



OurWay

OCEANBIRD

**SAILING
REVOLUTION**



Why is Oceanbird IMPORTANT?

The other day I bought vegetables from a local farmer just a few kilometres from my house. And I took the bicycle to get there and back. This way I eliminated the need of transport, by sea and land over long distances.

Today, nearly everything we do releases greenhouse gases. This we need to change. The insight for the need to act is growing, not only among private citizens but also among states, federations, businesses and other organizations. The Swedish parliament has decided that Sweden will have no net emissions of greenhouse gases into the atmosphere by 2045. Several nations have now declared that they will aim for climate neutrality at certain dates; China by 2060, Austria by 2040, Denmark 2050, Finland 2035 and most of EU is committed to 2050. The US has as of now withdrawn from the 2015 Paris Agreement, but California is aiming for 2045.

HOWEVER, THE SWEDISH Environmental Protection Agency's scenarios show that Sweden will not achieve the climate goal with the current approach. This is why Oceanbird is so important, since the current measures not are enough. With a wind-powered cargo ship, a very old tradition in a new shape, we show that disruptive change is possible. We want to inspire others to do something groundbreaking as well, in order to stop climate change.

The International Maritime Organization (IMO), a UN specialized agency, has adopted mandatory measures to reduce emissions of greenhouse gases from international shipping. The IMO target is

to reduce total annual GHG emissions from shipping by at least 50% by 2050, compared to 2008.

Projects today range from reducing fuel consumption on conventional vessels to ships with batteries or, in our case, a wind-powered ship. Fossil-free fuels are an important path to explore. The solution is not a single technology, but a combination of all available ones. Different solutions will be suitable for different conditions and environments, in the fleet of today and new ships tomorrow.

WITH OCEANBIRD WE also want to reach economical sustainability, i.e., that sustaintech is sound business that generates revenue. This has been proven already by many other businesses, and there are now investment funds that only invest in sustaintech. We want to show that the shipping sector can also achieve this.

We at Wallenius do it every day, from our own windmills to wind-powered ships and beyond. It's necessary that other industries, such as car makers and logistics companies, as well as consumers, take action to reduce climate change in every way they can. Where will you buy your vegetables tomorrow?



RICHARD JEPSSON
VP Commercial & Partnership
Oceanbird



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Richard Jeppsson

Editorial production OTW

Editors Sofia Lundgren,

Pia Adolfsson Jansson

Art Director & Layout Artist

Martin Isaksson

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ABOUT SOYA GROUP

Soya Group is the collective name for a group of companies active within three main business areas: shipping, real estate and trotting. The group was founded in 1934 and the common denominator for all companies is that all business shall be carried out with a strong sustainable focus. Today, some 1,100 people work in Soya Group companies in Europe, the US and Asia.

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A GREEN MAGAZINE

This magazine is produced in accordance with the Nordic ecolabelling system, the Swan.

"WE CAN ALL FEEL INCREDIBLY PROUD"

We continue to focus on the ongoing development and improvement of our existing operations from the perspective of sustainability. Oceanbird is a tremendous project that will change shipping fundamentally, but continuous improvements to our existing vessels, real estate and other operations are at least as important for the transition to a sustainable world. We are firmly committed to driving this transition process across a broad front, and have strong credibility thanks to our know-how and history in this area. We can all feel incredibly proud that we have succeeded in driving development forward by combining our energies and nurturing our vital pioneering spirit. Follow our vision and walk the talk Our Way!

JONAS KLEBERG

Chairman and CEO of Soya Group



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LOWER EMISSIONS *on the* HORIZON

When the first Oceanbird sails, it will be a historic occasion for maritime transport. The expectation is that Oceanbird will contribute to changing the shipping industry. No small feat, but the growing demand for more sustainable ways of shipping, combined with the global goals of significantly reducing emissions, make out-of-the-box solutions an absolute must.

Today, after millennia of naval trade, shipping is still the method currently used for transporting 80-90% of the world's trade in physical goods. Although it remains the most sustainable way to transport goods, its climate impact is still considerable. Wind-powered cargo ships are rare today, since most ships are powered by fossil fuels, and shipping accounts for up to 3% of global emissions and 10% of transport emissions. Those numbers are about to be cut – the International Maritime Organization (IMO) has set a goal of reducing CO₂ emissions from international shipping by 40% by 2030.

The Wallenius family, active in the shipping industry since the 1930s, realized 20 years ago that big changes were needed. Wallenius Marine has always been at the forefront of sustainable maritime



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**THE MOST IMPRESSIVE
THING ABOUT OCEANBIRD
IS THE FACT THAT THEY
REALLY COMBINED THIS
NEW TECHNOLOGY WITH
A DRIVE TO IMPLEMENT IT
ON A GLOBAL SCALE.**

Rein Jüriado
Chief Strategist, Swedish
Transport Administration

innovations. Its ship designs are among the most efficient in the world. Certified by Lloyd's Register for ISO9001 and ISO14001, Wallenius Marine is also a front-runner in developing performance-monitoring systems for optimizing operational efficiency and environmentally sound ballast water treatment systems.

“To create a change, you need a vision and strong support for that vision. We have both. The commitment from our visionary owner family gives the entire organisation a very strong drive and encouragement to realize our vision of truly sustainable shipping,” says Josefin Falk, Communications Manager, Wallenius Marine.

LOOKING INTO SUSTAINABLE shipping solutions for the future, Wallenius Marine concluded that the renewable energy source with most potential was wind power. Deep investigations into wind power followed, looking at different solutions such as kites, motor sails and more conventional sailing rigs. The conclusion was that only fixed wing sails would satisfy Wallenius Marine's stringent demands for performance, sustainability and durability.

