

Under full sail

by Romain Grandsart, *Chief Operating Officer, OceanWings*

Even with the best of intentions – and the latest technologies – shipowners face a challenging time ahead as they prepare for ever-increasing carbon accountability. Wind-assisted propulsion offers them a solution today, many years before new fuels become readily available, and with no requirement for dedicated infrastructure.

The latest **HELCOM annual reporting** shows that the most significant contributors to CO₂ emissions in the Baltic Sea are ro-ros (ferries and pure cargo) and tankers. International Windship Association's figures meanwhile suggest that at least 20% could be shaved off shipping's carbon footprint if wind-assisted propulsion was rolled out across the existing fleet and integrated into newbuilds.

Enter *Canopée*, the first modern purpose-built wingsail ro-ro cargo ship in commercial operation. She is a demonstration of how wind energy can help deliver the decarbonised shipping sector of the future. The 121-metre vessel, designed by VPLP Design in France and built by Neptune Yards in the Netherlands, entered service last year, transporting components of the Ariane 6 space launcher from continental Europe to French Guiana for the Ariane Group. Owned by Jifmar, *Canopée* is operated by Alizés (a JV between two French shipowners: the Jifmar Group and Zéphyr & Borée). It makes up to 12 return trips to Guiana every year, carrying 5,000 tonnes of freight at an average speed of 16 knots.

Canopée is powered by two Wärtsilä 6L32 main diesel engines (rated 3,480kW each at 750 rpm) and four articulated semi-rigid OceanWings® covering 363 m² apiece. The vessel's hull form is optimised for sailing, with the controllable pitch propellers able to run in feather mode when the wind-assist system alone delivers sufficient power.

The proportion of wind power used

varies between 20% and 50%, depending on the required speed and the available winds. *Canopée* was designed to enable the wing sails to cut fuel and emissions by approximately 30% on her regular trans-Atlantic route. Data gained by OceanWings over four years of global testing indicate that the wingsail design would be capable of providing up to 50% savings on some ships and routes.

Ahead of regulatory timetables

Canopée is an important demonstration of wind-assist technology because it has become operational at a time when shipowners need to act on reducing emissions, whilst engine and fuel cell manufacturers are still developing new technologies.

Meanwhile, the shipping industry is considering how well-to-wake accounting can be introduced so that CO₂ emissions are not simply pushed further up the new bunker supply chain. New fuels, such as biofuels and methanol, and even hydrogen and ammonia, can be made from different feedstocks using varying processes and requiring delivery from disparate locations.

No single well-to-wake carbon accounting equation is going to represent this diversity equitably. The combination of vessel type and fuel diversity means that settling on the regulatory details is going to be a protracted process. **As the International Chamber of Shipping stated earlier this year**, a global greenhouse gas (GHG) pricing mechanism for shipping is urgently needed

to de-risk investment in zero GHG marine fuels and to provide billions of dollars of funds to support developing countries.

At this stage, regulators are also still coming up with ideas for fair, realistic, and achievable emission requirements that are workable across the broad range of commercial vessels in operation. As an example, **Interferry recently highlighted that ro-ros are a special case** for the International Maritime Organization's (IMO) Carbon Intensity Indicator (CII). The emissions from these vessels are highly route-dependent and significantly impacted by their relatively high number of port calls. Ro-ros and ro-paxes are often purpose-built for the crossings they serve, so swapping an older vessel to a more 'CII-friendly' route to reduce emissions wouldn't necessarily lower a fleet operator's overall GHG output. This raises the spectre of making sub-optimal investments in existing ships, and Interferry is proposing an alternative compliance mechanism – fleet-balancing – which it plans to submit to the 82nd meeting of IMO's Marine Environment Protection Committee later this year.

