
# MAS Regulatory Working Group Conference
20 January 2021

# Zulu Associates

**ZULU Associates** is active as an initiator, developer and operator of innovations in the marine component of logistic chains. Its goal is to enable **zero emission** operation of commercial vessels on short sea, coastal and inland waterways routes through **autonomous operation** and **alternative propulsion**.

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## Sustainability

### Facts and figures

**+1°C**

As of 2017 humans are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels.

**+20cm**

Sea levels have risen by about 20 cm (8 inches) since 1880 and are projected to rise another 30–122 cm (1 to 4 feet) by 2100.

**2050**

To limit warming to 1.5C, global net CO2 emissions must drop by 45% between 2010 and 2030, and reach net zero around 2050.

**1/3**

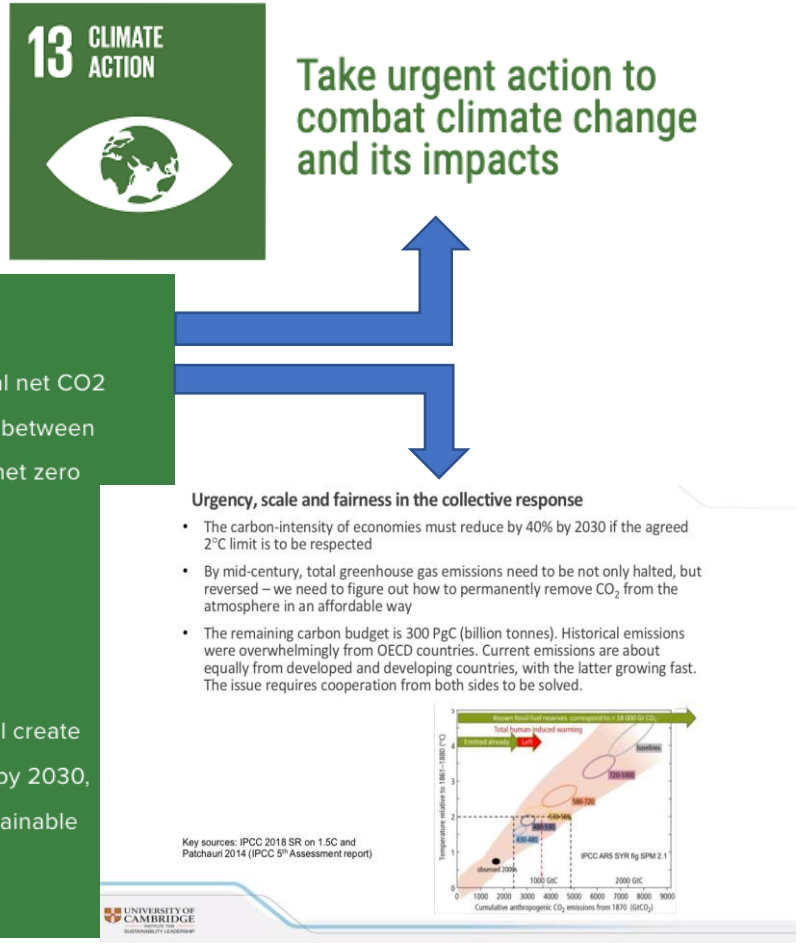
Climate pledges under The Paris Agreement cover only one third of the emissions reductions needed to keep the world below 2°C.

**$26 trillion**

Bold climate action could trigger at least US$26 trillion in economic benefits by 2030.

**18 million**

The energy sector alone will create around 18 million more jobs by 2030, focused specifically on sustainable energy.

