

IWSA
International Windship Association

Decade of Wind Propulsion 2021-2030

Delivery | Optimisation | Facilitation

www.decadeofwindpropulsion.org





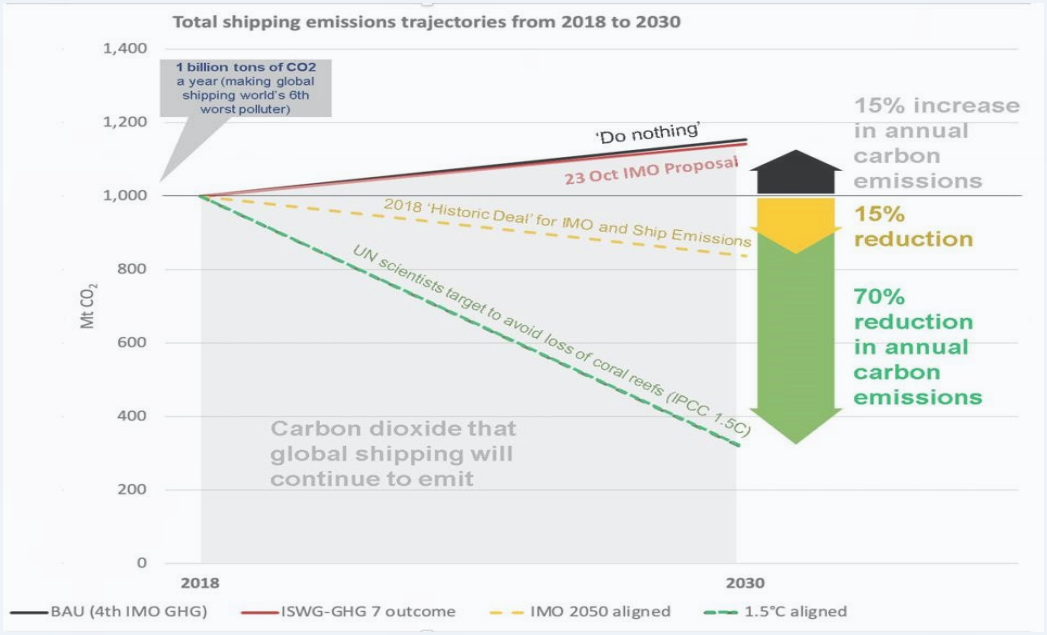



International Windship Association
Gavin Allwright, Secretary General
secretary@wind-ship.org
www.wind-ship.org

IWSA
International Windship Association

PARIS AGREEMENT

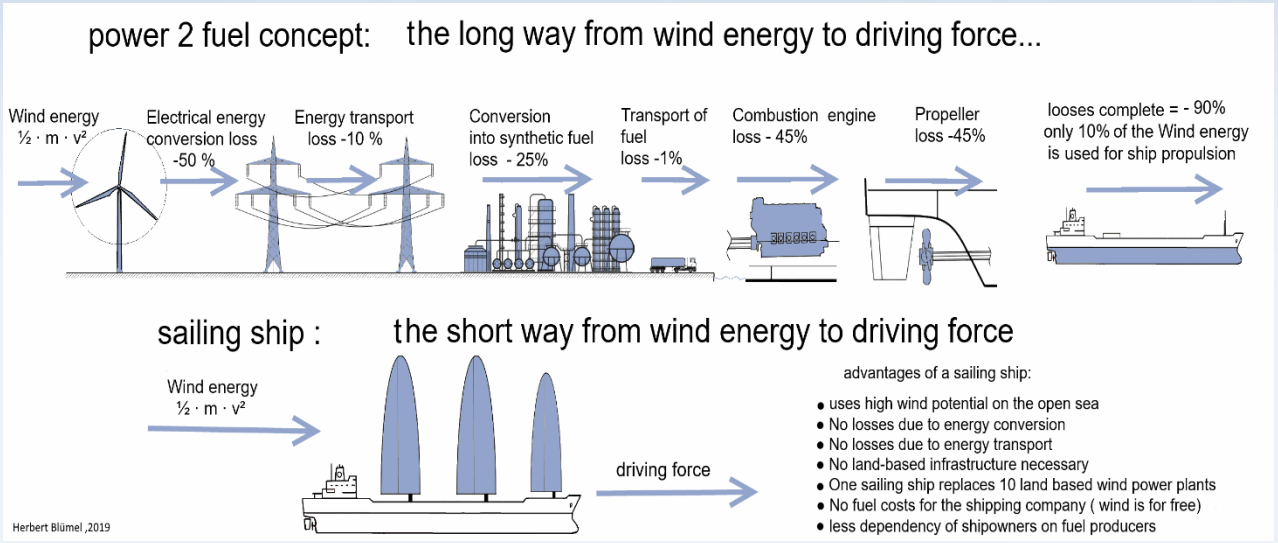
"All ships designed and built today must operate in a net zero emissions world at the end of their service life"



