bound4blue®

CINEA Green Shipping Workshop

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ASPIRING WINGSAILS

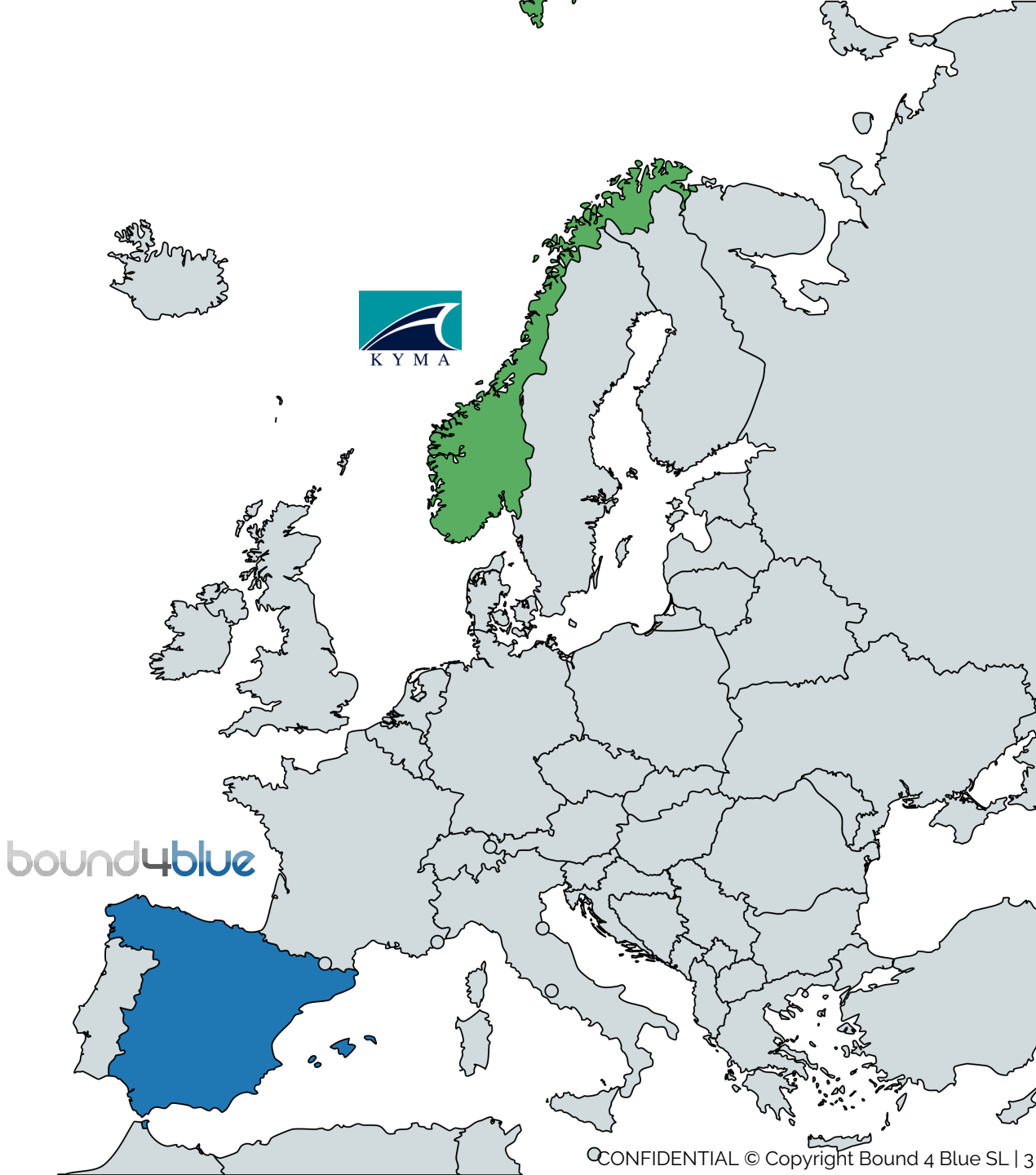
Co-funded by the European Union

Aspiring Wingsails – Project Overview

Project overview

ASPIRING WINGSAILS

- **Acronym**: ASPIRING WINGSAILS
- **Full title**: FULL-SCALE DEMONSTRATION OF AN ASPIRING WINGSAIL SOLUTION WHICH REDUCES FUEL USE AND POLLUTANT EMISSIONS IN MARITIME TRANSPORT THROUGH WIND ENERGY CO-PROPULSION
- **Coordinator**: Bound 4 Blue, S.L. (Spain)
- **Beneficiaries**: Kyma A/S (Norway)
- **Duration (start date/end date)**: 31 months (October 2019 – May 2022)



The problem and regulations and initiatives to help to solve it

The shipping and fishing industries need **technological innovation to achieve large reductions in global GHG emissions while reducing the economical impact**.

High fuel consumption

Fuel accounts between 30% and 60% of the vessels OPEX depending on fuel costs and vessels types and sizes, being the highest operating expense.

International environmental regulations

The IMO (International Maritime Organization) is setting environmental regulations that are forcing shipowners and ship operators to switch to alternative fuels, which are expected to cost 3 to 10 times more.

EU Initiatives

Fuel EU Maritime Initiative

Expected to stimulate the uptake of sustainable maritime fuels and zero-emission technologies