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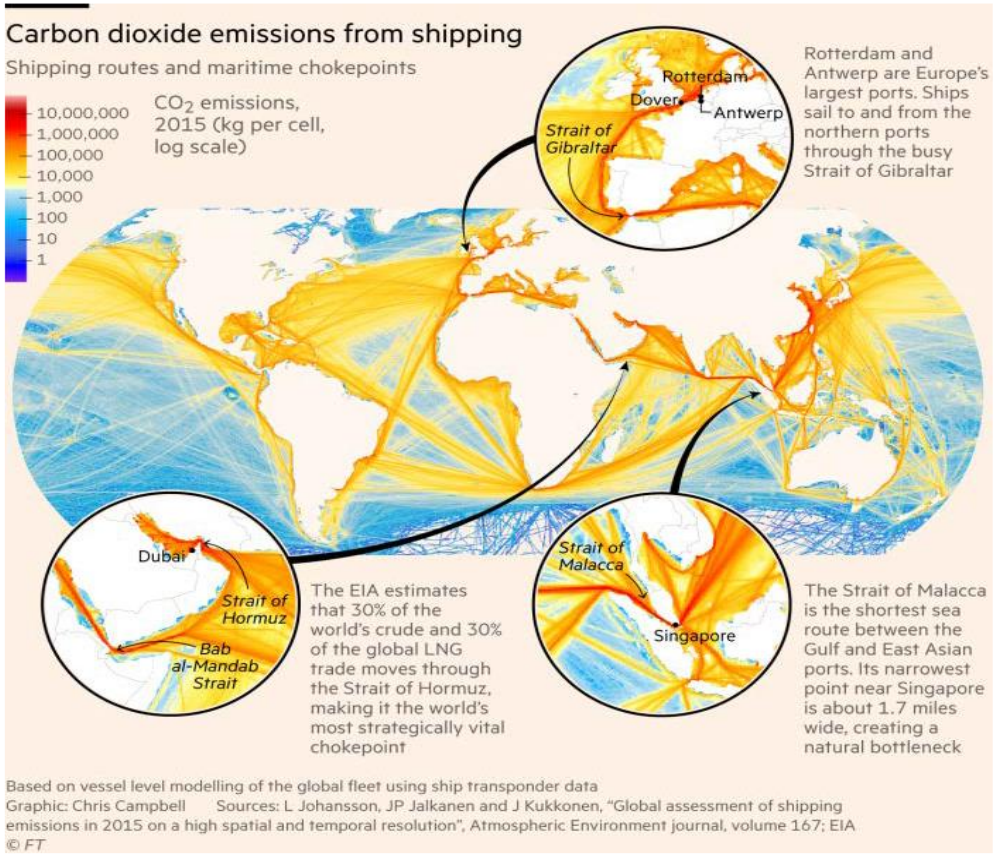
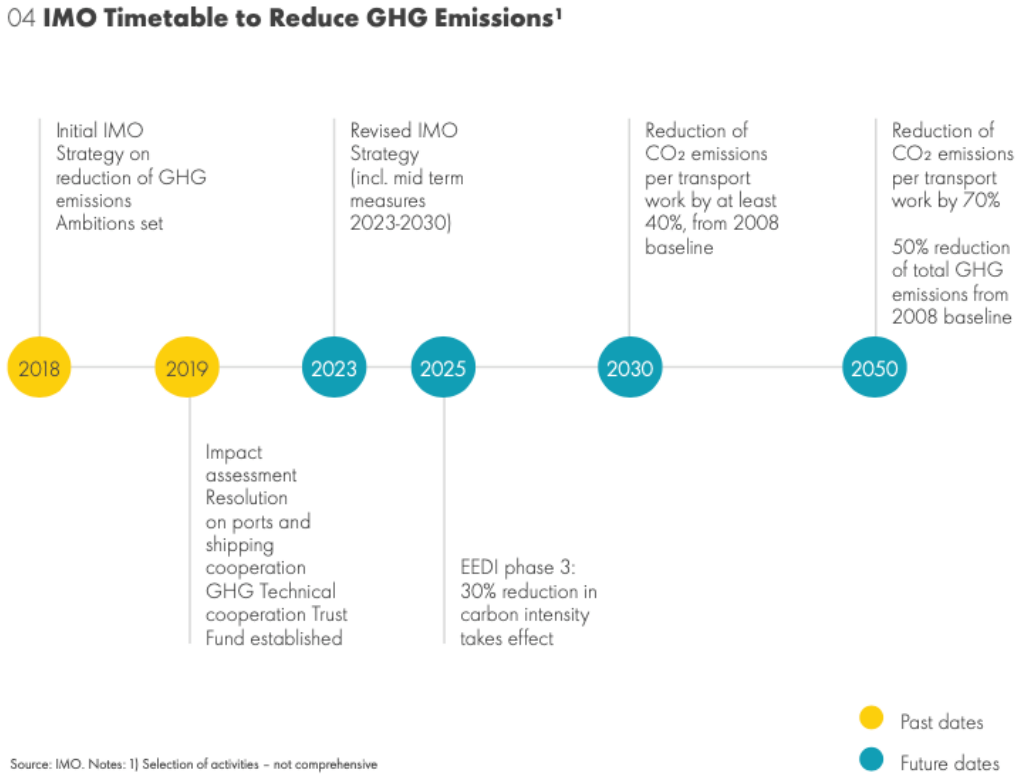
## Sustainability