Source: International Council on Clean Transport (ICCT), Oct 2020

IWSA International Windship Association

Direct Application of Wind Power



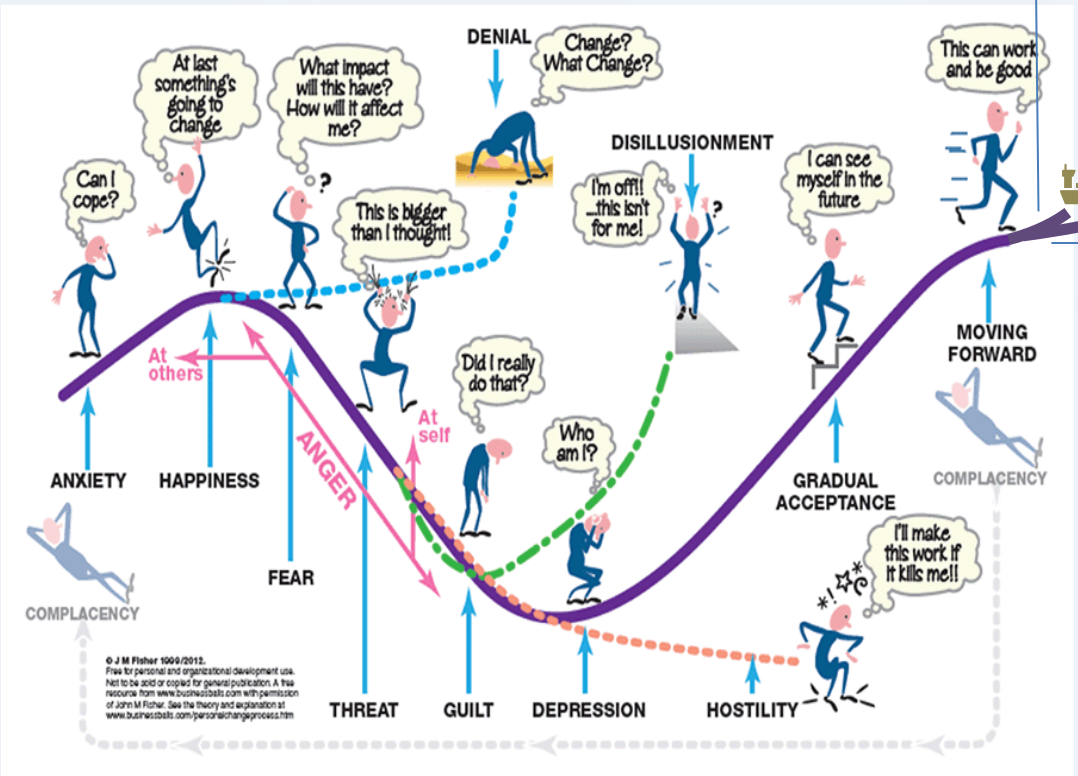
RETROFIT
5-20% propulsive energy & optimised up to 30%