“We started from a blank piece of paper and took on a holistic approach. We needed to look at all different aspects like aerodynamics, hydrodynamics, cargo, operation, root optimization risk and robustness to come up with the best overall solution. Also, to get all the different components, like the wing rigs and the hull, to work together as an integrated unit has really been a challenge but also the key to success,” says Carl-Johan Söder, Naval Architect, Wallenius Marine.

The most challenging part, according to Söder, was to get a set-up where you have sufficient efficiency, but also the ability to generate enough power, as well as the ability to de-power in a safe and robust way.



Josefin Falk
Communications Manager,
Wallenius Marine



Carl-Johan Söder
Naval Architect,
Wallenius Marine

WHY OCEANBIRD?



TO CREATE A CHANGE,
YOU NEED A VISION AND
STRONG SUPPORT
FOR THAT VISION.
WE HAVE BOTH.



WALLENUS MARINE partnered with KTH and SSPA, creating a cluster of competence. Together they applied for project funds and were approved for co-financing by the Swedish Transport Administration (Trafikverket) which fully embraced the project, calling it one of the most important and valuable investments in sustainable solutions. This boosted the project potential, and in the beginning of 2019, it went from being an idea on paper to something that actually would become a reality. The economic and technical calculations, simulations and tests intensified, with the first model launched in the summer of 2020.

“When Wallenius contacted us at Trafikverket, we saw that they really wanted to tackle this issue of fossil fuel dependency. The Swedish government has the ambition to make Sweden one of the first fossil-

free nations in the world, not only out of responsibility towards coming generations, but also because it makes economic sense. The most impressive thing about Oceanbird is the fact that they really combined this new technology with a drive to implement it on a global scale. Since Wallenius Marine is a big shipping company, they really have the possibility to turn this project into a commercial success,” says Rein Jüriado, Chief Strategist at the Swedish Transport Administration.

“The support from Trafikverket means a lot. Even though substantial private financing is put in this project, the support from Trafikverket has really made it possible to kick-start the research project. I would even go as far as saying this has shortened the delivery time for Oceanbird vessels by years,” concludes Josefin Falk. ©



Rein Jüriado
Chief Strategist, Swedish
Transport Administration

MEET THE TEAM BEHIND OCEAN- BIRD

Developing a vessel like Oceanbird is of course the work of a large team. Here are some of the key people in the project.

RICHARD JEPSSON

VP Commercial & Partnership for Oceanbird

ROLE: TO BRING OCEANBIRD TO THE MARKET AND FIND PARTNERSHIPS FOR TRULY SUSTAINABLE SHIPPING.

We now see an awareness in the entire world that we must act if we want to achieve a climate-neutral society. More and more communities have pledged to reach this goal, from nations and cities to businesses and civic organisations. To design a ship that in itself minimizes the environmental footprint is to show the world that action is possible. When we saw that it actually is possible to sail across the oceans with a ship of this size, we decided to make a go for it. We have now gained the support of the Swedish government, several partners and organizations.

To be part of a groundbreaking project is always exciting. To be part of this groundbreaking project which also moves the sustainability agenda forward in a radical way is a dream come true. We have already faced some challenges, and there will be more and difficult ones to come, but I'm looking forward to the launch of the vessel.



MEET THE TEAM



CARL-JOHAN SÖDER

Naval Architect Wallenius Marine

ROLE: THE INITIATOR AND PROJECT MANAGER OF OCEANBIRD

In parallel to a strong shipping interest, I've always been very interested in high-performance sailing craft and closely followed the development in high-tech sailing classes like the America's Cup. So for me, to design something like Oceanbird, which merges cutting-edge sailing technology into the world of commercial shipping, is extremely rewarding both on a personal and professional plane. And also, to see the enthusiasm from our kids, discussing how this development helps giving them a better planet, is absolutely rewarding on a new level.

Back in 2017, when the design was still in the conceptual stage, we could sense that there was already a special buzz around the Oceanbird project. We noted that even people normally not into ship design were showing an unusually great interest in the concept. Already then, we could feel we were on to something big. In 2019, the prospect of transforming Oceanbird from a vision into reality grew further when more and more important stakeholders, both within and outside Wallenius Marine, endorsed the project and joined forces with the core team.

Now I'm longing to see the ultimate realization of Oceanbird and see her being built in a shipyard. But beyond that, it's my hope and belief that this isn't limited to just a few vessels; in 10 years' time I'd like to see 100 Oceanbirds and in 20 years I hope that the Oceanbird concept is used in the majority of global deep sea shipments. To be part of this, which could well become the biggest shipping revolution of our lifetimes, is of course extremely inspiring. It keeps us going and our minds busy day and night.

PER TUNELL

COO Wallenius Marine

ROLE: TO GUIDE THE PROJECT TOWARDS THE VISION AND COMMUNICATE OCEANBIRD TO EXTERNAL PARTIES.

As a naval architect, working with sustainability in Wallenius for over 10 years, this project is truly a dream! It is really aiming at Wallenius's ambitious vision and it is full of engineering challenges. Communicating this project and our ambitions to external parties and getting their feedback really encourages us to continue on the path we have already chosen.

Shipping plays a significant role in how our society is built, but it is also a large contributor to harmful emissions. We've made a decision – we will lead the way towards truly sustainable shipping, and we will contribute to transforming the shipping industry. With Oceanbird, we take a leap towards that vision. We're cutting emissions by 90% compared to best-in-class vessels of today.

At Wallenius Marine we've been pushing the sustainability agenda for decades and it's been challenging at times, but in the last few years we've seen a growing demand for sustainable solutions.

Introducing something completely revolutionary like this will of course challenge our habits. This vessel will be an odd bird in the beginning and may not fit perfectly in today's transport systems. But the support we are getting from key stakeholders – like operators, cargo owners, ports and authorities – is overwhelming.





MIKAEL RAZOLA

Research Project Manager Wallenius Marine

ROLE: TO COORDINATE THE COLLECTIVE RESEARCH AND DEVELOPMENT AT WALLENIOUS MARINE, SSPA AND KTH.