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## Autonomous Operations

Autonomous operations enable major cost savings in the operation of vessels, in essence by:

- Lowers the cost of the crew (salaries, safety, food & beverage, accommodation, ...),
- Lowers insurance costs due to improvement of safety due to reduction of human error,
- Lowers energy costs (route planning, lower energy needs,…),

This in turn allows relatively smaller vessels to be competitive with larger manned vessels. This also opens the door to use more **sustainable propulsion systems** and thus to reach **increased sustainability**.

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## Definition of Autonomous operation

- Autonomous operation equipment on vessel for present waterway infrastructure.
- No crew on vessel during passage/transit.
- Remote Control Centres (RCC) in continuous contact for monitoring and control.
- Autonomous equipment capable of situational awareness and complexity analysis (levels).
- Situational awareness communicated from vessel to RCC.
- RCC intervention in steps pending on operational situation & needs for intervention.
- Fall back safety action.
- Data gathering and exchange with RCC and other vessels.

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## Economics of Autonomous operation

**Lower Investment**
- Accommodation
- Safety Systems

**Higher Investment**
- On board AI
- Sensors
- Redundancy
- Communication
- RCC

Margin for increased competitiveness vs crewed vessels & for alternative propulsion

**Lower Opex**
- Crew Costs
  - Wages
  - Personal Equipment
  - Catering
  - Safety Equipment
- Lower energy needs
- Increase Safety
- More efficient voyage planning

**Higher Opex**
- RCC costs
- Additional equipment maintenance
- Additional in-port supports
- Communication

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## Propulsion and on board energy provision

- Propulsion of the vessel by electric engines.
- Power generation through modular containerised system, allowing for simple “bunkering” or replacement for maintenance or repairs when in harbour.
- Modular system allows for transition to alternative propulsion without adaptations of vessels.
- Modular system can be provided by third party, allowing to pay for energy used rather than investment.
- Shore power when in harbour.
- Auxiliary propulsion: wind and foils, when possible.

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## Business case: Replacement segment

Retrofitting or updating existing vessels to be autonomous and sustainable is economically and technically unviable, because of:

- Costs involved in creating digital twin for autonomous operation of each vessel;
- Retrofits need each time to be made to measure as each vessel is different;
- The hull will not be optimised for propulsion efficiency;
- The unused crew accommodation, hotel systems and associated SOLAS/MARPOL requirements remain part of the vessel after the retrofit.