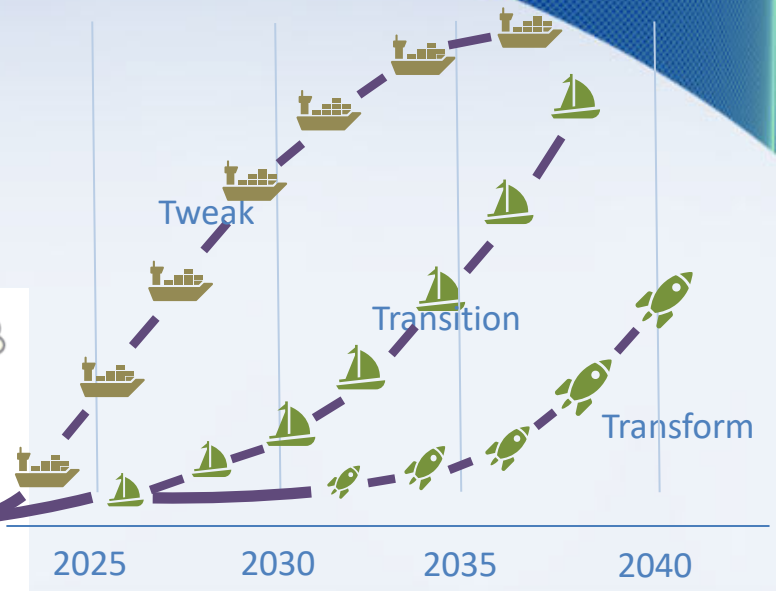
OPTIMISED NEWBUILD
50-80%+ possible with operational changes

- Pure **Zero-Emissions** Energy Source
- Abundant & Available Worldwide **Today**
- **Free** & Delivered to the Point of Use
- No New **Infrastructure** or Onboard **Storage**
- Harvesting Technology **Available** Now
- **Compatible** with All Fuels
- **Facilitates** Secondary Renewable Fuels
- **Uniquely** Available to Shipping
- Shift from CAPEX to **OPEX** possible

Pathways: Tweak, Transition & Transform

- **Tweak**: Retrofit current fleet of 60-100K large ships + 7 mill+ small vessels – extend carbon budget 20-30%





- **Transition**: Natural replacement with wind optimised wind-assist & primary wind vessels + operation adjustments to max. wind energy component

- **Transform**: Accelerated replacement of existing vessels with primary wind + 100% energy autonomous vessels