From the start we have tried to combine the commercial incentives with a scientific approach to the development of Oceanbird. The result is clear proof of what can happen when the collaboration really does work, and we have seen some amazing exchanges of knowledge within the project. Working closely with the Swedish-based maritime knowledge company SSPA and KTH Royal Institute of Technology has given us access to top-level expertise in areas such as testing methodology, hydrodynamics, aerodynamics and logistics. At Wallenius Marine, we provide the market-related insights and the necessary operational know-how to give this project credibility. When designing Oceanbird we have used long-established knowledge of sailing and built from that, really focusing on the power of the wind. It's not as simple as 'putting wing sails' on an ordinary ship. The design of the hull is just as important, since the vessel as a system must be considered here more carefully than ever.

Since 2019, the Swedish Transport Administration has been a very important stakeholder. Their financial support really made Oceanbird possible. When they increased their support in July 2020, it wasn't just a big deal financially, it also showed us that they really believe in us as a group and made us feel that we are really delivering something of value. They, like us, really believe Oceanbird to be the future.

CARL FAGERGREN

Project Manager Wallenius Marine

ROLE: TO MANAGE THE TOTAL SHIP CONCEPT DESIGN, INCLUDING CUSTOMER DEMANDS, OUTLINE SPECIFICATION AND PREPARATIONS FOR PROCUREMENT.

The vision of Truly Sustainable Shipping is a longstanding aim for Wallenius Marine. When I started working at Wallenius Marine, that was my job: to plot the road map and make a plan for how we should proceed. We, in our Ship Design & Newbuilding team, made an inventory of all the new technology and research that was of interest to us, and we saw some potential in wind power.

A couple of years ago, many alternative sources of power were out of the question due to their higher cost, but these days consumers are more willing to pay for sustainability. If you look at the road map, we didn't expect to have come this far in 10 years, but now the time is right. Social trends and attitudes have changed, and there is great commercial potential in exploring the power of wind.

Looking further ahead, we will continue to follow our road map quite closely when it comes to fuel like LNG, biofuels and electro-fuels, as well as emission-free energy sources. Battery power is high on the agenda at the moment, but today the batteries are far too heavy and expensive for ocean-going vessels. On shorter distances though, they can be a part of a multi-fuel solution. But changes can occur fast and new technology can take a sudden leap in development. Right now, for example, hydrogen is all the rage.

My job is to follow and exploit the technical development in these areas and make sure we optimize the propulsion of Oceanbird. After all the years of working with the road map, it's truly exciting to be so close to the goal.



Since Oceanbird is such an odd bird in the maritime world, there is great interest in the project. Here are some of the many questions about Oceanbird:

1 **Could you please explain the technology behind the wing sails?**

The technology is actually quite similar to airplane wings, although airplane wings are asymmetric in profile since they should only provide lift upwards. Oceanbird's wings are symmetric to be able to produce lift, regardless of wind coming from port tack or starboard tack. The wings can also rotate 360° to optimize the angle depending on wind direction relative to the ship.

2 **What difference does this project make to the environment?**

The ambition is to show that this concept will decrease CO₂ emissions significantly. This project could also be extended to create a complete emission-free vessel, since the engine also can run on alternatives to fossil fuels. It's really important to show that the shipping industry can provide such an emission-free concept. It's sought after in many instances such as cargo owners, keen on getting an alternative for their long-distance shipping.

3 **What's the draft of this vessel?**

Even though it's a sailing vessel the draft doesn't have to be very deep. This is because stability is reached thanks to water ballast onboard in combination with trimming of the wingsails, and is not dependent on a keel. The moulded draft, or distance to the bottom of the vessel, will be around nine metres.

4 **What kind of control system is used in Oceanbird?**

One interesting aspect of this vessel compared to others is that typically a motorship has a rudder and it can control its speed. In Oceanbird, we have five wing sails, controllable fins under water and the rudders. We have the engine. In effect, we try to control the same amount of degrees of freedom as other ships, but we have a surplus of activators.

5 **How much will Oceanbird heel? Is it possible for Oceanbird to capsize?**

The ship will sail upright, using water ballast for active heel compensation. If the vessel is sailed fully powered, without heeling compensation, it will only heel 5°.

6 **Can Oceanbird dock in any port or do the ports need to be rebuilt?**

Oceanbird may look really different but there will be no need to change the regulations of the ports or the infrastructure. When we lower the sails in order to navigate a port, the difference compared to a conventional ship won't be that big. We are already engaged in dialogue with the ports to prepare them for what's coming.

7 **Why a car carrier?**

We need to start somewhere. Oceanbird is a concept for sailing vessels and we start where we have the most knowledge: the car carrier business. The primary cargo is cars, but basically any kind of RoRo cargo – trucks, buses, excavators, high and heavy, etc. Anything you can put wheels on or store on a trailer can be on board. But we are going to expand the Oceanbird concepts to other segments too.

8 **How can you claim "90% lower emissions"?**

Within the project we have developed a sophisticated toolbox for performance predictions where we simulate entire voyages based on historic weather forecasts – so-called hind casts. With this toolbox, we can run 100 voyage simulations overnight to get statistically representative performance figures. We now use this tool to study how design modifications affect the overall performance in order to further improve the design. The toolbox also helps us to build confidence that we will reach our target of 90% lower emissions.

Find more questions and interesting answers about Oceanbird at

[OCEANBIRDWALLENUS.COM](https://oceanbirdwallenius.com)



9 When can we see the first full-scale Oceanbird vessel in commercial operation?

We have come a long way into the project but there is still a lot to be done. There are both technical and commercial challenges that we need to solve, but we also need to get more stakeholders involved in the project. Our project plans are ambitious but we are on track to making it possible for a delivery and start of operation of a full-scale Oceanbird in late 2024.

