



X SUSTAINABILITY

WITH OUR LOVE AND PASSION FOR THE OCEAN, IT IS IMPORTANT FOR US TO FOCUS ON SDG 14 "LIFE BELOW WATER"

Sustainability is an integrated part of X-Yachts strategy. From the beginning we decided to focus on Sustainable Development Gold (SDG) no. 14: "Life below water". But are now ready to intensify our efforts and focus on more.

We quickly learned that it was important to involve all employees in the process, and we try to engage them through an SDG corner in the company. Here they can read about the work and the Sustainable Development Gold (SDG) set by the UN.

Employees can be inspired and involved and give their good ideas. It often comes

the best ideas from the employees who are close to the product and the resource consumption.

Pollution of the world oceans is a growing problem, and we want to help what we can at this point. We do this in collaboration with one of our valued partners "Race for Oceans foundation".

Together with them we focus on SDG 14 where we together focus on removing plastic in the oceans.

THE GLOBAL GOALS

For Sustainable Development



ABOUT THE RACE FOR OCEANS FOUNDATION

The Race for Oceans Foundation is a non-profit organization based in Denmark. Their purpose is to shine a light on Sustainable Development Goal 14: Life Below Water, including the growing plastic pollution.

In a unique way we create a greater synergy between sports, beach clean-ups and knowledge and we wish to be able to include everyone in our activities.
– Signe Simonsen

Race for Oceans is built on volunteers and a strong cooperation with organizations and companies wishing to shine a light on SDG 14 - life below water, hereunder the growing plastic pollution. Race for Oceans works together with the international organization UNLEASH. Together, they spread the concept globally in almost 40 different countries and regions on 6 continents.



“We are very happy that X-Yachts joined forces with us in 2021 on our journey to shine a light on SDG 14 - life below water. We are really looking forward to intensifying the collaboration here in Denmark, where we will see the X-Yachts boats and community be part of the Race for Oceans Relay along the coastline in the years to come. It will also be really interesting to follow the globalisation of the Race for Oceans concept on six continents to all seven continents, which also was supported by X-Yachts in 2021”.

Signe Simonsen

Founder of the Race for Oceans Foundation

INTRODUCING /// ELECTRIC PROPULSION

X4^{9E}

REACHING FOR NEW HORIZONS – X-YACHTS FEELS XSTATIC

A new range of electric powered sailboats is a natural step for X-Yachts in order to support a greener future. Based on our path of 42 years of innovative yachts and heritage, combined with Danish green and sustainable energy, we look forward to launching the first electric sailboat in May 2022.

With the cooperation between John Haurum* and OceanVolt

we believe that the time and setup is just right, for launch of the first X4^{9E} with electric propulsion.

Our focus on the environment is more than just going electric – In the spring of 2021 X-Yachts became the main sponsor of the ‘Race for Oceans’, an organisation whose target is to protect the oceans from plastic.



**ALL TO PROTECT
THE EARTH FOR
A BETTER SAILING
LIFE AT SEA**



– When I met X-Yachts and shared my ideas X-Yachts immediately committed to the project and shared a common interest in merging innovation, sailing pleasure, and a greener future.

The fact that X-Yachts has their own design office in-house at the yard in Denmark is essential to build and control a project like this – When looking back at the heritage of X-Yachts, and the innovation that has already been done within X-Yachts – I’m sure that this will be another great success”

John Haurum

– The client of the first electric-powered X-Yachts





**ANDREAS ØRBÆK OLESEN
– SALES MANAGER OF
THE ELECTRIC-POWERED
X-YACHTS**

“When I first met John and he told me about his thoughts of having a new boat with electric propulsion, I was excited. I instantly felt his interest and passion in this eco-friendly system. To John, it was way more than just a product and a new boat – it was a passion for a new future with sustainable energy combined with his passion for sailing”

**A MINDSET BECOMES
A LIFESTYLE**

My plans for the X4⁹ are primarily to use it for long-distance cruising, but it has also been specified with performance sailing in mind and I intend to participate in challenges like Around Denmark Race and eventually, also the ARC Cross Atlantic.

To commit to an electric saildrive is a mindset and perhaps a changed way of life at sea.

