B9 Shipping®

TAKING A NEW TACK

FLAGSHIPS OF OUR FUTURE

B9 Energy Group

- Environmental Entrepreneurs active in Project Development, Design, Funding, Build, Own, Operation & Maintenance of…
- Onshore windfarms – largest independent operator in the UK and Ireland
- Anaerobic Digestion
- Energy Storage
- Offshore wind
- Fossil fuel free merchant ships

SHIPPING

Hidden Offshore

Shipping sector accounts for global GHG emissions +/- 4% ...and rising

IMO, charged with reducing emissions at Kyoto, has introduced EEDI which ...excludes small ships.

Small ships <10 000 dwt move 4% total cargo and emit 26% emissions

1% global GHG emissions

Need systems approach to tackle the complexities

Fine opportunity to showcase sustainable transport in South Pacific

Data sources :Clarksons, Lloyds Register & IMO GHG Report. Analysed by UCL Energy Institute

Ships are complex systems

Operating within the interconnected global shipping fleet

which in turn is the

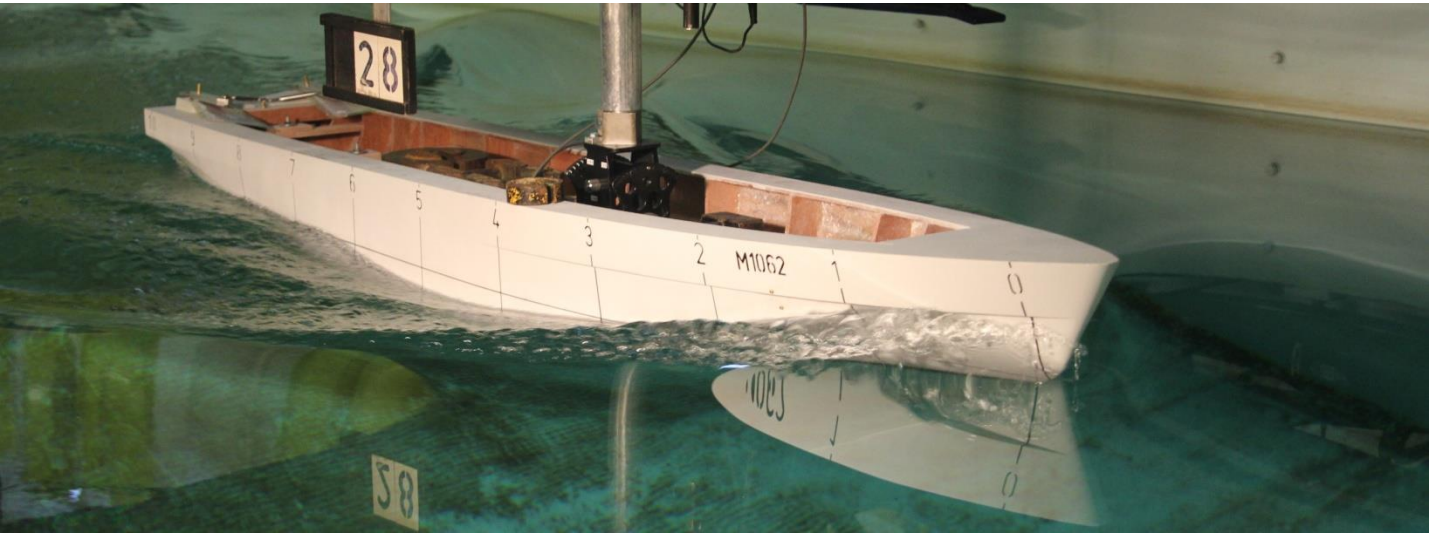
Lifeblood of the global economy

But the global economy and the global environment is behaving

unpredictably

we must

design for resilience



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TAKING A NEW TACK

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THE CONCEPT

100% fossil fuel free, proven technologies – technically commercially viable future proof

Demonstrating design efficiency, vessel manageability

1 small woman uses technology to beat a fleet of brawny men around the world – brain power not fossil power