10 In what region and on which route will Oceanbird sail?

Oceanbird can sail any ocean but a North Atlantic crossing is probably where it will start. Oceanbird is most suitable for open water operation and could potentially also be efficient in coastal operation on longer hauls. For shorter hauls, or in dense traffic areas and such, we believe that there are other more attractive sustainable solutions such as electrification or non-fossil fuels. Wind-powered vessels are not the solution for all types of shipping.

11 How much will it cost, construction-wise, compared to other vessels?

We don't have the full picture of the costs yet, but it's likely to be slightly more expensive than traditional vessels but in the same ballpark. The wing rigs will come with additional cost, but less machinery equipment will be required than on a conventional vessel. All in all, it will be slightly more expensive.

12 Does the existing shipbuilding industry have the capability to build this kind of vessel?

It depends on the shipyard, but the hull isn't that complicated to build. Most likely the wing rigs will need to be built by an external supplier and then delivered to the shipyard for assembly. To assemble the wing sails and then mount them on the hull will be a completely new procedure for the shipyard.

13 Is the speed of the ship dependent on wind, which is highly seasonal?

With modern weather forecasts it is possible to find and sail with the winds in a reliable way most of the sailing time. In addition there will be auxiliary power on-board, preferably with fossil-free fuel, to assist when needed. Thousands of simulations in different weather have been done. The simulations show that it's possible to have a reliable scheduled speed of 10 knots.

14 Will Oceanbird reach ports on scheduled time?

Reliability is key to the car manufacturers and the logistics system. It's the date of delivery that is important, more than the speed, or time, used between ports. To secure reliability we will guarantee a scheduled speed of 10 knots so that delivery will be on time.

From drawing board **TO OCEANBIRD**

Although the final launch is yet to come, there have been some major milestones in the development of Oceanbird. Let's take a look at some of the biggest occasions, from early pencil drawings to the 3d-rendered Oceanbird of today.

2. MODEL BEHAVIOUR

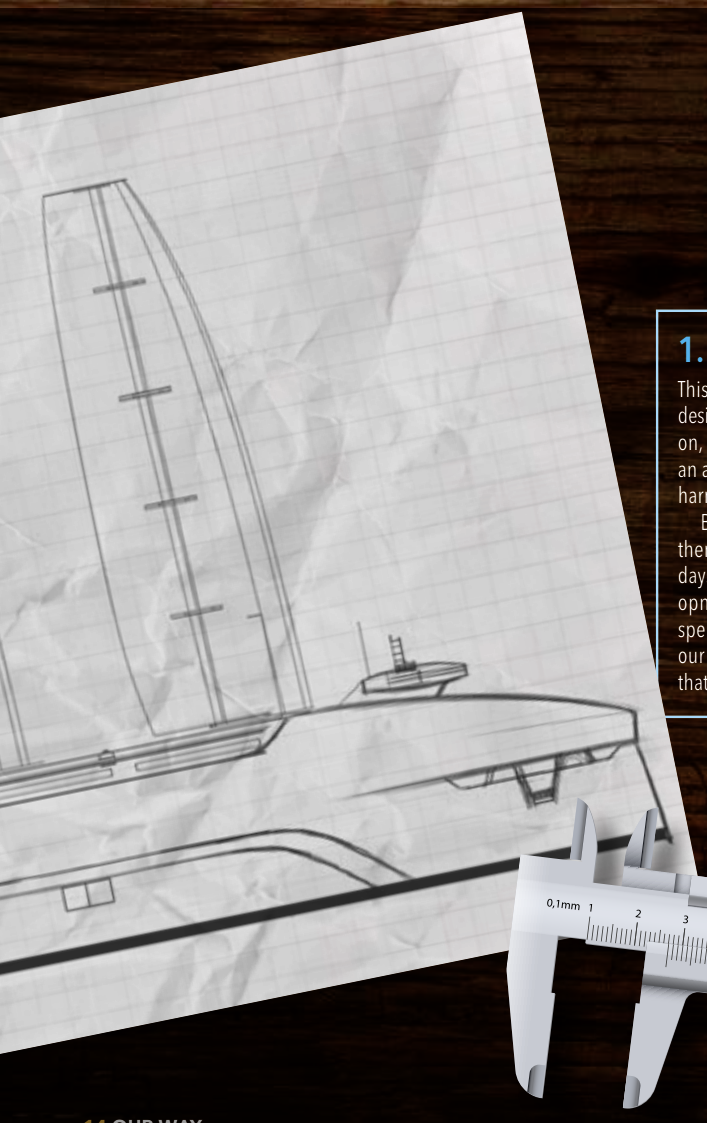
Some of the students in the course Naval Design at KTH made a seven-meter model of Oceanbird. In May 2020, the students drove the model to Viggbyholm Boat Club, north of Stockholm. There they performed an inclination test to get the center of gravity and also tested the motoring part and the rudders.



1. EARLY SKETCH

This sketch is from 2017, when the design started to fall into place. Early on, we started to work on achieving an aerodynamically efficient hull, in harmony with the wing rigs.

Back then, there were only four of them, instead of today's five. In those days of early conceptual design development, a lot of time and effort was spent on trying to sell this venture to our colleagues and convince everyone that this was a worthwhile enterprise.

