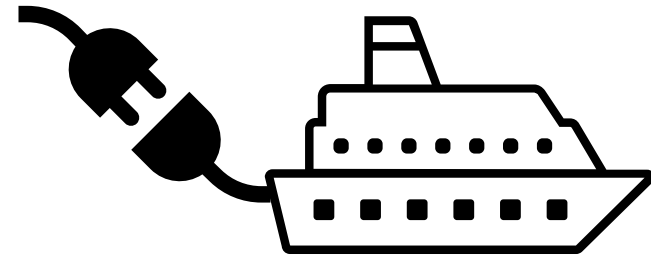
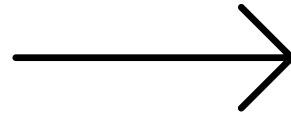


SHIFT R

Electrifying Waterways



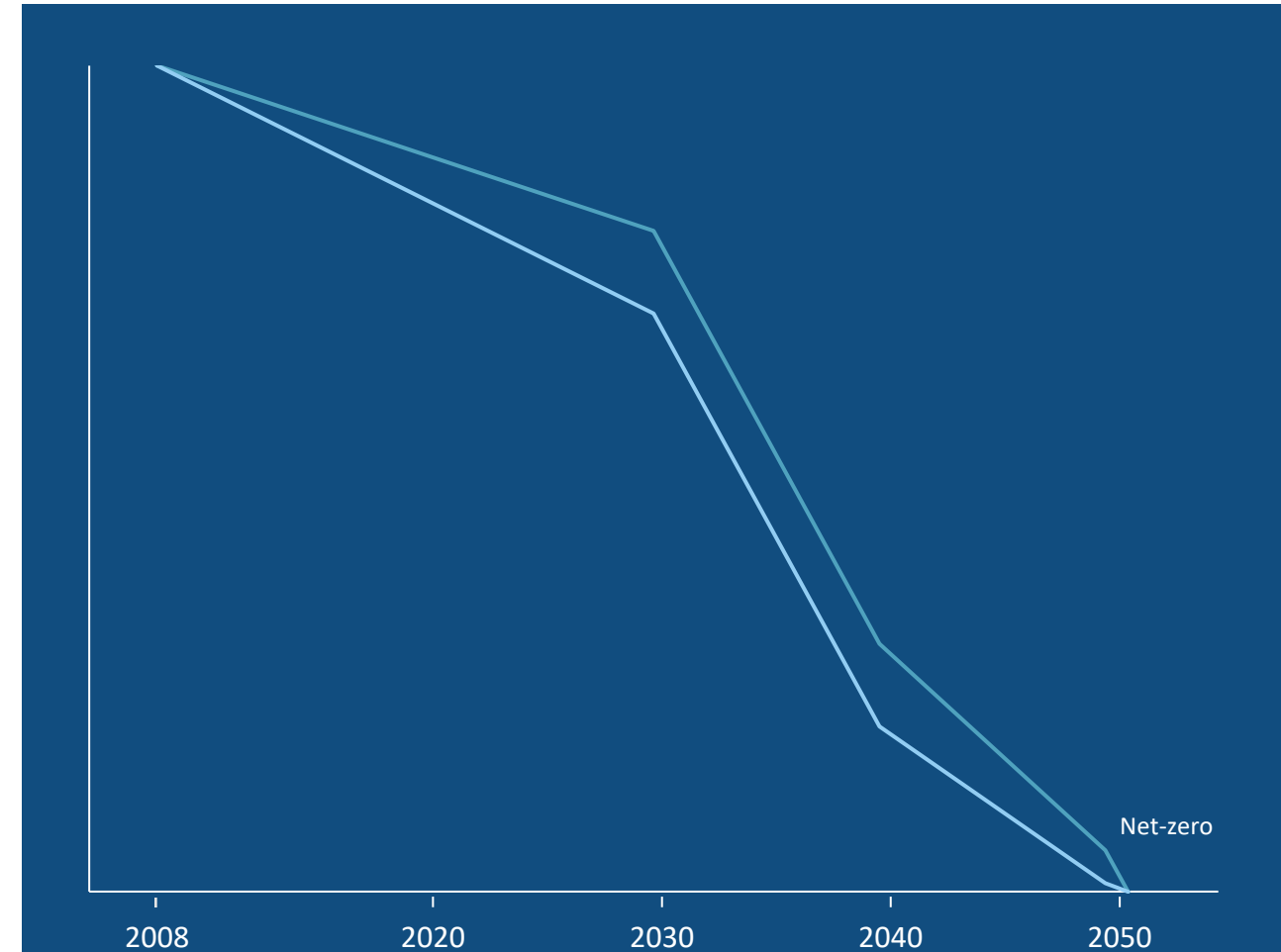
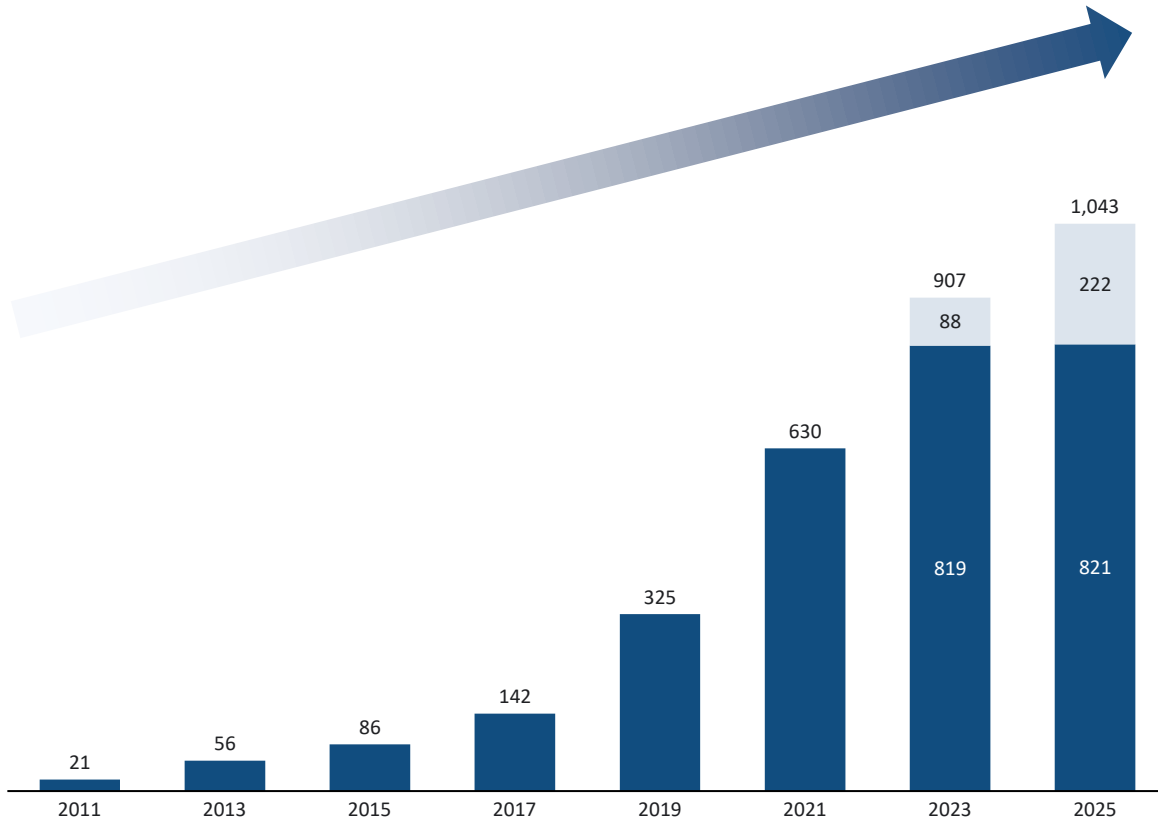
THE PROBLEM