(adopted by the European Parliament during October 2022 plenary session in Strasbourg)

Objectives

MAIN OBJECTIVE

The specific objective of the project was to provide the fishing and the maritime sectors with a novel aspiring wingsail suitable for vessels which do not require a foldable solution while offering up to 30% savings in fuel use, reducing CAPEX (hardware costs) and making the solution accessible to more vessels.

SPECIFIC OBJECTIVES

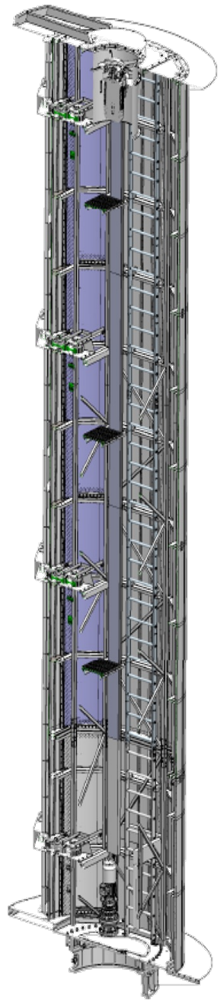
- Design of an up-scale, customised full-scale demonstration eSAIL system and its construction.
- Updated design and up-scale of the automated control system.
- Installation of the eSAIL on the fishing vessel.
- Demo/testing journeys.
- Turn-key solution standardisation.
- Internationalisation.

Consortium and tasks developed by each member

- Project promoter and coordinator
- eSAIL development and manufacturing
- eSAIL installation on the ship
- Performance evaluation

- Development of the fuel savings monitoring system
- Monitoring system installation
- Performance evaluation

Technology developed in the project → eSAIL®



eSAIL® constructive drawings & first real scale unit being manufactured

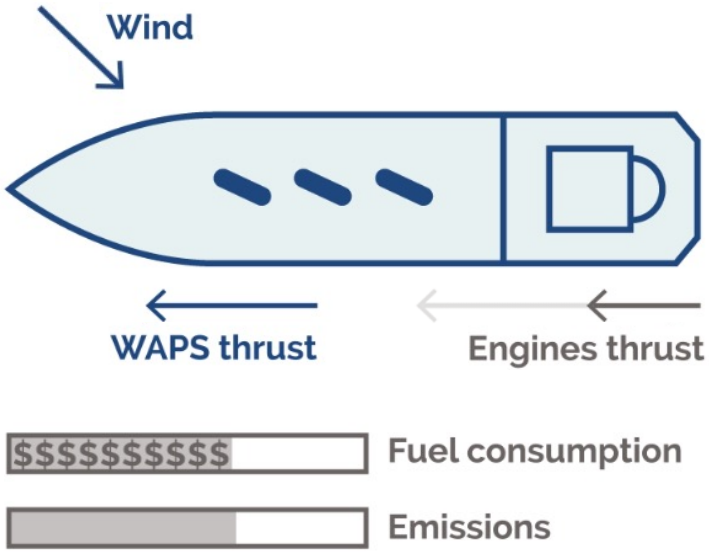
First eSAIL® unit ready for installation
(Left: our facilities in Spain / Right: Shipyard in Panama)