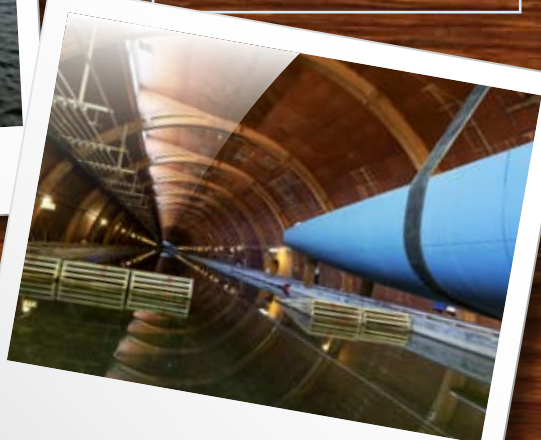


3. THE POWER OF WIND

A key to developing wind-powered vessels is to understand how the wind behaves. There is little systematic measurement data to validate models of wind behavior in the atmospheric ground boundary layer (0-250 metres above water) over the open ocean. To understand the characteristics of the wind in this region, we conducted a series of experiments. For example, we installed laser measuring equipment on an ocean-going ship's deck. This allowed us to measure both wind speed and wind direction from the ship deck up to 300 metres above deck, where the wings will operate.

5. TELESCOPIC WING RIGS

We considered a folding rig earlier in the project, but a telescopic solution where you can adjust the height of the sails by pushing sections up and down has many advantages. The construction is more robust, it's possible to quickly get rid of wind power, and it also saves space on deck. You don't have to expose the whole sailing area if you just need a small amount of power. The telescopic solution is also more efficient from a sailing performance point of view.



4. HULL DURABILITY

During the spring of 2020, SSPA performed a test of an Oceanbird model in their towing tank. Earlier, we had done a number of computer simulations and needed to confirm the results of the experiments. We were interested in the hydrodynamic performance, focusing on the hull, rudder and propeller. Once in the water, the model behaved very well. We saw a smooth wave pattern behind the model, which indicated that the resistance was low and the hull was efficient.



6. AERODYNAMIC DESIGN

Designing Oceanbird, we had to pay much more attention to the aerodynamics than we normally would do. Not only do the wings have more in common with airplane wings than traditional sails, they also interact with the hull in a very complex way. This means that we can actually harness the power of wind in a very efficient way, where the different parts of the hull and wings are working closely together, boosting the vessel performance.

WIND *in the* SAILS

Plans for expanding the Oceanbird concept further are already in the making. In a not-so-distant future, travellers and all sorts of cargo may once again cross the great oceans on wind-powered ships, with significantly lower emissions than today.

Josefin Falk
Communications
Manager
Wallenius Marine



A

lthough the first Oceanbird is yet to be launched, plans have already been drawn up for new options of wind-powered vessels. Wallenius Marine's guiding star is Truly Sustainable Shipping, a concept in which Oceanbird will play a major part. In short, Truly

Sustainable Shipping means that Wallenius Marine's complete service offering, from design to recycling, makes it possible to become sustainable in all aspects and in all stages of a ship's life cycle, explains Josefin Falk, Communications Manager Wallenius Marine.

"Our strategy is to find 'upstream solutions', in other words to eliminate the source of the problem instead of settling for solutions that will just reduce the problem or move it elsewhere. One of IMO's lesser-known goals is to achieve as close to Zero GHG as possible in this century. Oceanbird will have 90% lower emissions than its peers, and we're striving to design Zero Emission ships."



**OUR VISION IS
TO LEAD THE WAY
TOWARDS TRULY
SUSTAINABLE
SHIPPING.**



ANOTHER AIM FOR global maritime transport is to cut CO₂ emissions by 40% in 2030. Oceanbird won't bring about that change single-handedly, but the concept can play a major role if shipping companies add the concept to their fleet. The segments of ships closest to the present version, i.e., car carriers, are cruise ships/explorers and bulk carriers. When designing wind-powered versions of these types of ships, the experience and knowledge gained from Oceanbird PCTC will help us use the concept for other types of ships.

"There have actually been quite a lot of requests to buy passenger tickets to travel on Oceanbird. That's not in the foreseeable future, but we really appreciate the level of interest. Oceanbird has a wide commercial range, and its concept can, and will, be adapted to carry a number of different kinds of cargo. But we can't do everything at once. Right now we operate on the basis of what's most feasible," says Josefin Falk. "We are now exploring other ship segments such as bulk carriers and explorer cruise vessels. For each ship type there are different challenges, but we see that the concept can be adopted for most

segments. Particularly challenging is of course vessels where large and moveable cranes are operating on deck since they may interfere with the wing rigs, but we think it's possible to get around that," says Carl-Johan Söder, Naval Architect Wallenius Marine.

Another interesting aspect of Oceanbird is the possibility of retrofitting, since Oceanbird's wing sail rig could be adjusted to fit already existing ships. This will give the ships wind assistance and reduce emissions, thus speeding up the transformation of maritime transport.

YOU MIGHT WONDER why Wallenius Marine chose to reveal so much of its design and the work process at such an early stage.

"Our vision is to lead the way towards Truly Sustainable Shipping, and we of course want others to join. It is not a competition, but rather a direction we all need to take. By being transparent in the process, we wish to inspire others to test the limits of what is possible. We all need to make a change and it just can't wait any longer," Josefin Falk concludes. ©



Carl-Johan Söder
Naval Architect,
Wallenius Marine

VOICES ON OCEANBIRD

Groundbreaking, inspiring and a first-class initiative – since Oceanbird's launch, many have been amazed.

TOMAS ENEROTH

Swedish Minister for Infrastructure

"I see Oceanbird as a first-class initiative; the entire transport sector has to change if we are to achieve the climate goals. The main focus is of course road traffic, which is largely being electrified, but shipping also needs to change, to become fossil-free.

"As Minister for Infrastructure I have prioritized support for shipping, partly by switching more freight to this sector, but also by making it more competitive. The shipping sector's own efforts to reduce climate impact are vitally important – this makes Oceanbird so innovative and exciting, and shows that Wallenius Marine

and other stakeholders, including ports and shipping companies, are really making a contribution.

"Just a few years ago, I chose to double the innovation grants – the Oceanbird initiative is part of this investment to support domestic innovation, of which there is a long tradition in Swedish shipping. If Sweden can become what I call a 'permanent world exhibition' we can show the rest of the world that it is possible to change. I would like to see more initiatives such as Oceanbird in Sweden."



