

The little big journey



Operating the region that never sleeps

Sailing every 15 minutes, 24 hours a
day, all year around in all weather

142 crossings per day

Efficient, punctual & safe

The most environmentally friendly
alternative to cross the strait

Business & Pleasure



One of the most important crossings over Öresund

- 7,1 million passengers
- 1,3 million cars
- 452 000 trucks
- 16 500 buses

**“The most sustainable, customer focused
company, striving for zero emission”**

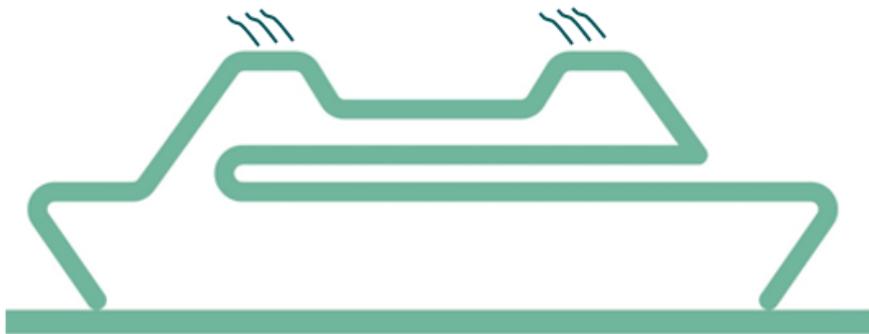
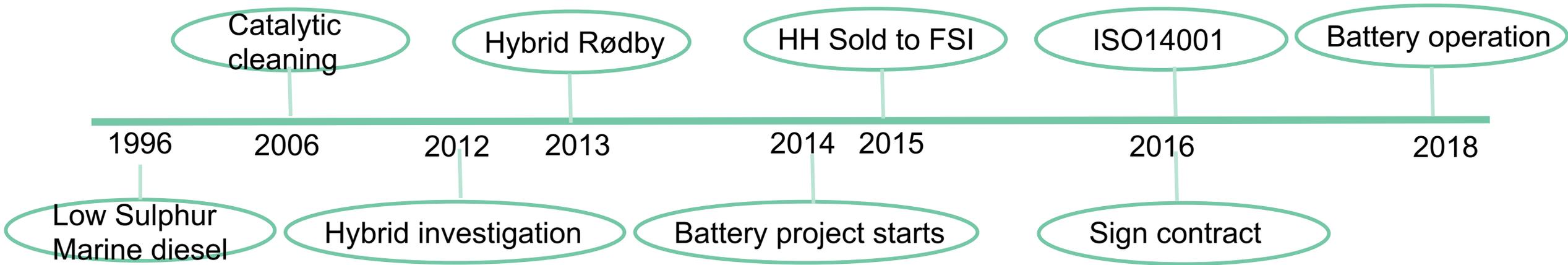
FORSEA

Battery ferries



Co-financed by the European Union
Connecting Europe Facility

The way to battery operation





- Two main consideration - high oil prices and environmental footprint
- Return of investment - unpredictable oil prices
- Power infrastructure in the port
- Battery lifetime - fast development
- Grant from INEA 13,15 MEUR
- Taxations on electricity
- Maintain high-frequency sailing schedule - 60 minutes turnaround
- How to achieve maximum environmental benefits

Authorities and approval



- **No Rules for batteries**
- **1455 Guidelines for approval of alternative design.**
- **Pre risk assessment before signing the contract. Design team consists of many different specialists**
- **Lloyds role for approval**
- **Flag state Authorities (DMA and STA) roles for approval**





M/F Tycho Brahe

Battery driven



- [FoodXpress](#)
- [Ristretto](#)
- [ShopXpress](#)
- Conference & event
- Bar - open in certain periods

Built	1991
Total Length	111 m
Width	28 m
Draught	5.3 m
Car capacity	238
Passenger capacity	1100
Lane meters	539 m



M/S Aurora

Battery driven



- [FoodXpress](#)
- [Ristretto](#)
- Lounge
- [ShopXpress](#)
- Restaurant: Waves
- Bar with live music
- VIP-room/meetings

Built	1992
Total Length	111 m
Width	28 m
Draught	5.3 m
Car capacity	238
Passenger capacity	1250
Lane meters	539 m
Gross tonnage	11 046

Pioneering technology

- 640 batteries per ferry, with a weight of 90 kg per battery. A total capacity of 4,160 kWh/vessel
- The batteries are placed in four containers between the funnels
- Watercooled batteries for highest safety
- Possibility to hybrid mode or full diesel mode
- No emissions from in battery operation
- Higher degree of efficiency – reduced heatloss
- Less noise and vibrations