New design : ZULU MASS and X -Barge

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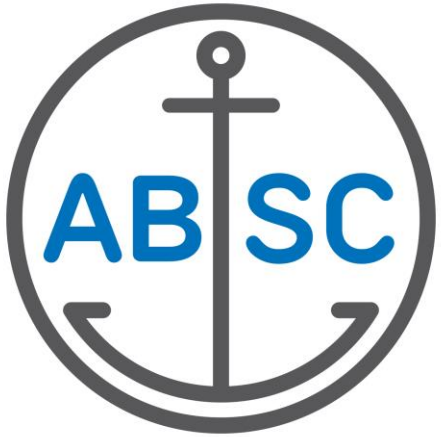
## Anglo Belgian Shipping Company




ZULU MASS

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# Anglo Belgian Shipping Company

## Overview

- ZULU MASS : a new 3.500t (180 container) Marine Autonomous Ship System, to provide a short sea platform initially for container direct and feeder flows and able to operate on River-Sea flows.

- ZULU MASS is designed for:
  - standardised and assembly line production;
  - modular in equipment to allow ease of maintenance and technical through life maintenance and upgrading;
  - modular and exchangeable energy provision systems;
  - hull design and routing to be energy efficient;
  - digitally connected;
  - cradle to cradle.

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# Anglo Belgian Shipping Company

## Market Segments

- River Sea market segment flows*
  - Transfer existing flows from major RORO hubs to smaller (inland) ports = more efficient total logistic chain.
    - Shorter transits on land;
    - Direct connections onto Inland Waterways by ZULU MASS operations;
    - Less road freight used;
    - Less congestion on roads and at major ports.
- Replacement market segment**
  - Replace vessels in the existing coaster segment fleet of almost 10,000 vessels.
    - Many ships are outdated both technically and in terms of performance;
    - An existing urgent need for fleet renewal or costly refurbishment programmes driven by higher expectations from transport customers and tougher regulations such as IMO 2020 emissions targets;
    - Estimated replacement fleet market of 2.000+ vessels.

*https://inland-navigation-market.org/chapitre/2-river-sea-transport-in-europe-the-case-of-seagoing-ships-navigating-on-inland-waterways/?lang=en

** https://www.dnvgl.com/expert-story/maritime-impact/Next-Generation-coasters.html

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# Anglo Belgian Shipping Company

## Specifications ZULU MASS

- Length Overall 95.0 metres
- Draft mid. 5.5 metres
- Beam mid. 15.0 metres

- Air draft limit (Assumed) 9.10 metres (ab. WL)
- Service Speed 10.5 knots (85% MCR)
- TEU Capacity 180 (varies with air draft)
- GWT 3.500 t

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# Anglo Belgian Shipping Company

## Building process

- Market segment is estimated at 2,000+ units to be built.
- Time frame for deployment is 10/15 years due to Green deal initiative.
- No single shipyard is capable to fulfil this production within set timeline under present work practices.
- Design of new production process and practices with
  - Maximum standardisation
  - Assembly line production
- Cost savings through standardisation and quantities.
- Co-operation with existing shipyards.

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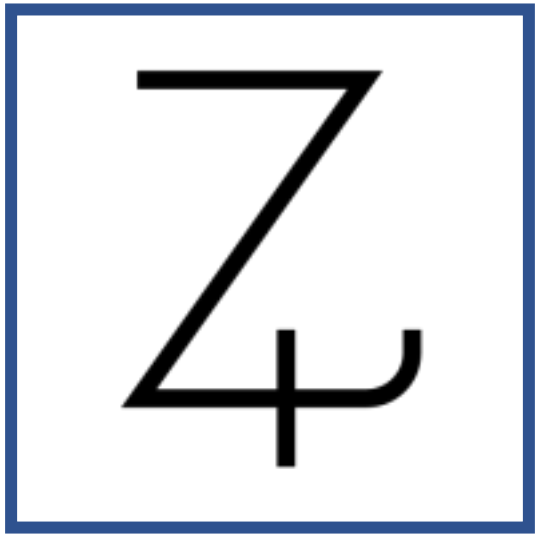
## ZULU Inland Navigation Company