PER BOLUND

Swedish Minister for Financial Markets

"It's incredibly inspiring to see such transformative ideas emerging now, which can have a huge impact on reducing emissions from the transport sector. Not least when it comes to international freight transport, where so far, good ideas have been lacking.

"In Sweden, we have set extremely ambitious goals to become the world's first fossil-free welfare state. And we really do mean fossil-free. All emissions must come to a halt. We know that emissions from the transport sector are significant and must be reduced, both on land and at sea.

"Therefore, we need people working with technology to be as creative as possible to supply us with renewable energy and sustainable transport. I think this – Oceanbird – is a prime example of this.

"I want to see an armada of sailing vessels transporting goods in the future and I think Oceanbird really is a timely concept. I am convinced that there will be many who want to build these ships, and many who want to transport their goods on them."



ANNA WEIMERS

Head of Global Outbound Logistics Strategy & Engineering, Volvo Cars

"Sustainability is really at the heart of Volvo Cars' purpose, we want to provide freedom to move in a personal, sustainable and safe way. As a part of that, we want to be a climate neutral company by 2040. In the short term, that means we want to reduce our operational emissions by 25% per vehicle by 2025. The transport sector is difficult and challenging to de-carbonize, so to be able to make this happen, we really want to find partners out there that can help us with this challenge, partners that share the same sustainable commitment. We see this as a great initiative that we want to support going forward."

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WE SEE THIS AS A GREAT INITIATIVE THAT WE WANT TO SUPPORT GOING FORWARD.



GUY PLATTEN

Secretary General, International Chamber of Shipping (ICS)

"To meet the ambitious target to halve emissions by 2050, and become a zero-emissions industry as soon as possible after this date, we will need an 'all of the above approach' to developing the ships of the future. Innovation is going to be key to the success of this strategy and we welcome all initiatives that further our ability to deliver a zero-emissions industry."



CHRIS CONNOR

President & CEO, American Association Port Authorities

"The American Association of Port Authorities (AAPA) – the unified and recognized voice of seaports in the Americas – applauds and congratulates Wallenius Marine and its partners on their innovative initiative to develop a commercially viable car carrier vessel that will emit approximately 90% fewer air emissions than existing ocean-going ships powered chiefly by diesel-burning engines. The Oceanbird is truly a revolutionary concept relying on a clean, age-

old power source – the wind! America's seaports strive to be good community partners. Reducing air emissions continues to be a high priority for many of these ports. Wallenius Marine's wind-powered Oceanbird will help improve air quality in and around port communities where they call.

"When the Oceanbird is deployed in the next two or three years, it'll be a sight to behold, and America's ports will eagerly welcome it!"



SPECIFICATIONS

TEXT **SOFIA LUNDGREN** ILLUSTRATION **MARTIN ISAKSSON / SHUTTERSTOCK**

OCEANBIRD IN NUMBERS

90%

lower emissions than best-in-class vessels of today

5

wing sails which can be lowered and raised

200

metres long

40

metres wide

16

knots top speed at beach reach (10 m/s)

10

knots average speed

12

days to cross the Atlantic

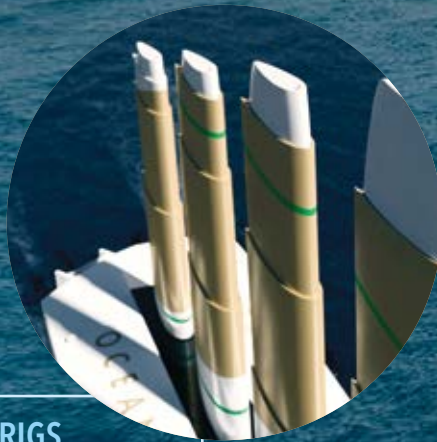
AUTOMATION

The rig itself will be highly automated. The nautical officer basically decides how much power he or she wants to take out, and then sheeting angle optimization and de-powering in gusts is done automatically.