IWSA International Windship Association

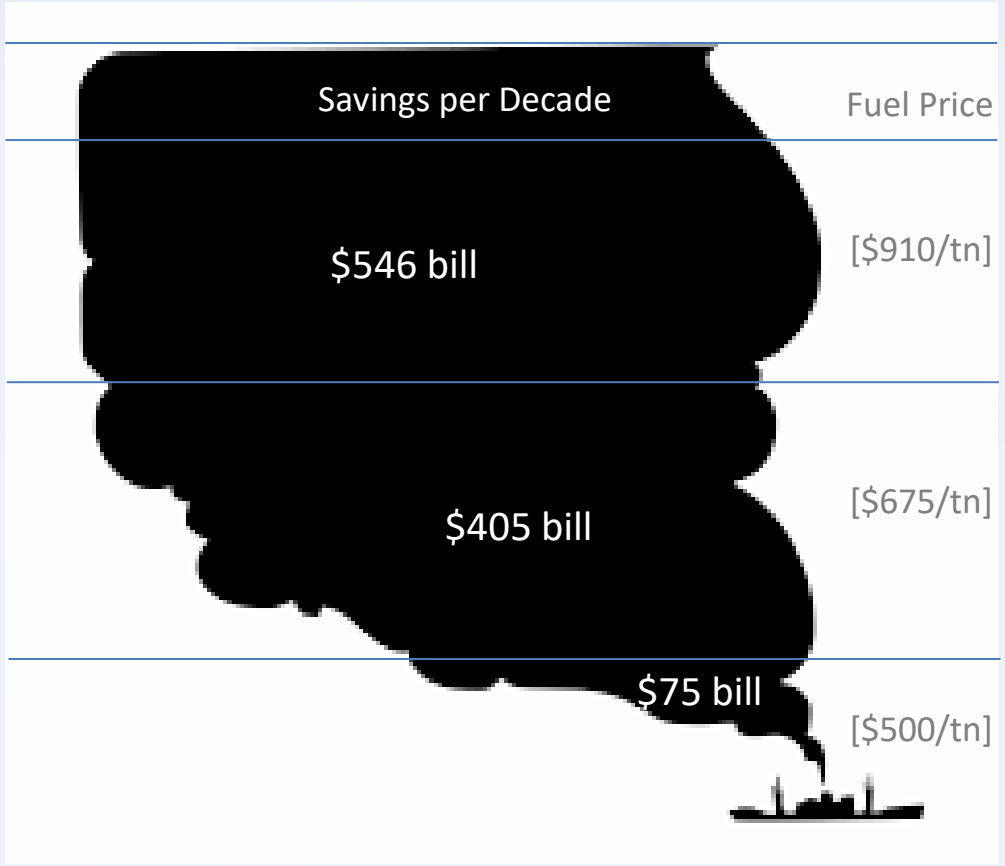
Hybrid W.A.V.E.

WIND	+	ACTIVITY	+	VESSEL	+	ECO-FUELS
Wind –assist or Primary wind power (Primary Renewable)		Operational optimisation		Vessel optimisation		Renewable energy or waste-derived fuels (Secondary Renewables)
-retrofit wind-assist (5-20% savings – possible up to 30%) -newbuild primary wind 50%++ -today's tech +optimise & cheaper -lease/OPEX approach		-voyage & fleet management -weather routing -speed reduction -virtual arrival -crew training -data/ blockchain -new business models etc.		-design -size & capacity -energy management system -energy efficiency measures -air lubrication -reduced engine power etc.		-2nd gen biofuels -batteries -synthetic fuels + CCS -bio-gas/liquids -H2 & H2 carriers *Electric propulsion systems enables modular approach
20-30%	+	20%	+	20-30%	+	20-40%

Note: All figures are estimates. Any one measure in each category could provide a significant % of the proposed total.

The Shipping Decarbonisation Challenge….

Could Wind Propulsion Fund the Decarbonisation Transition of the Fleet?



- *Static fleet size*: 60,000
- *Fuel:* 300mill tn/yr
- *CO2*: 1bill tn/yr
- *Price*: $500/tn (VLSFO/04 May 21)
- *Increase*: 35%/decade from 2030s
- *Wind*: 20% (inc. operation change)

NOTE: No IRR/Currency rates etc included

UMAS/ETC Report
IMO2050 (50%) = $1trill
100% Decarbonisation = $1.4-$1.9 trill

[$1.4 trill = 23 mill per ship]

WPT cost = $5 mill/ship = **$300bill**
+ Reduce total cost by 10-20%

$300 bill invested (2020s+) = **$1trillion**+ savings by 2050 + lowers total cost to **$1.1-1.7 trillion**

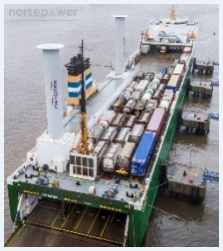
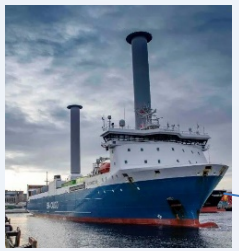
Large Vessel Installations Today…

15 Ocean Going Vessels with Wind-Assist Systems installed by end of Q2 2021

& 1 Wind-ready + more than 20 small sail cargo, fisheries & cruise vessels in operation