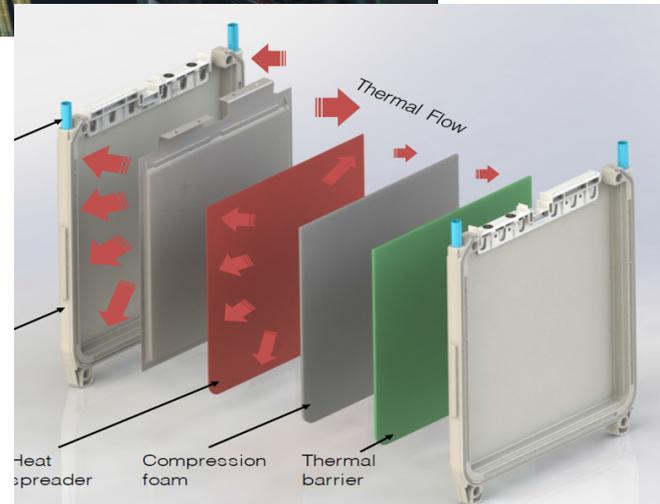
Charging fast and green

- A fully automatic laser-controlled robot arm
- 6-9 minutes of efficient charging for a 20-minute crossing
- Charging with 10 500 kW, 10 500 V and 600 Amp
- Green electricity – wind & water



Batteries

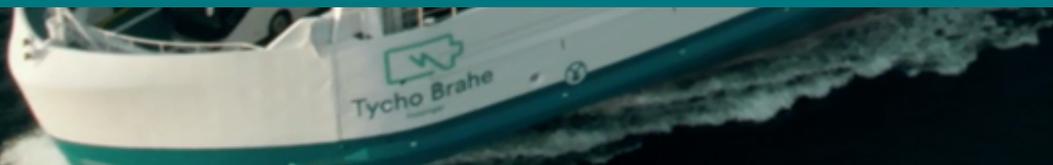
- **Litium Ion batteries**
- **'Production costs' approx. 1200-1700 tonnes CO2**
- **Lifespan approx 5 years**
- **Minerals from controled suppliers**
- **Batteries to be reused in other areas**
- **Casing to be reused after end of life of cells**
- **Fast development within the area**