– Sailing is all about harnessing the wind for energy and pleasure, X-Yachts and OceanVolt have taken this mindset to the next level. The OceanVolt system stands out as enabling the use of the saildrive either for propulsion or powerful electricity hydrogeneration while sailing. X-Yachts is using this to build an integrated energy system also comprising of solar panels and a conventional backup generator, for the rare instance where continuous sailing for a motor is needed. I expect the system will fully serve my sailing needs, while largely being energetically self-sustainable.





X4^{9E}

JOHN MORRING

– TECHNICAL MANAGER OF X-YACHTS

Every X-Yacht is designed with performance in mind – and the X4^{9E} is no exception.

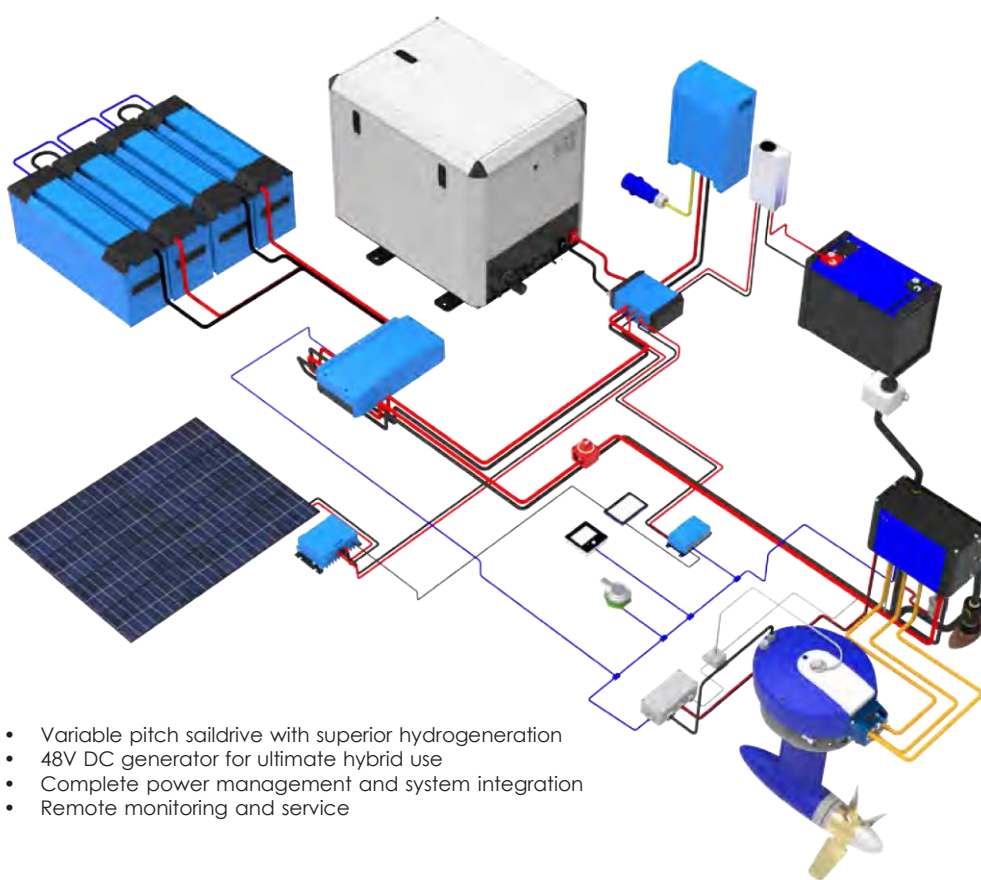
The X4^{9E} is the first X-Yacht built as a hybrid-powered yacht. It is fitted with 2 x 10 kW electric sail drives, a 28,8 kWh Lithium battery bank, and an onboard

DC generator with a capacity of 11 kW. The hybrid concept is chosen to make long-distance crossings possible without worrying about distance limitations. A pure electric solution is also available if limited distance under engine can be accepted.



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Oceanvolt is proud to supply
the first ever hybrid electric X-Yachts.

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THE HYBRID POWERED X4⁹E

THE CONCEPT

The X4⁹E is the first X-Yacht built as a hybrid powered yacht. It has 2 x 10kW electric saildrives installed, a 28,8 kWh Lithium battery bank and an onboard DC generator with a capacity of 11 kW.