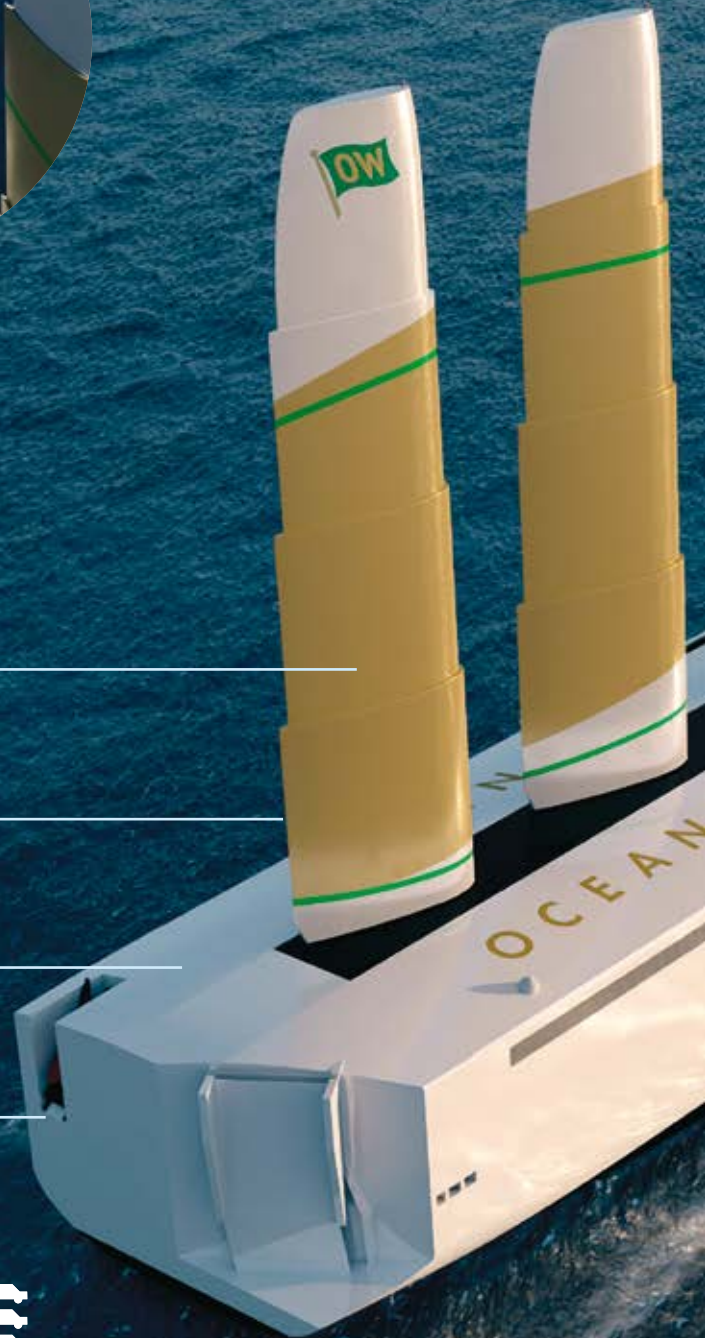
SPEED

10 knots is Oceanbird's average speed towards target – if it's windy the ship can go faster, and if there's less wind it'll go slower. To be able to get in and out of harbours and, as a safety measure, Oceanbird will also be equipped with an auxiliary engine.



THE WING RIGS

The wing rigs are made of steel and composite materials and turn 360 degrees to catch the wind in an optimal way. A telescopic construction allows the rigs to be lowered from 105 to 45 metres when the vessel needs to pass under a bridge, or if strong winds make it necessary to reduce wing sail surface to reduce speed.

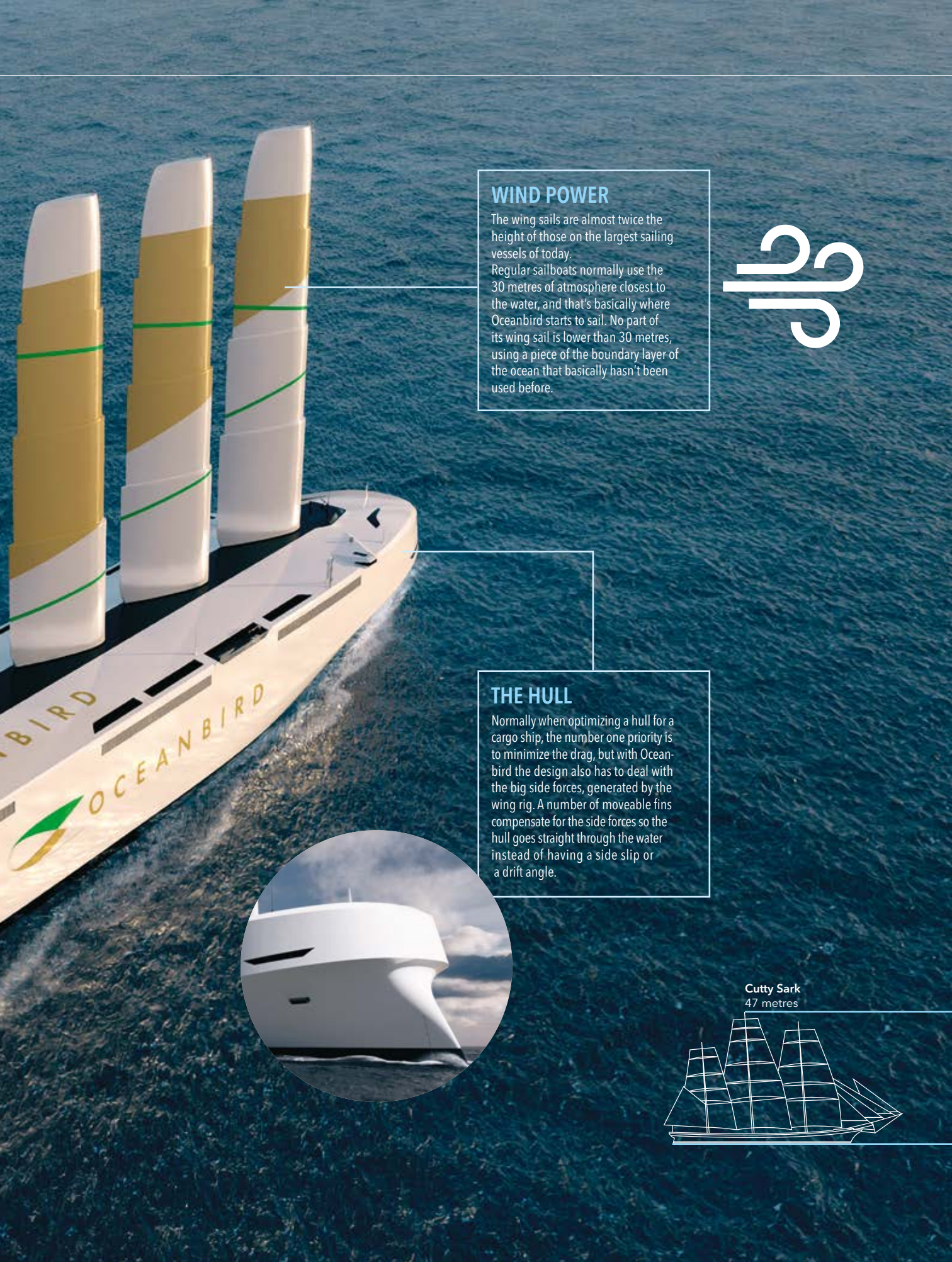


CAPACITY

Oceanbird will have a capacity similar to car carriers of today. That means that she will be able to carry 7 000 cars but will also be able to carry high and heavy and break bulk cargo.



x 100



WIND POWER

The wing sails are almost twice the height of those on the largest sailing vessels of today.