VALUE PROPOSITION



RAPIDLY GROWING MARKET

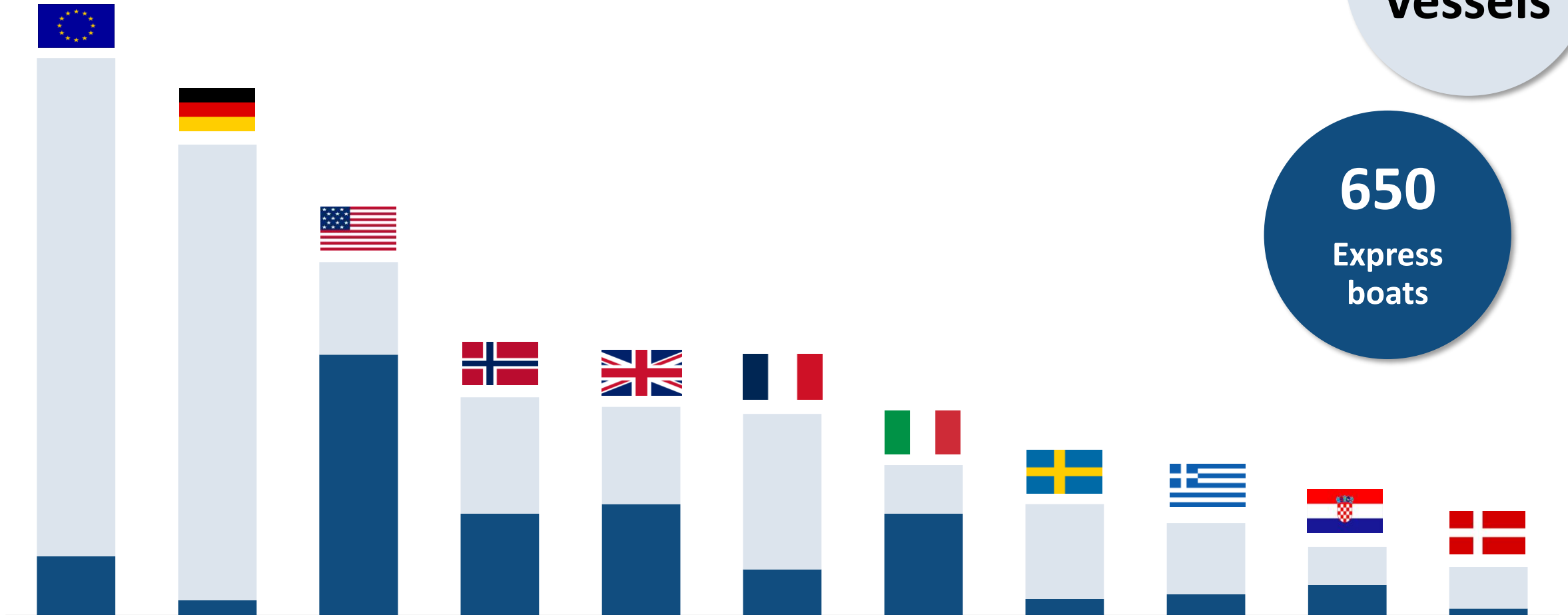


LARGE ADDRESSABLE MARKET

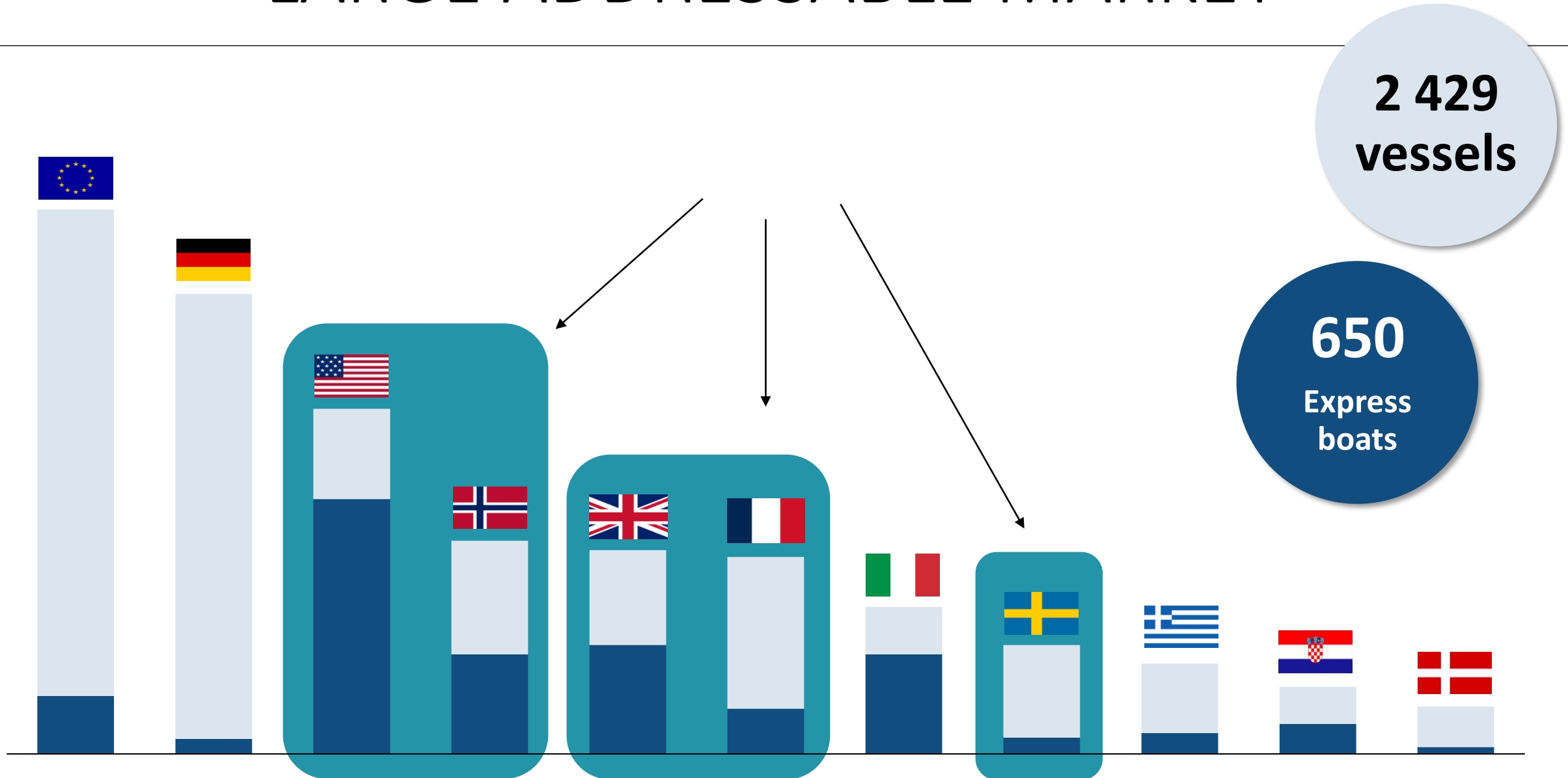