First 12-meter eSAIL® unit being installed at the shipyard
(Panama)

How the technology works

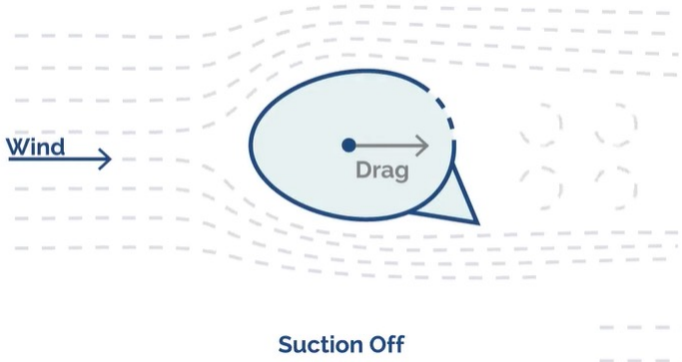
WAPS (Wind-assisted Propulsion System)

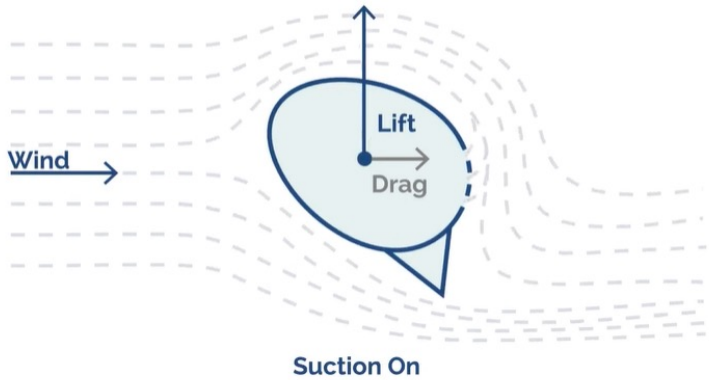
Wind propulsion creates a **propelling force** from the **available wind** lowering the required load on the main engine, which **reduces** its power requirements, its **fuel consumption** and its **pollutant emissions**.



eSAIL®

When the suction is activated, a small amount of air is sucked in, which re-adheres the airflow to the sail, generating **enormous amounts of lift with low drag** and **producing 6-7 times more lift than a conventional sail**, with minimal power consumption and no mechanical complexity.





eSAIL® competitive advantages

The **eSAIL® combines** the advantages of regular rigid sails and flettner rotors, avoiding its disadvantages, outstanding over both.

RIGID SAILS

- Large size
- Low lift coefficient
- High weight of system and foundations
- High impact on stability, visibility, lights, deck occupation, airdraft…
- Foldability mechanism required
- Mechanical complexity
- Higher CAPEX & OPEX

eSAIL®

- **Low power consumption**
- **Excellent capacity to sail up-wind**
- **Ease of operation**
- **Lower weight**
- **Higher savings**
- **Structural & Mechanical simplicity**
- **Negligible maintenance**
- **Lower OPEX**
- **Lower CAPEX**
- **Excellent Payback**

FLETTNER ROTORS

- High power consumption
- High drag coefficient
- Low capacity to sail upwind
- Constant rotation at high speed of a large structure
- Mechanical complexity
- High weight of system and foundations
- Higher CAPEX & OPEX