Regular sailboats normally use the 30 metres of atmosphere closest to the water, and that's basically where Oceanbird starts to sail. No part of its wing sail is lower than 30 metres, using a piece of the boundary layer of the ocean that basically hasn't been used before.

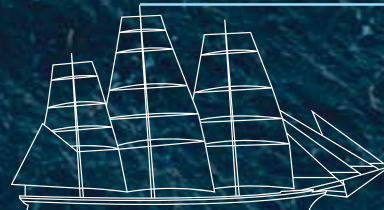


THE HULL

Normally when optimizing a hull for a cargo ship, the number one priority is to minimize the drag, but with Oceanbird the design also has to deal with the big side forces, generated by the wing rig. A number of moveable fins compensate for the side forces so the hull goes straight through the water instead of having a side slip or a drift angle.



Cutty Sark
47 metres



THE SKY IS *the* LIMIT

Although the long process of designing Oceanbird is coming to a close, the first voyage is a few years away. Alterations and changes may still be made, but in the current state of design, here is Oceanbird in numbers.



Forging ahead with Wallenius

In its long history dating back to the 1930s, Wallenius has always been driven by a strong commitment to innovation and entrepreneurship. The company's founder, Olof Wallenius, was one of the great pioneers of his time, and his innovative spirit lives on to this day at Wallenius.

Wallenius Marine has many firsts to its name. In 1955, its sister company Wallenius Lines received

delivery of the world's first purpose-built car carriers and later went on to launch the RoRo (roll-on-roll-off) cargo system, which changed the nature of the car carrying business forever. More recently, the company has established itself as an environmental front-runner, leading the way in everything from ballast water treatment and sustainable antifouling paint, to the present launch of wind-powered ships.

This is the story of the small Swedish

shipping company that went on to become one of the most cutting-edge logistics providers in the world.

IN 1934, OLOF Wallenius formed Rederi AB Soya, acquiring the company's first vessel, m/t SOYA, which had a capacity of 125 tonnes. By the time he passed away in 1970, the company was shipping more than 500,000 vehicles a year across the seas. Those who knew Wallenius called him a true entrepreneur, someone who approached a new idea by first swiftly considering the opportunity and the risk, then gathering the resources needed to realise it. He was impatient, and wanted quick ideas and results. And even though rumour has it he was satisfied if one in ten ventures turned out well, he did not like to

be reminded of the failures.

Olof Wallenius soon made a name as a forward-looking businessman, and in 1963, he placed Wallenius Lines firmly on the map with the development of the roll-on-roll-off (RoRo) cargo system, which replaced lift-on-lift-off (LoLo) as the car carrying system of choice. The idea for cars to use their own power to roll on and off ships was the brainchild of Captain Bengt Törnqvist, and Olof Wallenius immediately saw an opportunity to establish Wallenius Lines at the cutting edge of the burgeoning automotive industry. RoRo allowed cars to be frontloaded onto the ship, first using a bow visor, and later via the stern or bow ramps, instead of using cranes, making the loading process both quicker and safer.

Olof Wallenius,
Founder of
Wallenius Marine



The ROLLEFF hydraulic engine was one of the inventions from AB Soya's experimental department.

AROUND THE SAME time, Wallenius Lines patented a new hydraulic engine and pump for the marine market. To develop the technology, Olof Wallenius formed Rederi AB Soya's experimental department. The new ROLLEFF hydraulic engine was launched in the late 1960s, but unfortunately Olof Wallenius did not get to experience its success before his death. ROLLEFF was eventually sold to Hägglund & Söner.

As the years went on, Wallenius Lines continued to improve the cargo systems for car carriers. In the mid-1970s, when customers began to demand shipping in special and separate car holds, Wallenius Lines responded by building bulk carriers with three separate car garages and four bulk holds.

Never a company to follow the pack, Wallenius Marine has tended to act faster than the competition and get ahead of the legislation curve. This has applied especially in recent years as the maritime industry has become subject to ever-stricter environmental regulations.

IN 2002, WALLENIUS Marine installed ballast water treatment equipment on a first vessel for testing, and in 2006 Wallenius Water launched its groundbreaking Pure-Ballast method for cleaning water without the use of chemicals. Meanwhile, in 2004, the International Convention for the Control and Management of Ships' Ballast Water and Sediments was adopted

by the International Maritime Organization (IMO) to control the transfer of potentially invasive species that are often found in ballast water. The regulation came into force in September 2017 – although all Wallenius Marine's vessels had already been compliant since 2015.

Similarly, in 1997, Wallenius Lines switched to tin-free hull paint and, later, introduced silicon-based antifouling paint that contained no substances that were harmful to marine life. By 2000, the entire Wallenius fleet was free from TBT, a toxic component found in antifouling paints. The corresponding IMO Convention on the Control of Harmful Anti-fouling Systems on Ships was adopted in 2001 and only came into force in 2008.

Over the last two decades, Wallenius Marine has consistently remained a step ahead of the competition and the regulators when it comes to marine emissions. In 2004, the company set a world record in low sulphur content in bunker oil for ocean-going services and, between 2005 and 2013, its CO₂ emissions were reduced by approximately 21%.

LOOKING TO THE future, Wallenius Marine is prepared to take the next huge step on its journey to a zero-emission future with the launch of the avant-garde Oceanbird, confirming once again its position as one of the shipping industry's greatest pioneers of all time. ©

Oceanbird,
launched
in 2020.



The PureBallast family,
launched in 2006.



The RoRo
vessel
m/s ANIARA
in 1963.
It could fit
240 cars.



The PCC m/s
DON JUAN
in 1975,
with a
loading
capacity of
5,000 cars.