6,000
tons less CO_2

100%
Renewable energy

Ellen and Nerthus

The electric ferrytale

PROJECT ZERO
SONDERBORG

Green waves around Als

Partly located on the island of Als, Sønderborg Municipality relies on an active ferry network to link its communities with neighboring islands and the mainland.

Today, three ferry routes connect Als to Ærø, Funen, and Jutland. Two of the ferries – Ellen and Nerthus – are fully electric, powered entirely by certified green electricity.

Emitting no CO_2 and producing neither air nor noise pollution, they offer a glimpse into the clean future of maritime transport.

When Ellen first set sail in 2019, she became the world's first fully electric ferry on a regional route, paving the way for zero-emission maritime transport. With the launch of the larger Nerthus in 2025, Sønderborg has shown that fully electric solutions for ferries are not just possible – they're already here.

Als ferry connections

Ellen
Power source: Electricity
Connects: Als and Ærø
Launched: 2019

Nerthus
Power source: Electricity
Connects: Als and Funen
Launched: 2025

Watch the case video

Cutting carbon at sea

Sønderborg's adoption of electric ferries highlights a trend that is gradually emerging on the global scale. Ellen, which connects the islands of Als and Ærø, revolutionized maritime transport when it was launched in 2019 as the world's longest-range electric ferry, setting a world record by covering 92 kilometers on a single charge.

In 2025, Sønderborg introduced Nerthus, an electric ferry sailing between Als and Funen.

Named after the ancient goddess of fertility and peace, Nerthus lives up to her name by gliding silently through the water – benefitting both passengers and porpoises, the dolphins' smaller cousin, often spotted in the waters surrounding Als.

Together, the two ferries save approximately 6,000 tons of CO_2 annually compared to the diesel ferries they replaced.

6,000 tons reduced CO_2

Together, the two electric ferries cut 6,000 tons of CO_2 annually in operation compared to the diesel ferries they replace.

100% renewable energy

The ferries are charged with certified renewable electricity, sourced entirely from wind, hydro, or solar power.

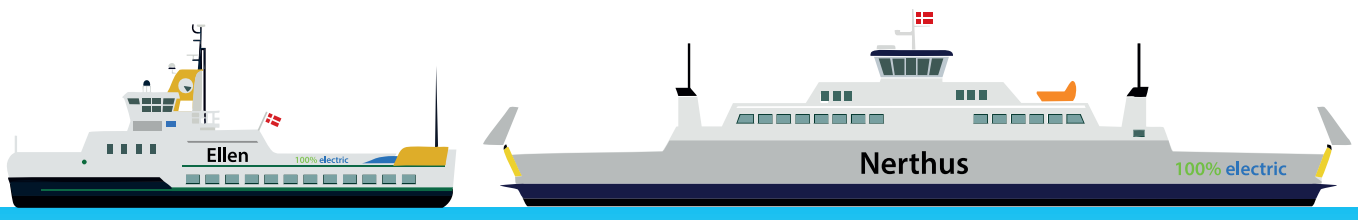
The evolution from Ellen to Nerthus

Joining Ellen six years later, Nerthus represents a new generation of large-capacity electric ferries.

One of the most significant advancements lies in battery technology. The battery systems on Nerthus are not only faster to charge but also more compact and energy-efficient. Nerthus can fully recharge its batteries in just 20 minutes – fast enough to top up while passengers and vehicles are boarding at the dock. On top of that, each kilowatt-hour of storage now weighs just 7 kilograms, nearly half the weight of Ellen's batteries in 2019, which came in at 13 kilograms per kWh.

Nerthus also sets new standards in digital innovation. Equipped with advanced autonomous systems, the ferry can dock and charge itself with high precision. Like a self-driving car learning its route, Nerthus gradually memorizes its crossing path through repeated journeys, enabling semi-autonomous navigation that streamlines the route. The captain remains in control but transitions into more of a supervisory role, overseeing a smooth operation.

The journey from Ellen to Nerthus illustrates just how fast maritime technology is evolving. In just six years, improvements in the energy efficiency of electric drive and charging systems (including inverters), battery design, and smart automation have raised the bar for electric ferries.



59,5 meters

116,8 meters

Ellen
Capacity: 31 cars / 198 passengers
Width: 12,8 meters
Draft: 2,5 meters
Operating Route: 40 km (Als-Ærø-Als)
Battery capacity: 4.3 MWh

Nerthus
Capacity: 188 cars / 610 passengers
Width: 18,2 meters
Draft: 3,2 meters
Operating Route: 34 km (Als-Funen-Als)
Battery capacity: 3,1 MWh

Out of the ferry and into the grid

The batteries on electric ferries hold enormous potential – not just at sea, but also on land.

Take Ellen as an example. Ellen's battery has a capacity of 4.3 megawatt-hours. It weighs a total of 56 tons (incl. cabinets and firefighting system) and consists of 26,000 individual battery cells, which can be replaced as needed.

When the battery capacity drops to around 70%, they are replaced, as the risk of unstable performance and overheating increases beyond that point.

Yet the batteries still have plenty to give, and at the University of Southern Denmark in Sønderborg, researchers are exploring the possibility of giving them a second life. The 'retired' batteries are collected in large containers, which can be used as massive power banks for the electricity grid.

Put simply, electric ferries not only help phase out fossil fuels on ferry routes – they can also play a key role in boosting the share of renewable energy on land.

With over 15,000 ferries transporting more than 4 billion passengers annually, and only a tiny fraction currently running on electricity, the potential to scale this solution globally is massive. In other words, Ellen and Nerthus are more than just ferries – they are floating symbols of a cleaner future.

About ProjectZero

ProjectZero is a public-private partnership between Sønderborg Municipality and the Bitten & Mads Clausen's Foundation dedicated to making Sønderborg's energy system carbon-neutral by 2029. We also aim to inspire other cities to take on their green transition for a stronger positive impact on our climate.

In Sønderborg, citizens, organizations, businesses, utility companies and the municipality work strategically together in a public-private partnership to find local solutions to the global climate challenge.

Since 2007, energy-related carbon emissions have been reduced by 79% and the municipality is on track to deliver on their 2029 target of a carbon neutral energy system.

ProjectZero is anchored in the ProjectZero office, where a small team of employees coordinates and monitors the journey towards zero and brings together the right people, ideas and projects.

Our recipe for a green transition not only has the potential to solve the climate challenge in Sønderborg. It can be used all over the world. We want to show other cities the way and inspire them to create their own transformation. Every year, we welcome decision makers and journalists from all over the world, who want to know more about our road to carbon neutrality.

Do you want to know more or plan for a visit?
Visit our website or contact us at
visit@projectzero.dk.

PROJECT ZERO
SONDERBORG

Nørre Havnegade 43
DK-6400 Sønderborg
Phone: +45 31 68 30 90
Email: info@projectzero.dk