SIFTR

2 429
vessels

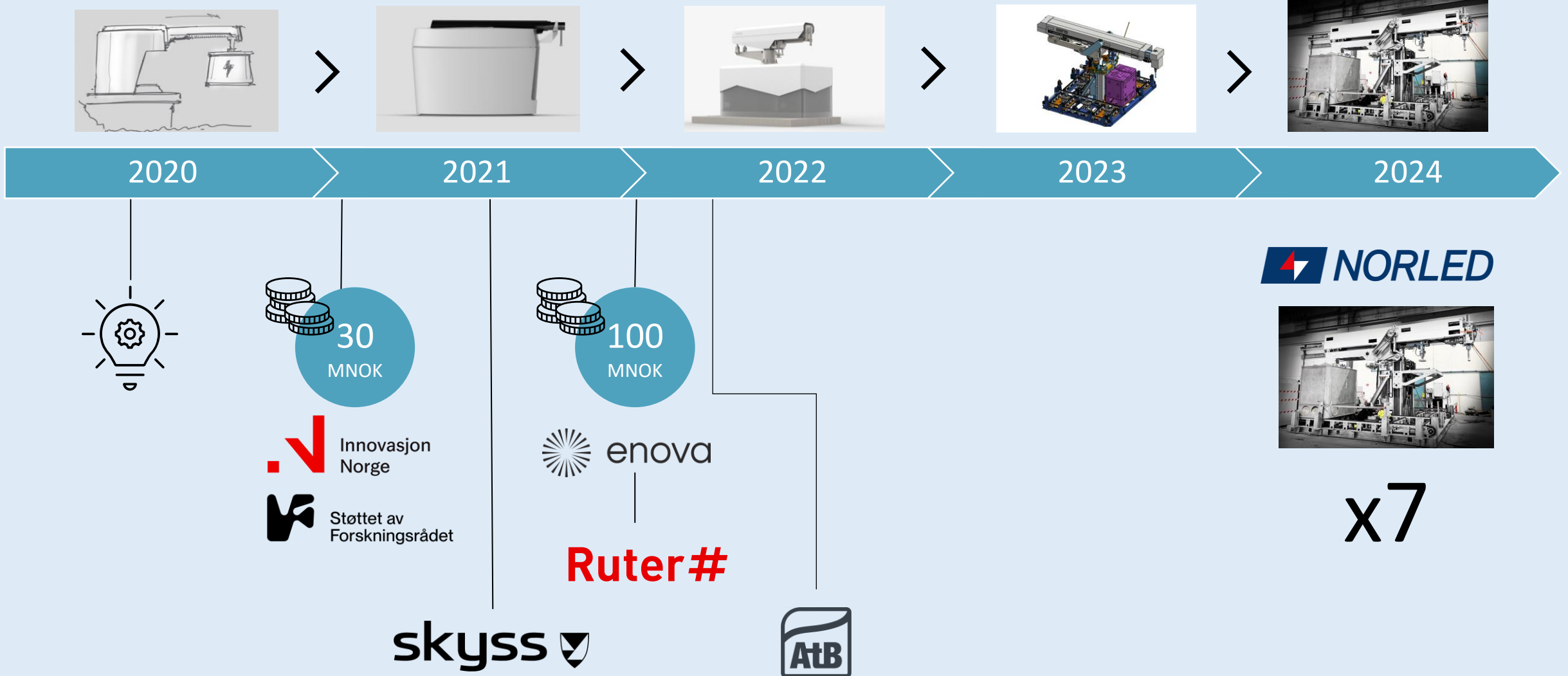
650
Express
boats



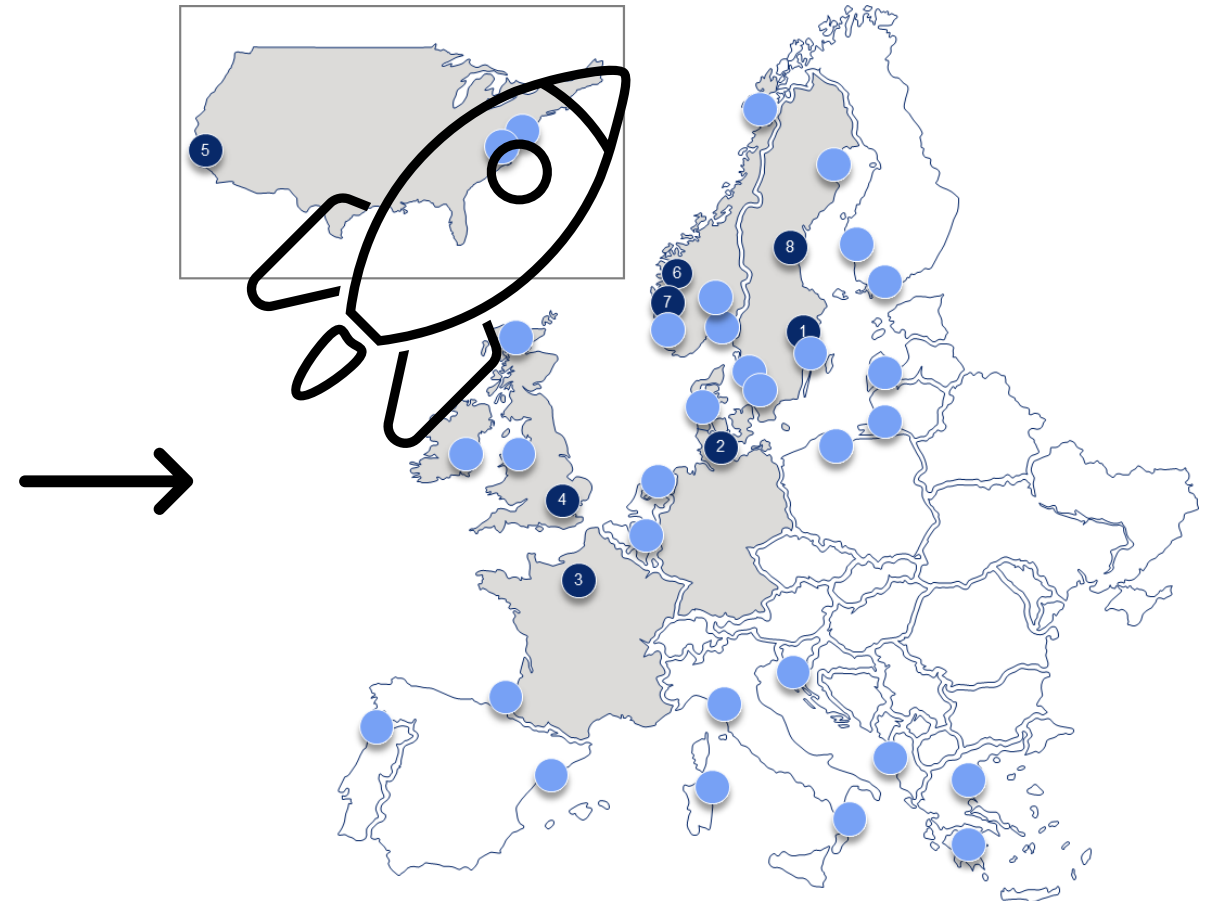
