

# PARIS AGREEMENT

1 5 °C

“All ships designed and built today  
must operate in a net zero emissions  
world at the end of their service life”



# Challenges Facing Shipping



Regulation & Compliance Costs (SOx, EEDI, SEEMP etc.)  
Future Regulatory Framework? (GHG, NOx, Noise)  
Regional Legislation (EU, US)  
Volatility in Fuel Prices & Energy Security  
Split Incentives for Efficiency Investments  
Next Generation Fuels ?  
Technology Selection  
Over Capacity  
Future Trade Patterns & Prediction  
Crewing & Training  
And so on.....

A large iceberg is shown floating in a body of water. The visible portion above the water is a small, sharp peak, while the vast majority of the iceberg is submerged, creating a dramatic visual metaphor for hidden risk or uncertainty. The background shows a cloudy sky and a distant shoreline.

Uncertainty

Transition

Volatility

# Wind Propulsion Systems can.....

- ...be retrofitted to existing vessels or incorporated into new build design.
- ...reduce dependency on fossil fuels and deliver increased energy security.
- ...deliver 10-30% fuel savings as retrofit and around 50% for new builds.
- ...help make vessels compliant with existing regulation and prepare for future scenarios.
- ...increasingly be viewed as a credible, viable and cost-effective alternative.

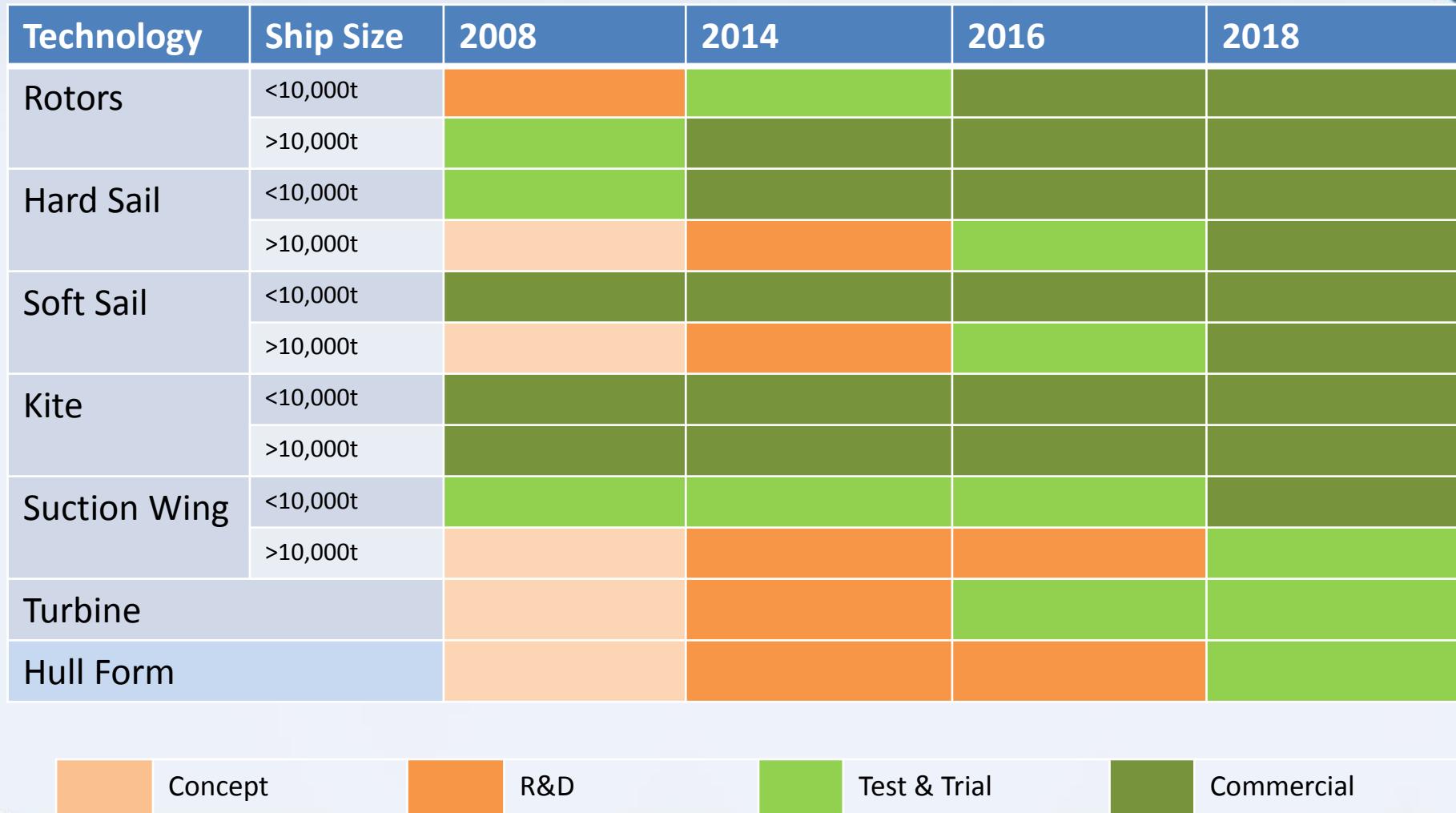
# Wind Propulsion Technology Options?