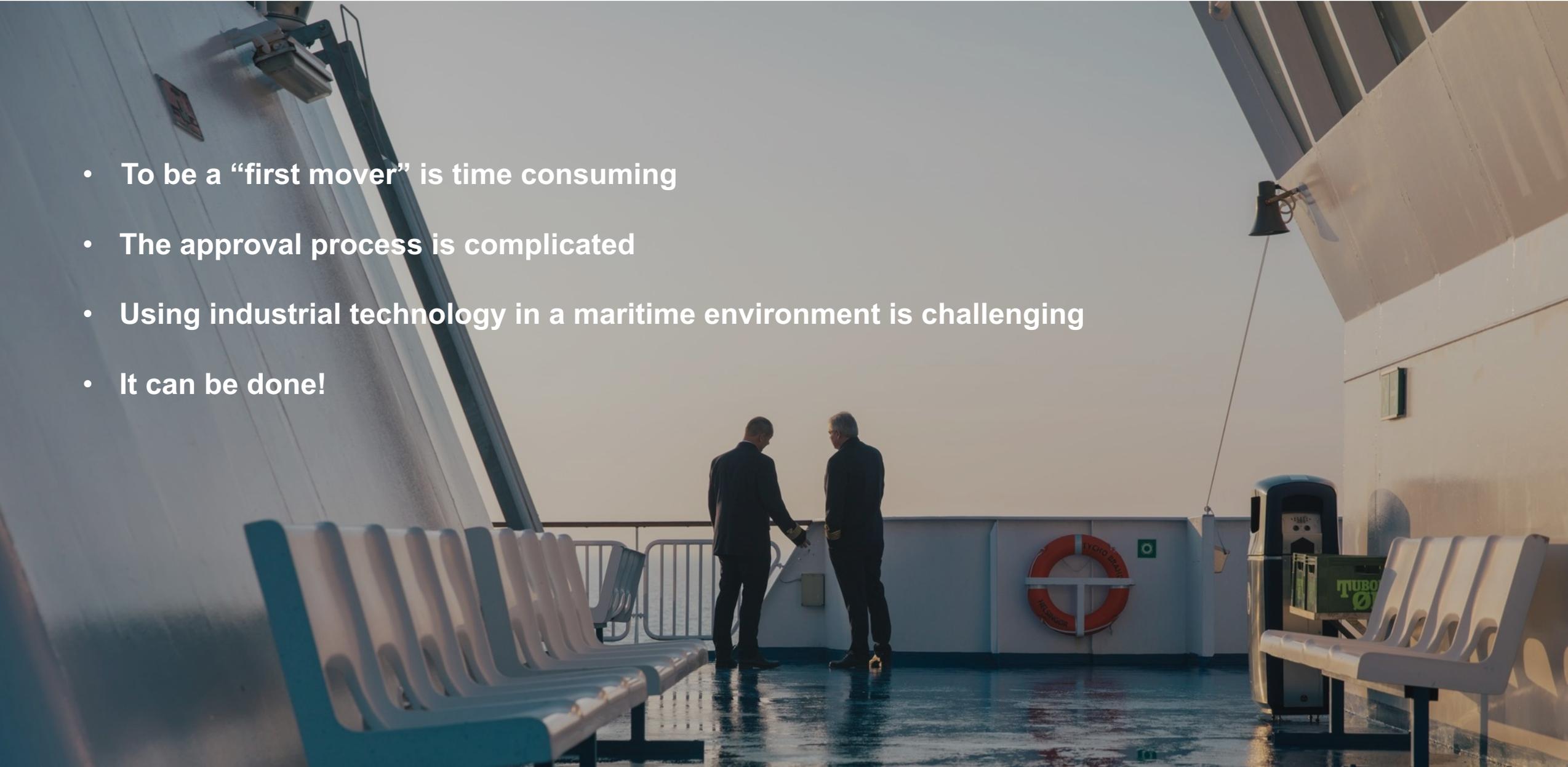
Results

- **Reduced bunker and emissions by 40% in 2019 -14 000 tons CO2**
- **Reduced energy consumption with approx. 24%**
- **Reduced amount of PM and SOx**
- **Less noise and vibrations**
- **NPS – customer satisfaction increased from 50 to +62 on battery vessels**

- **In full batteryoperation (97%), reduction in bunker and emissions are expected to reach 65% in total – equals approx. 23 000 tonnes CO2, 13 tonnes NOx and 5 tonnes SOx**

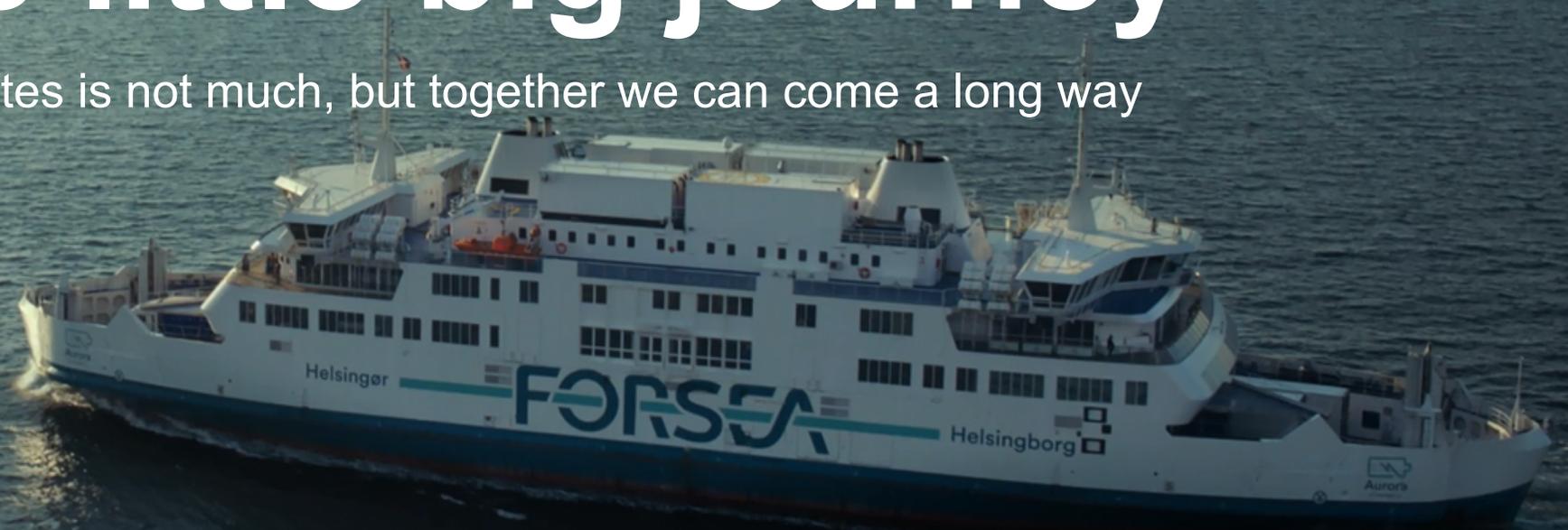


- To be a “first mover” is time consuming
- The approval process is complicated
- Using industrial technology in a maritime environment is challenging
- It can be done!



The little big journey

20 minutes is not much, but together we can come a long way



The logo for FORSEA features the word "FORSEA" in a bold, white, sans-serif font. A horizontal light green line passes through the middle of the letters, creating a visual effect of a line being cut through. The background is a solid teal color.

FORSEA