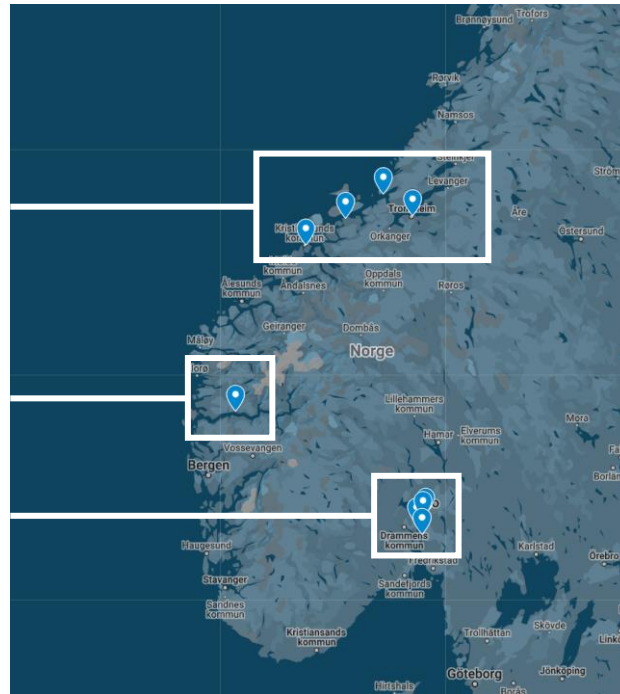
LARGE ADDRESSABLE MARKET



TIMELINE



MARKET ENTRY IN 2024



ROGALAND ENTRY IN 2027?

SIFTR



TEAM & PARTNERS

Co-founder

K. Adolfsson



Co-founder

Norled



Partner

SEAM



Partner

Aarbakke



GET IN TOUCH!

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