Humphreys Yacht Design and WUMTIA

Dame Ellen McArthur – Vendee Globe – technology transfer

Sailing – 'Aviva' and skipper Dee Caffari (UK) round the Cape of Good Hope and begin the Atlantic homeward stretch to become the first woman to sail solo and non-stop around the world against prevailing winds and currents. 3rd of April 2006 – Royalty free for PR use
Photo: Peter L. Goldman / DPPI / AVIVA CHALLENGE

Demonstrating :
robust & straightforward design ,
identical and efficient build at multiple shipyards

1 million sea miles
300 000 in Southern Ocean
– no material failures

Humphreys Yacht Design and WUMTIA

Global Challenge & 'wrong way' circumnavigation world record

The sailing rig demonstrated by the Maltese Falcon

In first 12 months of operation.....

- Sailed 23,310 NM
- 12 179 sail sets
- Crossed Atlantic

- 24.9 kts top speed
- 381nm in 24h x2
- 61% use of sails

no major breakdowns

Engine Powered by natural gas

Rolls-Royce

- CO_2 emission reduced by 23%
- NOx by 90 %
- SOx emissions resolved

Currently operating in 22 vessels worldwide

B9 organic energy®
SUSTAINABLE, NATURAL POWER.

Making bio-gas from food waste

Anaerobic Digestion

Virtual bio-methane supply chain - injects bio-methane into natural gas grid network to improve economic and environmental efficiency. The bio-methane B9 Organic puts in the grid is matched by the LNG B9 Shipping takes out to use in ships – green gas

Bunker LNG to B9 Ships = X kWhrs

LNG

LNG Dispenser

LNG Terminal

Methane Injection to grid

Methane compression plant

LNG Evaporation plant

LNG Storage Tanks

Natural Gas Network

Energy Input Avoided

LNG

AD Plant

Bio-Gas

Bio-Gas Upgrade plant

Bio-Methane

Bio-Methane compression plant

Suezmax Gas Tanker (LNG)