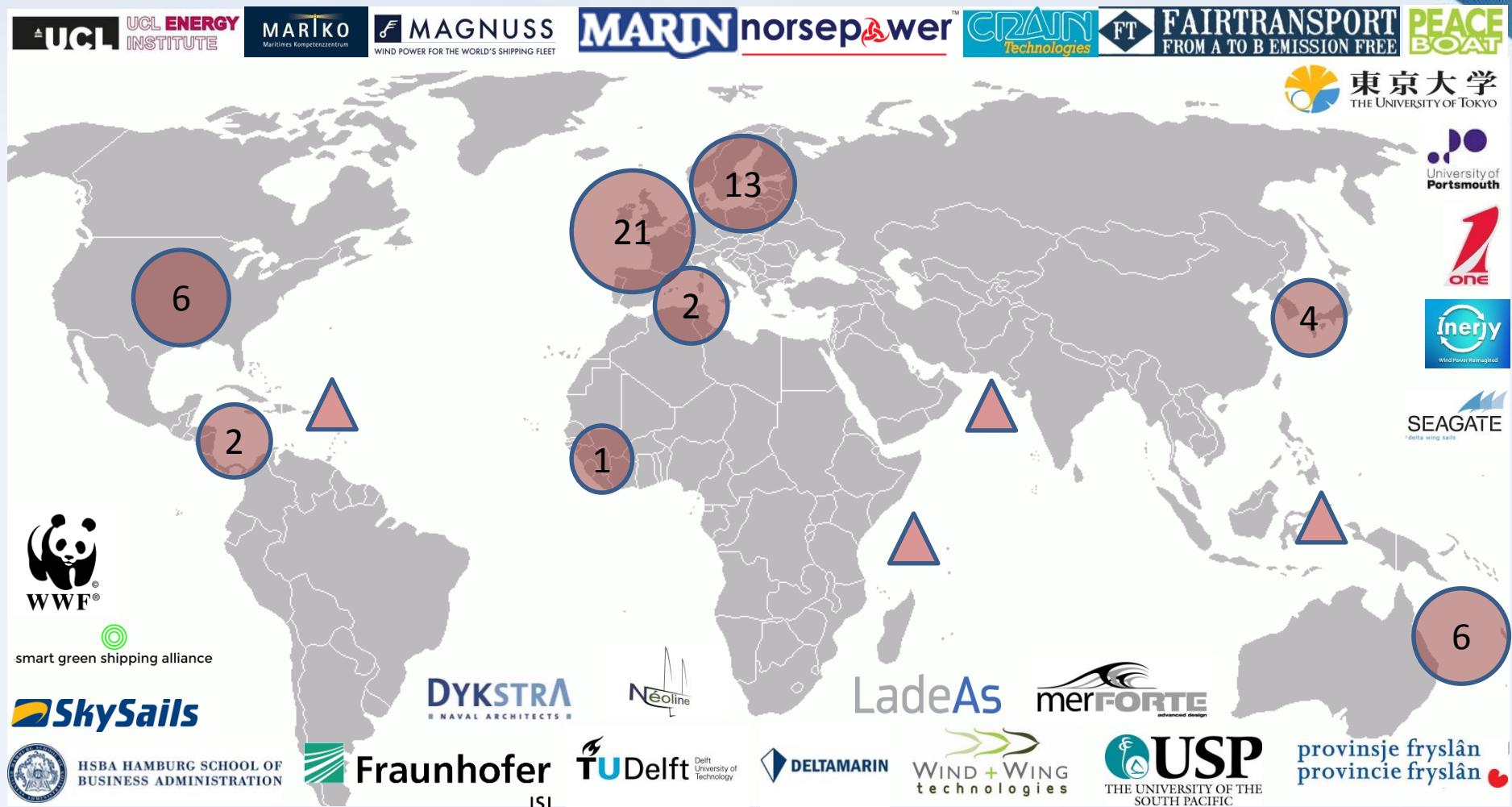
# Technology Toolbox



# Stage of Development?



# IWSA Membership & Windship Network

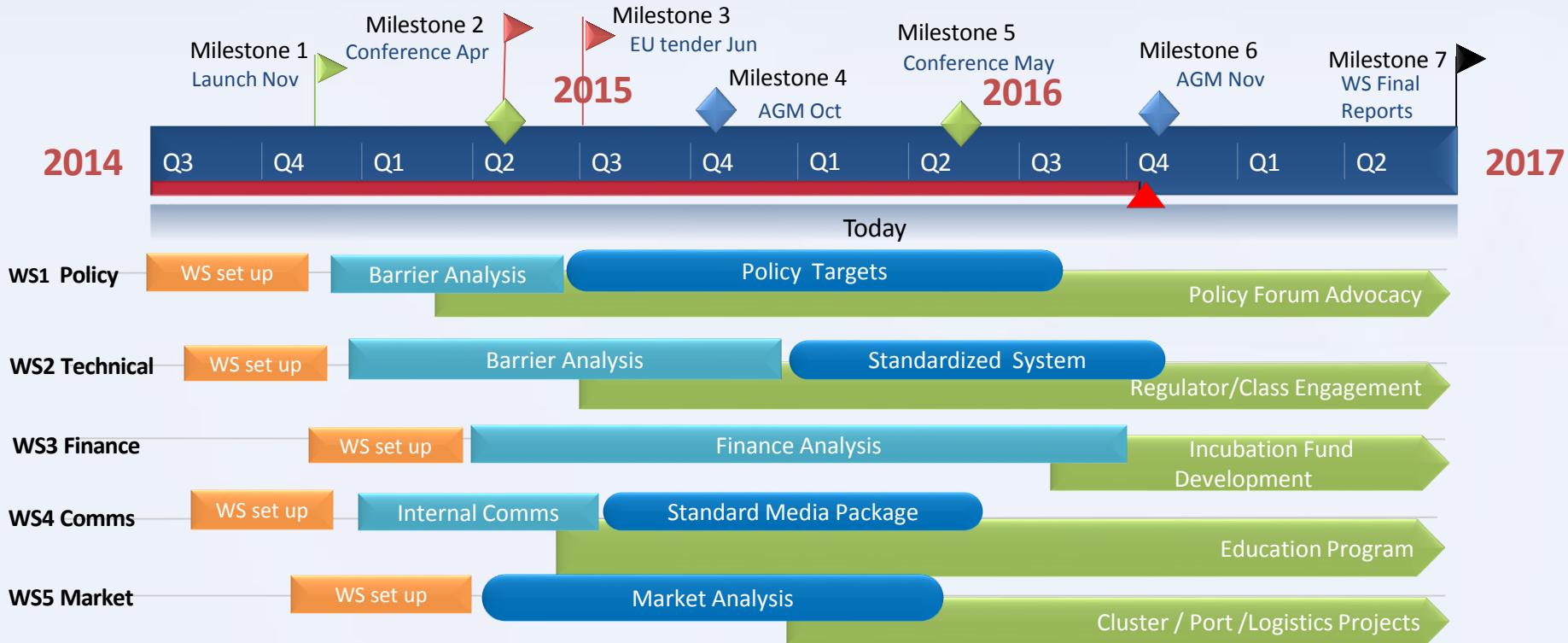


Blue Sky Over the Sea Conference 17-18 Nov



# IWSA Work Stream Development

***“Facilitate and promote wind propulsion for commercial shipping worldwide and bring together all parties in the development of a Windship sector.”***