The hybrid concept is chosen for making long distance crossings possible without worrying about distance limitations. A pure electric solution is also available if a boat is to be used as a day-sailor.

On the X4⁹E the entire engine room is converted to a technical compartment where the LiFePO₄ battery bank is located as low as possible in an aluminium battery box.

On the engine bulkheads the water-cooled motor controllers for the two saildrives are fitted together with the combi that's used for recharging the battery bank while the boat is connected to shore power.

The engine room still has the nice aluminium finish on all sides, but the noise insulation is excluded, hence it is not needed anymore.

The two Oceanvolt saildrives are installed below each berth in the aft cabins. They have a maximum power of 10kW each, theoretically enabling the yacht to sail with a speed of up to 7,8 knots whilst also repowering the battery bank with a regeneration power of up to 3.000 watts.

Aft of the engine room an 11kW Fischer Panda DC generator is installed. The generator is used to recharge the 48V lithium battery bank and/or to simultaneously supply power to the two Oceanvolt saildrives.

THE RANGE

When talking electric propulsion, the first question that arises will always be: What's the range under battery power?

The answer to this is that it highly depends on the boat speed, the wind, and the waves. The calculations from Oceanvolt for the X4⁹ with a lithium battery bank of 28,8kWh are estimated as follows:

Conditions Flat water no wind

Boat speed	Range	Sea margin
4 knots	49 NM	37,2 NM
5 knots	30 NM	22,7 NM
6,2 knots	19 NM	14,5 NM
7,3 knots	12,6 NM	9,4 NM

The range is the maximum range with a 90% discharge of the battery bank.

The sea margin takes 25% safety into account due to sea state etc.

In case the yacht has to travel longer distances under power the Fischer Panda generator must be started to enable it to deliver power to the propulsion system and to have the battery bank recharged.

Here are some examples that explains the power need versus boat speed:

RECHARGING TIME

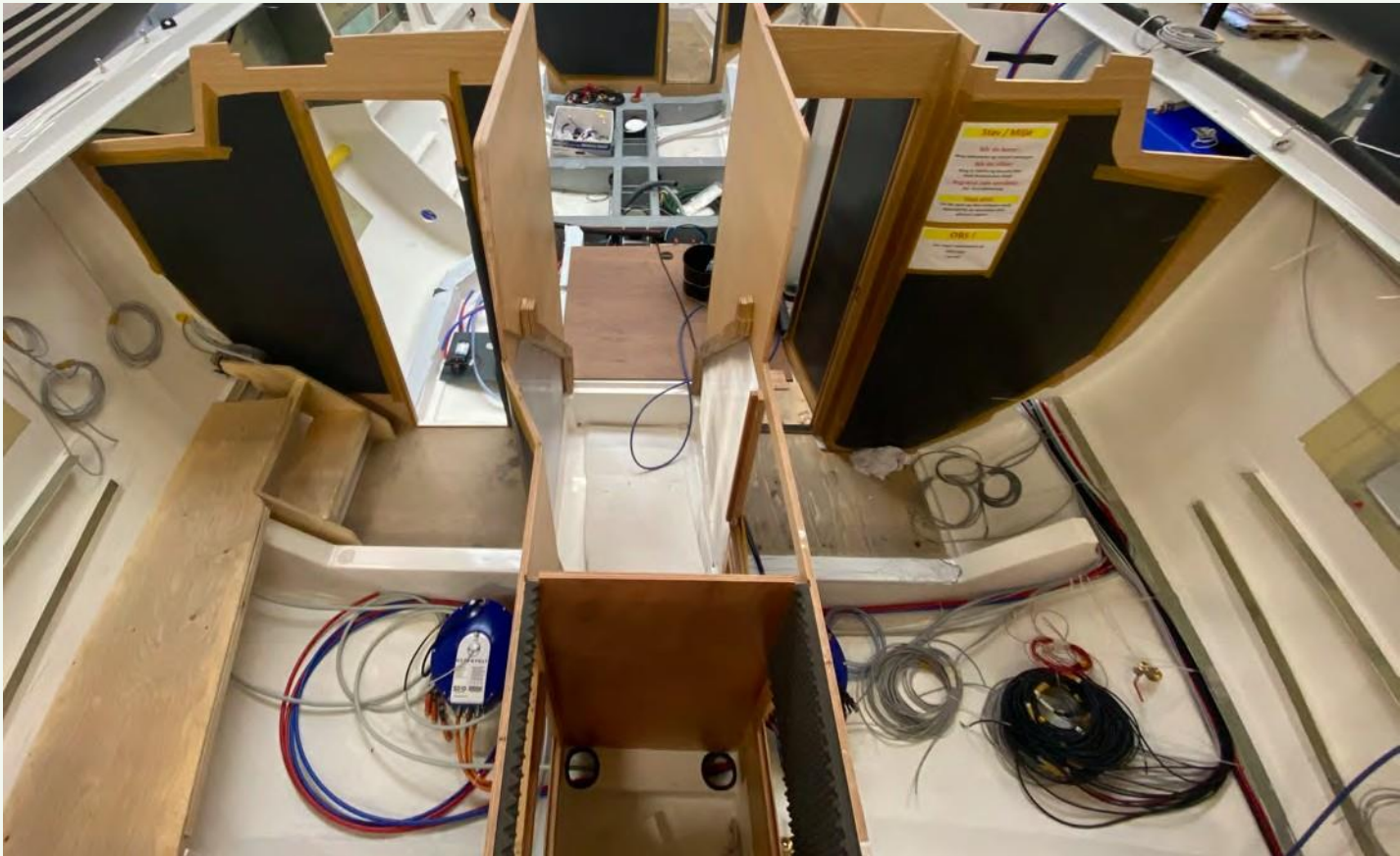
There are three ways to recharge the battery bank.