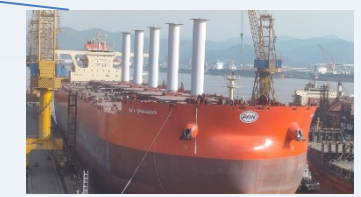
Ship Types
Tankers x 2 (1 x pending new build) 1 x VLCC, 1 x LR2 Tanker
Bulkers x 2 (+1) (2 x pending) 1 x VLOC, 1 x Ultramax 1 x Kamsarmax (wind ready)
RoRo x 2 (1 x pending new build)
Ferry/Cruise x 3
General Cargo x 5 (2 x pending) Various sizes: 2–12,000dwt
Fishing Vessels x 1





NOTE: *More large WPT vessels in operation than all new alternative fuelled ships combined (excluding tankers & LNG/LPG)*



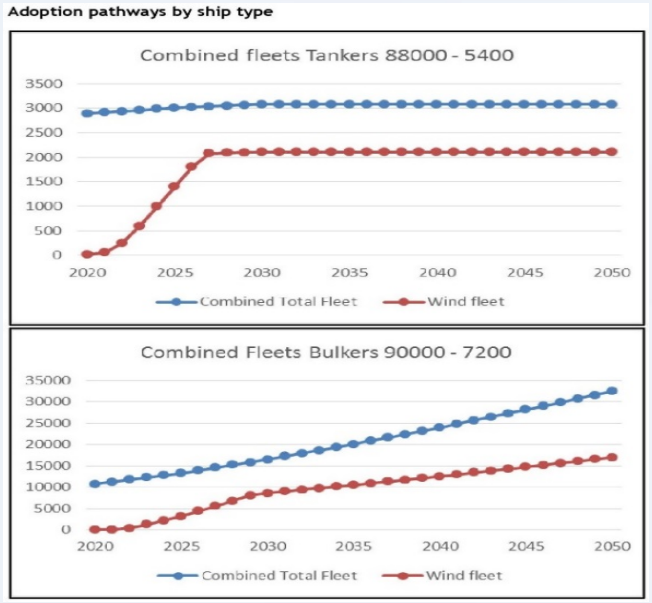


IWSA International Windship Association

Market Forecasts & Pipeline Status

End of 2022/23: **Existing Pipeline** – 47+ retrofit & newbuild vessels sea trialling & commercial operations + >30 smaller vessels. (NOTE: excludes any new commercial contracts made 2020-22)
Robust R&D Pipeline: 30+ Additional technologies & projects under development worldwide

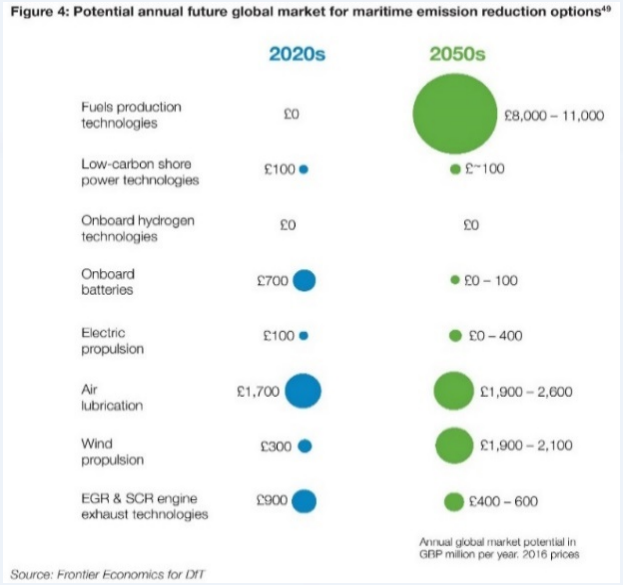
2030



EU Report *'…market potential for bulk carriers, tankers & container vessels =* ***3,700-10,700 installed systems until 2030*** *(varied by fuel price, speed, discount rate)*

2050s

UK Government Clean Maritime Plan (July 2019), research: **37,000 – 40,000 vessels** with wind propulsion systems installed or roughly **40-45% of the global fleet.**



Source: 'Market potentials & market barriers for WPT for ships'. (CE Delft 2016/7)

Project News...