Food Waste

Injection to grid = X kWhrs

Cargo LNG from Qatar etc

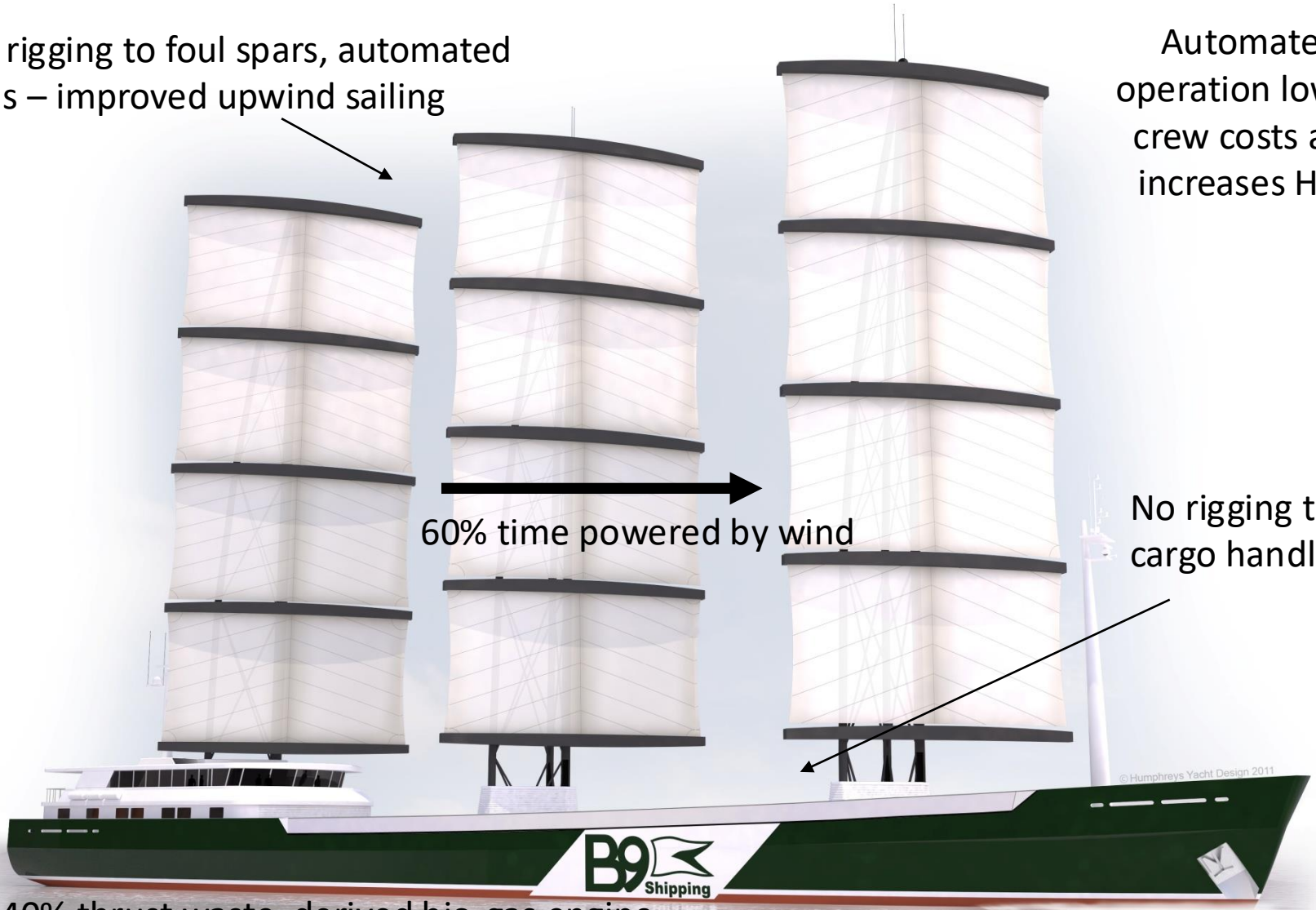
Bio-methane liquefaction avoided

No rigging to foul spars, automated sails – improved upwind sailing

Automated operation lowers crew costs and increases H&S

60% time powered by wind

No rigging to foul cargo handling



40% thrust waste derived bio-gas engine

Dry Bulk

Chemicals

Passenger / cruise

MAKING IT WORK

Collaboratively

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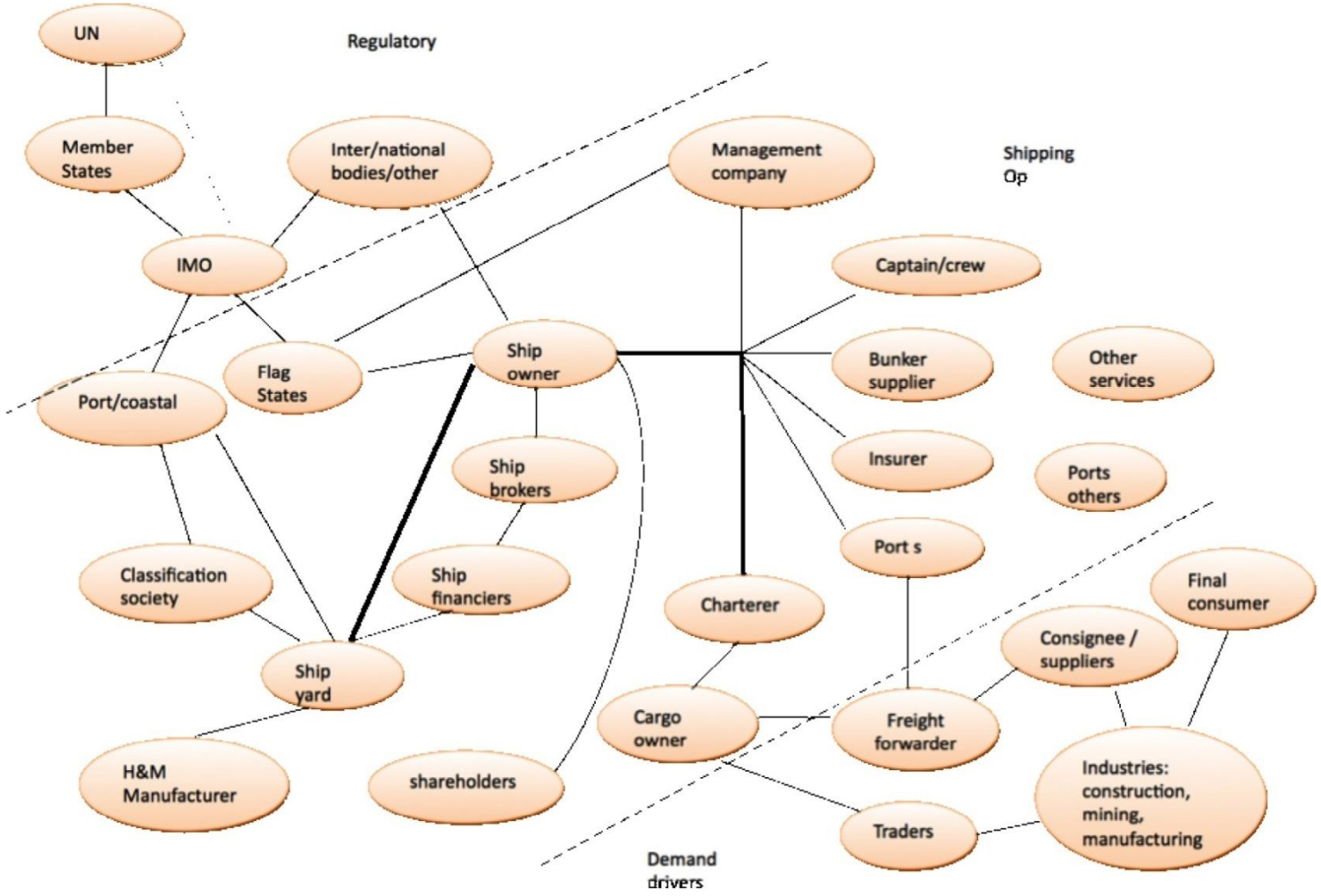
Complex Industry Eco-Systems




BRITISH SHIPPING
SEAaT
Shipping Emissions Abatement and Trading
WOLFSON UNIT