# Barriers & Challenges

**Industry structure** – the split incentive, charter party clauses

**Solution** - new mechanisms e.g. SSI2040 Save as you Sail, Clean Shipping Index, CWR

**Perception** - a psychological barrier on a potential solution that is so visible.

**Solution** – increasing number of demonstration vessels, communication.

**The promises** – the need to ‘prove’ savings

**Solution** – more demo vessels, independent verification, pooling of information (IWSA)

**Capital intensity for working demonstrators** – cost for technology to reach market

**Solution** – increasing coop/pooling resources (IWSA), finance facility & build tech cluster.

**Lack of technology transfer** – from the offshore and yacht sectors.

**Solution** – increasing transfer is underway, incubation/innovation support (IWSA)

**Operational & technical** – route specific savings, compliance, cargo handling etc.

**Solution** – working with class, NA/engineers. Weather routing, automated systems, operations management etc.

**Lloyds Register:** Wind-powered shipping 2015

# Case Study: Rotor Development



Deltamarin Award winning  
'Delta Challenger' design



Norsepower fits twin  
rotors on M/V Estraden



C-job Eco Freighter  
Design Contract

2009

2014

2015

2016

2017

2018

Enercon's E-ship 1  
operational



Wind Hybrid Coaster  
Design



Eco Flettner test  
on MV Fehn Pollux



Magnuss  
Commercial Test Rig



# Case Study: Wind Challenger



Cape Size Bulker	Panamax Bulker
296m	228m
177,000t	83,000t
9,000m <sup>2</sup> (sail area)	4,000m <sup>2</sup> (sail area)
18,660kW x 91rpm	9,965kW x 94rpm
15.0kt (service speed –design)	14.3kt (service speed –design)
25 crew	25 crew

# Case Study: Smart Green Shipping Alliance



smart green shipping alliance

## smart

Proven - Masts rotate to capture maximum wind. Push-button operation from the bridge ensures safety. Same crew number as conventional ship. No ropes or rigging on deck to obstruct cargo handling.

TRADEWIND automated routing system optimises wind propulsion.

Hull made from recycled steel



## SAILING HYBRID SHIPS

Potentially 100% renewable today

Commercially, technically and environmentally superior

## green

At least 50% propulsion from wind

Biofuelled conventional engines ensure scheduling reliability. Biofuel bought on long term fuel supply contracts provide fuel cost certainty.

Creates new transformational business model, increases order book to reduce unit cost and further improve customer proposition.



**TATA STEEL**

**HUMPHREYS**  
YACHT DESIGN

**WOLFSON UNIT**  
FOR MARINE TECHNOLOGY &  
INDUSTRIAL AERODYNAMICS

**CAMMELL LAIRD**  
SHIPREPAIRERS & SHIPBUILDERS LTD

**Rolls-Royce**

**L**loyd's  
Register



# Sustainable Shipping

## Commercial

### Profitability/Viability

Logistics chain – factory/farm gate to dinner plate.  
Circular economy – cradle to cradle development.

## Regulation

Clear, stable framework for low carbon shipping development worldwide.  
Modern shipping practices.

## Finance

Efficiency gains shared by all players. Finance decisions based on long-term infrastructure investment horizons

## Technical

Vision of Low Carbon Technology. Systematic development of R&D, demonstration & market introduction of low carbon technologies

# Any Questions?



**International Windship  
Association**  
[www.wind-ship.org](http://www.wind-ship.org)

Gavin Allwright  
[secretary@wind-ship.org](mailto:secretary@wind-ship.org)

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