Recharging times from 20-80% state of charge:

Fischer Panda generator: 95 minutes.

Combi charger: 9 hours and 40 minutes.

Servoprops: Minimum 10 hours.



CASE 1

Full or almost full battery bank and need to travel for long distance under power.

In this case the generator delivers all power (11 kW) to the two servoprops, i.e they are run at 5,5kW each.

This will allow the boat to travel with a speed of 6,7 knots (conditions: no wind and no waves).

The fuel consumption of the generator will be 3,8 litres per hour, i.e 1,7 NM per litre of fuel consumed.

The yacht will be able to continue with this setup until there's no more fuel in the tank.

CASE 2

Need to recharge battery bank while under generator power.

In this case the power of the servoprops must be decreased to a level lower than 5,5kW each, e.g. to 4kW.

The generator still delivers 11kW. 8kW for the Servoprops, and 3kW for recharging the battery bank.

The boat speed will be reduced to 6 knots, still calculating with no wind and no waves, and the fuel consumption will remain 3,8 litres per hour.

After 10-12 hours max. the battery bank will be fully recharged, and boat can continue as described in case 1.



CASE 3

15 NM miles to destination. Battery bank 80% full, and crew would like to travel as fast as possible to destination under engine.

If both servoprops work at full power of 2 x 10kW, the boat will sail with a speed of 7,8 knots.

It will therefore take approx. 2 hours to reach the destination.

Battery bank is 80% full, which is not enough solely to power supply the servoprops all the way to the destination. The generator must be started.

In this case the generator will deliver 11kW to the servoprops, the battery bank will deliver the remaining 9kW which will bring boat to the destination under full power.

FACTS

- The life cycle of the MG lithium batteries is 3.500 cycles. @ 6knots of speed, this is equal to 15NM * 3500 = 52.500 NM.
- The LiFePO4 batteries are the safest chemistry on the market.
- Recharging from 20-80% with generator takes approx. 95 minutes.
- Recharging time from 20-80% with charger takes approx. 9h 40 minutes.
- 2 x 10kW Servo props have the same torque as a 60hp diesel engine. In terms of top speed, the motors are equal to 30-40hp.
- Regeneration while underway without need for fuel.
- Only the generator needs to be serviced.
- Regeneration drag up to 2 knots if the boat is sailed below hull speed. 0,5 – 1 knot if close to hull speed.

OceanVolt is a leading manufacturer of electric motors for sail-and-power boats founded in 2004. The Finnish-based company has headquarter in Vantaa where every single part of the system is specially designed for electrical use, and every component is designed and manufactured in Finland as well – This makes OceanVolt unique to the market.

The first electric propulsion X-Yacht sailboat will be launched during the spring of 2022.