Windchallenger ClassNK AIP Bulker. 2 x newbuild 2022 5%+ savings/sail. Windhunter project launched

Ventifoil/Suction Wing 2x10m installation (ex.16m) – Van Dam Shipping, Boomsma Shipping, 500GT Fishing Vessel + Schram Shipping Q4,2021

Silenseas Range 210m, 23,000GT, 410 pax./crew, 17kn wind +Solid Sail – 38m test rig'21, 95m '22

Rotorsail Installations & Projects – New build VLOC bulker – 325,000dwt – 5 x 25m rotorsails + Rord Braren vessel 1 x 18m + Sea-Cargo 2 x tiltable rotors Q1 2021. Oldendorff Carriers JDP - 207,000 dwt Newcastlemax - 2022 Wartsila Service/Support

VLCC 300,000dwt: 2 x retractable wing sail sea trials completed – new build order 4 sails, 2022

Canopee – Build started of 121m RoRo launch 2022 - 4 Oceanwings + LNG = -35% GHG – AiP awarded

Kite systems –fully automated + dynamic - LDA/Airbus Roro 2021, K-line contract <50 installations 2022 onwards

Neoline – Build contract with Neopolia – 2 x 136m RoRo primary wind vessels <80% fuel savings - launch 2024.

Car Carrier design: Oceanbird: new build x wing sails <10 knots wind only. Orcelle Wind/ WWL Launch 2025. Partnership with Alfa Laval

Inflatable Wingsail – System unveiled by Michelin <20% savings

Wing Sail system – retrofit + operation system = 30% fuel saving – detailed design stage – installation on 1st tanker 2022 – EU CHEK H2020 project launched Q2 2021

Drivers, Barriers & Solutions

	Drivers	Barriers	Solutions
Policy	IMO & EU GHG strategy Speed/Power restrictions Paris + IPCC 1.5C report	Efficiency vs Resilience EEDI/EEXI, Charter terms Inclusion in Reports etc.	Market analysis WiSP – EEDI/EEXI, 3rd party IWSA - engagement
Price	Upward pressure – New Fuels VLSFO/ULSFO premium Carbon Price increase	Split incentive Historic lows + untaxed Commodity vs Saving	Ringfenced Carbon levy Lease/Rental/Modular Pay-as-you-save models
Providers	Increasing number Toolbox – Horses4Courses Hybrid approach + Class Guidelines	Access R&D finance Long lead times: SMEs Scaling & Strategy	Demonstrators – EU WASP Wind Hubs/Clusters 3rd Party platforms & Class
People	New Boardroom Pressure = B2B + C2B Collaborative approach	Not uniform Risk management Education/training resources	Multi-stakeholder projects Education program Access to experts/network
Perception	Growing Experience - Clear Change Credible, Viable, Profitable Positive Eco-Statement	Old/Unreliable - persists Fuel-centric, Silo approach Policy/Pathway exclusion	Demonstrate tech widely Transparency & Visibility Growing

Projects and Collaborations

WASP: EU Interreg North Sea Project

- Five Wind-Assist Installations - monitor & verify
- Develop business models
- Policy recommendations to help facilitate WP uptake.

WiSP: Joint industry Project

- Improve methods for transparent performance prediction + provide ship owners/operators with fast low-cost predictions
- Review the regulatory perspective including status of rules and regulations, EEDI/EEXI etc.

Wind Propulsion Accelerator (under development)

- Support WPT development from concept to market
- Five Wind Propulsion Hubs + Incubator Fund
- Test Fleet for WPT + Research + Training
- Installation & Newbuild Support Facility

IWSA Collaborations

Win-Win-Wind Propulsion….