X-Barge

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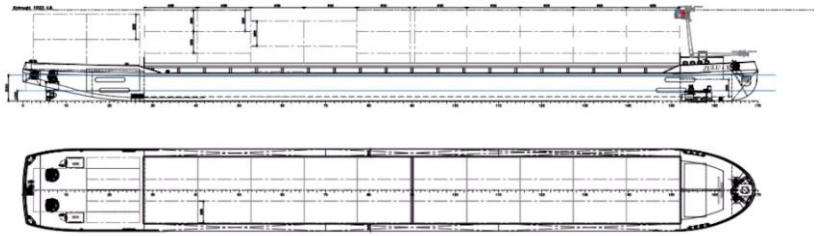
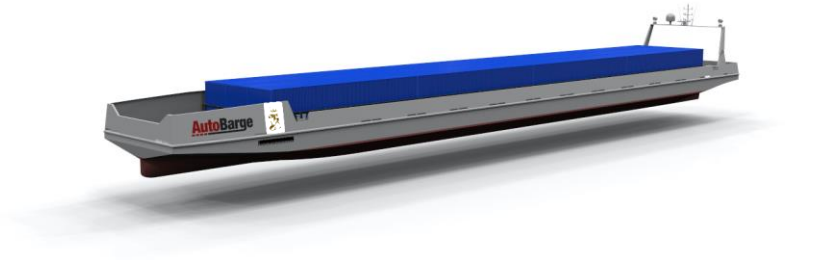
# ZULU Inland Navigation Company

## Overview

- X-Barge: a new 1.500t (80 container) inland barge, to provide a inland waterway platform initially for container and bulk flows.



- X-Barge is designed to be:
  - standardised and assembly line production;
  - modular in equipment to allow ease of maintenance and technical through life maintenance and upgrading;
  - Modular and exchangeable energy provision systems
  - hull design and routing to be energy efficient;
  - digitally connected;
  - cradle to cradle.

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# ZULU Inland Navigation Company

## Market Segments

Replacement market segment:

- Replace vessels in the existing dry bulk and container inland waterway fleet of almost 10,000 vessels.
  - Many ships are outdated both technically and in terms of performance;
  - Euro stage 2 diesels are less sustainable than Euro stage 6 diesel truck;
  - An existing urgent need for fleet renewal or costly refurbishment programmes driven by higher expectations from transport customers and tougher regulations such as Euro Green Deal emissions targets;
  - Estimated replacement fleet market of 2,000+ vessels.

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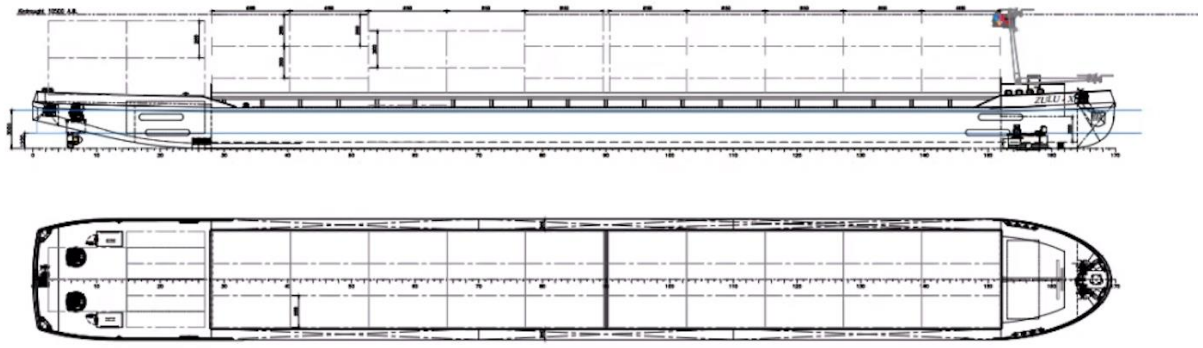
# ZULU Inland Navigation Company

## Specifications X-Barge

- Length Overall 85.0 metres
- Draft mid. 2.5 metres
- Beam mid. 8.9 metres

- Air draft limit (Assumed) 4.50 metres (ab. WL)
- Service Speed 8.0 knots (85% MCR)
- TEU Capacity 80 (varies with air draft)
- GWT 1.500 t



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