FOR MARINE TECHNOLOGY & INDUSTRIAL AERODYNAMICS
Rolls-Royce
tomorrow's company
forum for the future
action for a sustainable world
HUMPHREYS
YACHT DESIGN
UCL
group partners
GORDON MURRAY DESIGN
P&O Ferries
B9 Shipping
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B9 organic energy
SUSTAINABLE, NATURAL POWER.
Collaborative Network
GRAIG
Lloyd's Register
PE Pallion Shipyard
GIBSON
SHIPPING ENERGY
harland and wolff
BDO
holman fenwick willan
hfw
MAERSK
WINDSTAR CRUISES
180° FROM ORDINARY
Met Office

MAKING IT REAL

Collaboratively

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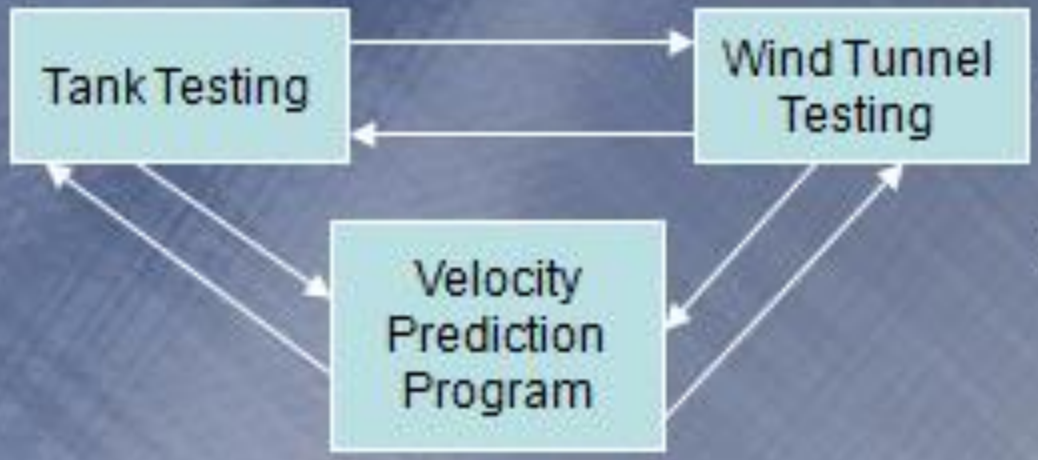
Wind Tunnel & Tank Testing