- **High lift coefficient**
- **Low impact on stability, visibility, lights, deck occupation, airdraft….**
- **Smaller size**

Our technology can be used with alternative fuels

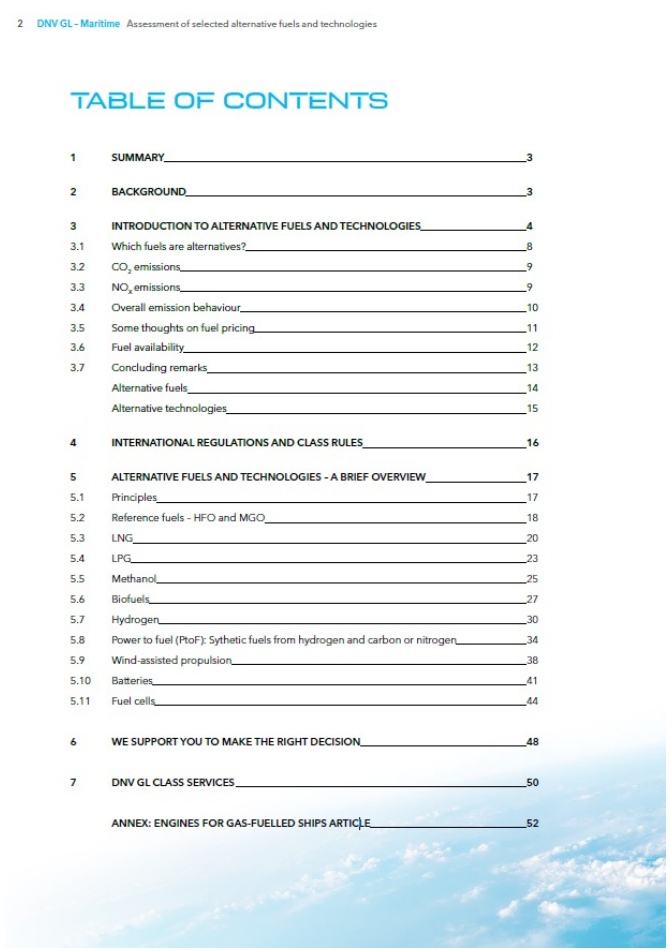

DNV·GL

MARITIME

ASSESSMENT OF SELECTED ALTERNATIVE FUELS AND TECHNOLOGIES

June 2019

SAFER, SMARTER, GREENER


2 DNV GL - Maritime Assessment of selected alternative fuels and technologies

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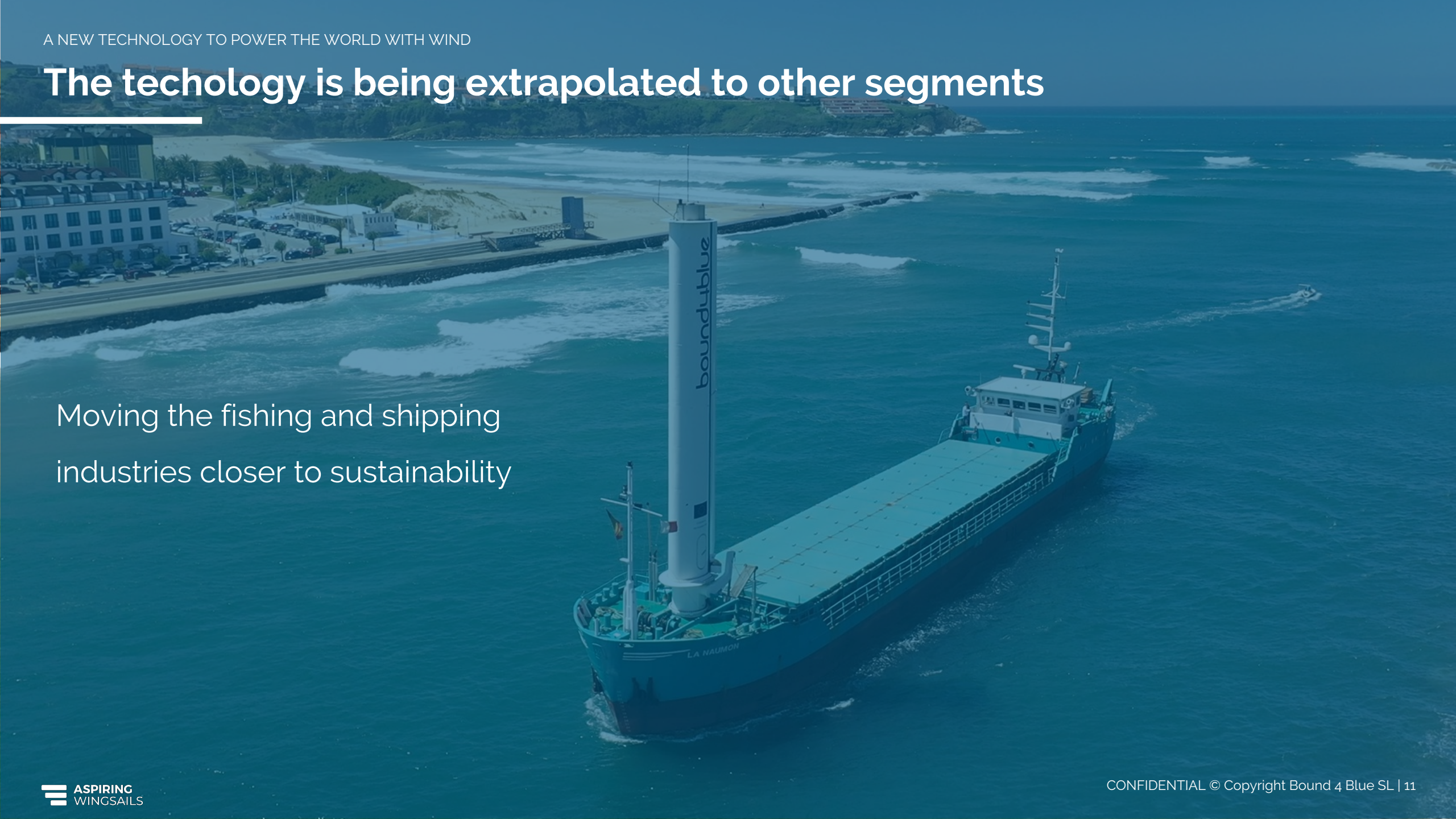
*"For thousands of years, wind was the primary energy source used to propel ships, apart from manpower. Today, wind-assisted propulsion is understood to be a **potential method of reducing the fossil-fuel-based energy consumption of ships**. Wind is an inexhaustible source of energy."*

DNV-GL

The techology is being extrapolated to other segments



Moving the fishing and shipping industries closer to sustainability

Installation #1

OPP 49
OR.PA.GU.
ORGANIZACIÓN DE PALANGREROS GUARDESES

Co-funded by
the European Union

SHIPOWNER: OR.PA.GU

Fishing Vessel

General Cargo

Ro-Ro & Ferry

Tanker

Bulker

Gas Carrier

ASPIRING
WINGSAILS

Installation #2

Co-funded by
the European Union

Fishing Vessel

General Cargo

Ro-Ro & Ferry

Tanker

Bulker

Gas Carrier

GENERAL CARGO SEGMENT

Installation #3

SHIPOWNER: Amasus Shipping

Fishing Vessel

General Cargo

Ro-Ro & Ferry

Tanker

Bulker

Gas Carrier

Installation #4

SHIPOWNER: Louis Dreyfus Armateurs

Fishing Vessel

General Cargo

Ro-Ro & Ferry

Tanker

Bulker

Gas Carrier

Installation #5

Marubeni

SHIPOWNER: Marubeni

Fishing Vessel	General Cargo	Ro-Ro & Ferry	Tanker	Bulker	Gas Carrier
					

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