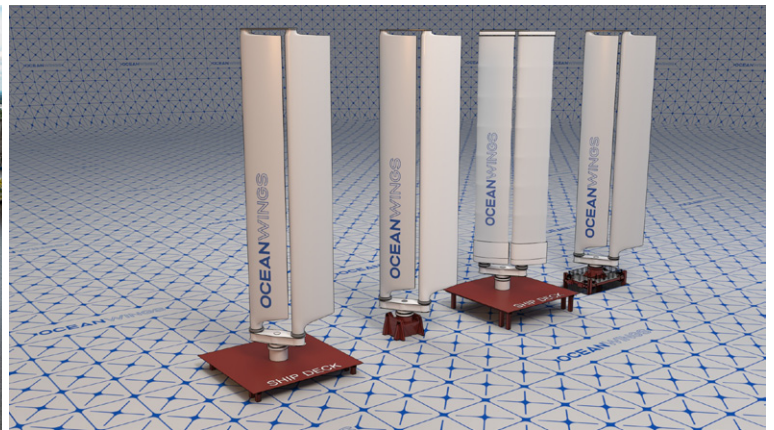
The emission benefits and fuel cost reductions of wind-assist technology are not dependent on regulatory timetables. Wind doesn't suffer from the 'chicken and egg' conundrum that currently limits the uptake of new fuels. Bunker-agnostic, it's a resource that can go in just about every 'basket' of decarbonisation solutions to meet regulatory goals, even those set as early as 2030.



Photos: AYRO



Photo: Jifmar Group/MaDfly/V. Derennes



Canopée again offers an example of this expedient way forward because the latest-generation wind-assist technology incorporated on the ro-ro is suitable for retrofitting on virtually all ship types as well as newbuildings. OceanWings' solutions are now available across multiple segments and sizes, including for tankers, bulkers, car carriers, and cruisers. For ro-ros, OceanWings leverages its lightweight design and a very low centre of gravity to match the stability objectives of such vessels.

Sails of the future

Canopée's wing semi-rigid design and a new rigid range designed so the position of the wingsails can be changed for cargo load- and unloading in port share the same unique 'two flap variable camber' idea, which is already proven to deliver industry-leading fuel savings over most operational scenarios and environmental conditions.

The OceanWings product range now also includes critical configuration options such as a tilt mechanism to address air draft requirements and an elevator mechanism specially designed for container ships to comply with their port operation constraints while minimising the impact on their carrying capacity. The original semi-rigid OceanWing design is reefable, which is a critical feature for vessels where tilting or lowering the entire wingsail is not an option.

Rigid wingsails from OceanWings are made from the same modern composite materials and follow the same manufacturing processes as wind turbine blades. This provides advantages in resilience and lifespan, for instance, for bulkers and tankers, and leverages a global manufacturing infrastructure to drive competitive pricing and the ability to scale to large volumes. The new modular design also optimises transportation and installation.

Wing technology continues to develop, though OceanWings' wingsails are already fully automated and require only minimal oversight from crews. Sensors on the ship can measure the wind in real-time, and software systems analyse the data (also on the go) to send instructions to the actuators controlling the wings, which can then adjust the angle of attack and the camber of each wing independently. The OceanWings® product range also features a 'safety-by-design' flag mode, automatically protecting the wings and the vessel when wind or sea conditions exceed specific thresholds. As digitalisation increases, solutions such as OceanWings® also come with an on-board

routing system through an external router that will advise crew on the best crossing for maximising performance.

Transformative change

We are witnessing the comeback of the long seafaring tradition of sailing with the wind, which for centuries powered maritime trade. Now that the industry needs to abandon oil as the single source of power for ships, a wind revival is underway.

Alongside other technologies, wind can help create hybrid zero-emission ships. As necessary as the IMO's work on future fuels is, shipowners can act with wind power now. Indeed, it is imperative that they do: 2023 was the warmest year on record for the planet, and nowhere is this more obvious than the Baltic Sea, which, as a marginal sea, has warmed more than any other. As HELCOM stated, "Transformative changes are needed in all socioeconomic sectors interacting with or affecting the Baltic Sea environment in order to protect and rebuild ecosystems and halt existing negative trends." Wind is free, everywhere, and ready to deliver double-digit GHG emission reductions today. ■

OCEANWINGS OceanWings is a French industrial start-up that designs, manufactures, and delivers wingsails to support the shipping industry in reducing its carbon footprint, enabling lower emissions for all types and sizes of ships transporting goods by water. Sail to oceanwings.com to learn more.