To achieve the best possible sailing performance, optimising the interaction between the hull and the rig is key. The rig has to generate enough power to overcome the resistance of the hull, but the hull also has to provide the grip in the water, to stop the ship slipping sideways due to the sail forces.

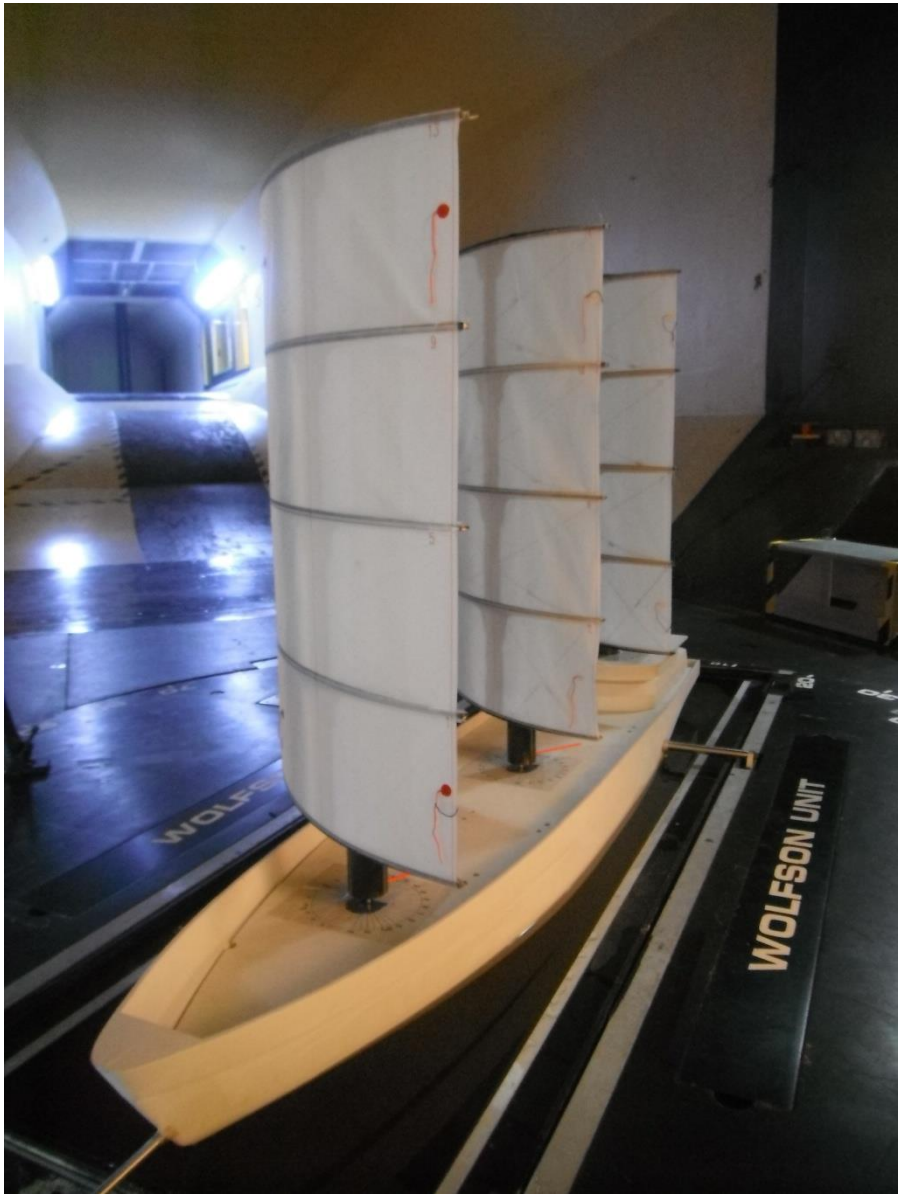


The information from both the tank testing and the wind tunnel testing is used within a Velocity Prediction Program for the ship, which estimates the sailing performance of the vessel given a variety of wind strengths.

The more these three methods are used in conjunction, the more performance of the ship can be improved and optimised.

University of Southampton
School of Engineering Sciences

WOLFSON UNIT
FOR MARINE TECHNOLOGY & INDUSTRIAL AERODYNAMICS



In the wind tunnel

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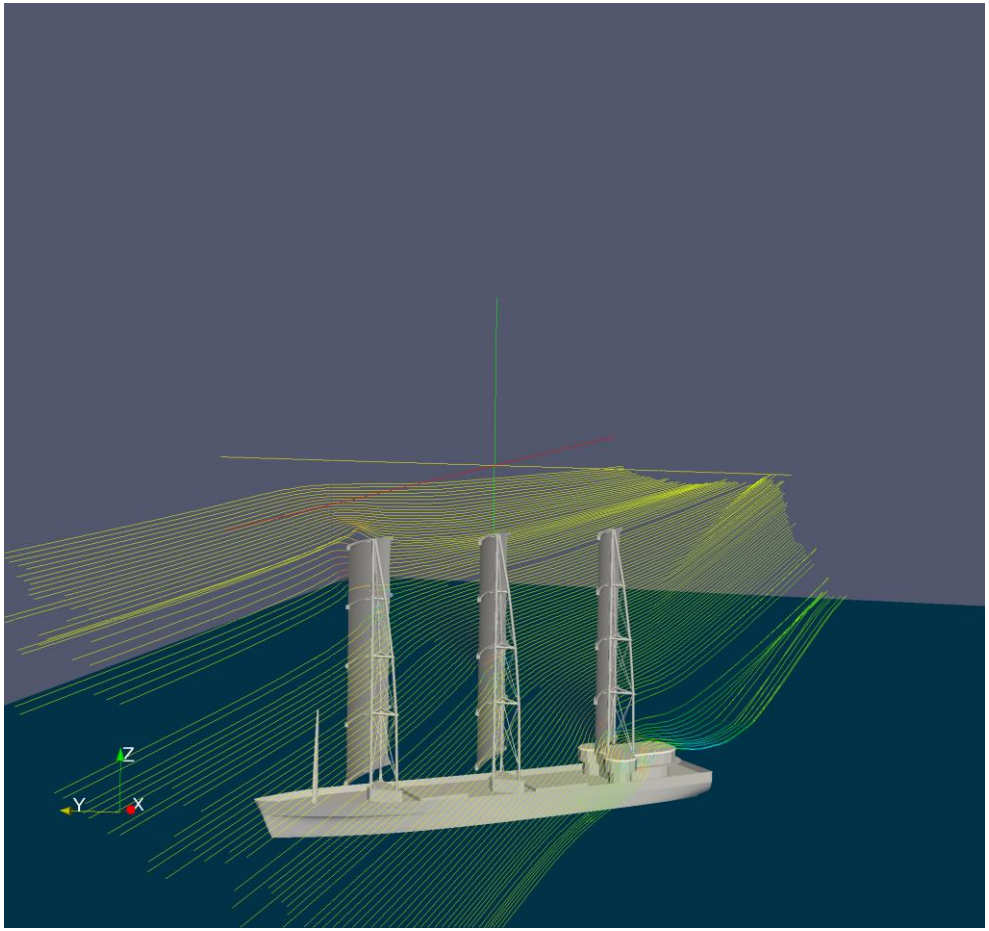

Test Programme

- fundamental performance data
- accurate emissions reduction predictions
- weather routing software in development
- economic ‘what if’ analyses
- commercial viability
- stakeholder comfort

Case Study

- Route analysis
- Tonnages
- Schedules

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A premium of 25% on new-building prices is commercially viable...

We have been witnesses to a lot of debate and speculations regarding the commercial viability and attractiveness of ECO ships and fears of a two tier market reflecting ship energy efficiency. ….

Chief Shipping Analyst at BIMCO, Peter Sand, says: "Our calculations show that, should you choose to invest in an ECO MR2-tanker, you could pay up to 25% more for your vessel before settling for a non-ECO MR2-tanker". BIMCO has been looking at the basic economics of this development and can conclude that a fairly large premium can be paid on newbuildings to operate ECO ships instead of traditional ships.

Dr. Uwe-Carsten Wiebers, Head of Ship Finance,
KfW IPEX-Bank GmbH

"Funding and operating "green" ships which can be used worldwide without restrictions is a very important task for bankers and shipowners today, as the internationally applicable environmental regulations for the shipbuilding and shipping industry have become more and more stringent in recent years."

Bunker prices more or less doubled – strong focus on 'eco-ships'
DNV Bulk Carrier Update

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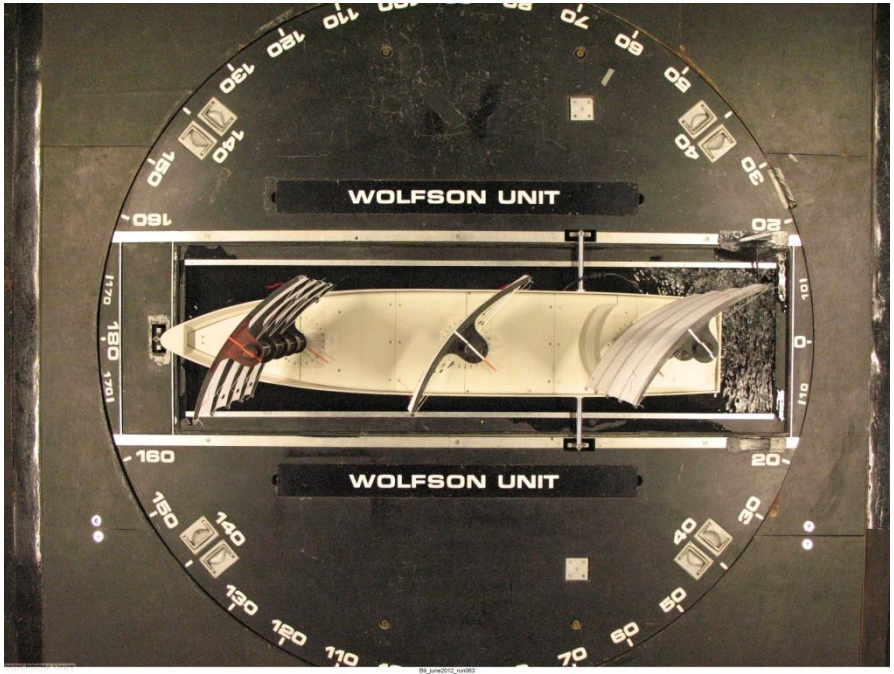
Work Packages 2013 – Charting our Course

Technical – mast, hull/appendages/loading discharge

Manufacture – small scale, local ship building

Commercial – global demand / financial engineering – long term value of predictable renewable propulsion v through life vessel costs

Political – fiscal incentives, parity with land based transport systems



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South Pacific
the showcase renewable shipping

- A global proving ground for small ship solutions
- Develop an integrated fleet to service small islands as a microcosm of global fleet
- Demonstrate the feasibility of commercially deploying renewables at sea

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THANK YOU

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