

# Batteridrift av skip

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# Elektrisk drift av skip - Ingen ny ide!



BEFFEN -Bergen Elektriske Fergeselskap 1894



# Fellow-Ship prosjektet har bant vei for mye av utviklingen vi sett innen elektrisk fremdrift



DNV-GL, Eidesvik Offshore, Wartsilä  
2003 - 2018



# Lavik – Oppedal: Ampere



- Utviklingskontrakt Vegdirektoratet
- Norled som operatør, Fjellstrand, Siemens, Corvus





- Første skip med Battery Power notasjon,
- DNV-GL batteri regler Januar 2016
- Første gang batterier kan brukes som en uavhengig kraftkilde i DP
- Equinor/Eidesvik offshore har dokumentert årlige drivstoffbesparelser på 18% og opp til 35% i DP mode





# Vision of the Fjords/Future of the Fjords

«Vision of the Fjords», 2016, 580 kWh, hybrid system

System integration by ABB, batteries from ZEM, “Ship of the Year 2016”

«Future of the Fjords», 2018, 1800 kWh, all electric

System integration by Westcom P&A, batteries from ZEM, “Ship of the Year 2018”







# Color line: Sandefjord - Strømstad



**Hybrid propulsion system, 5 MWh battery system  
In operation from 2019, to be built by Kleven yard  
System integration by Siemens**



# Hurtigruten: Expedition vessels



**Hybrid propulsion system: 6 MWh battery system**  
**In operation from 2019. To be built by Ulstein Yard**  
**System integration by Rolls Royce Marine, battery system from Corvus**





## And a significant number of car ferries/OCVs and other vessels



And many more have been ordered and are under construction (more that 100)



**Also battery systems for the large ferries as long as the crossing is not too long**

*Draft / Confidential*

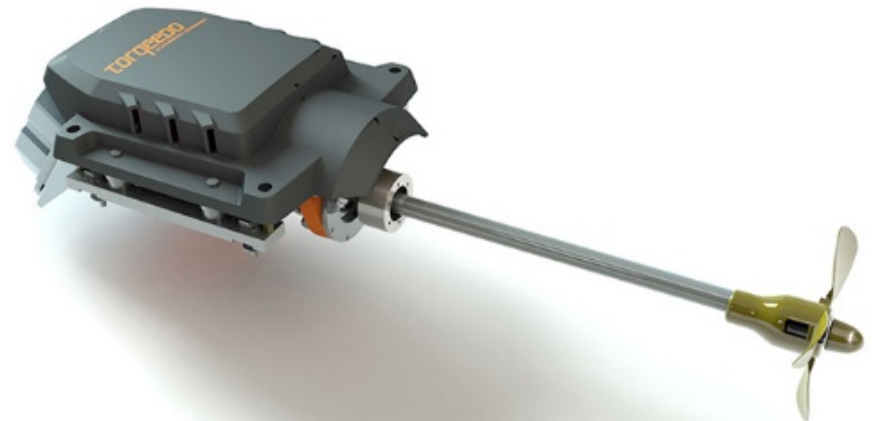
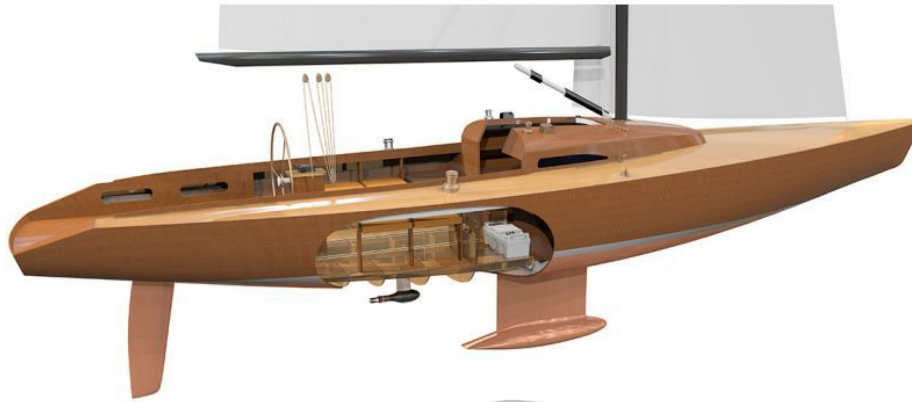


HH Ferries operates now the Helsingborg – Helsingør connection with battery powered Aurora and Tycho Brahe. 4.1 MWh battery system. 250 cars, 1100 passengers. System delivered by ABB, battery system by PBES.





# Electric drive lines are now available also for pleasure boats





# Drive line for an all electric free-fall life boat with Norsafe

*Draft / Confidential*



- 130 kW PM electric motor
- 150 kWh battery pack
- To be on the water in February 2018





# Electric passenger ferry for Fredrikstad city



**Electrical drive line with a 100 kWh battery system and 150 kW electrical propulsion motor. To be delivered fall 2018.**



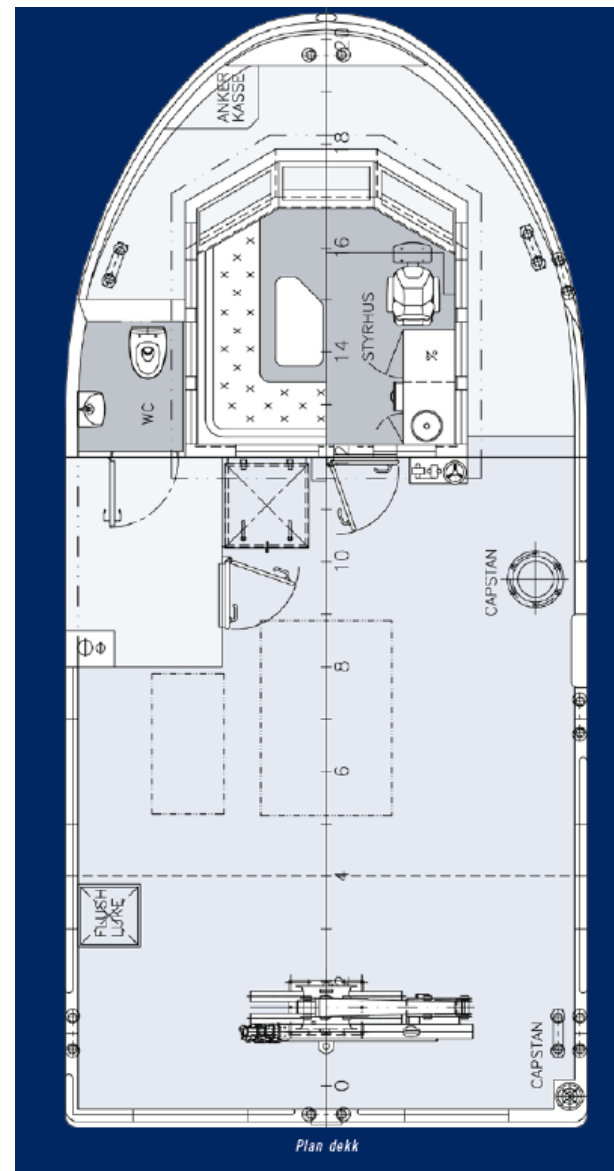
# Fish farming work boats



Working together with Moen Marin to deliver the drivelines for electric versions of fish farming work boats.

The drivelines are based on the same battery packs, electric motors and inverters as used for the life boat and the Fredrikstad ferry.

First vessel in operation from late summer 2018.







# What are the environmental benefits of an electrical driveline?

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## **Two cases:**

All electric Fredrikstad ferry: Positive CO<sub>2</sub> balance after 28 days of operation.

Hybrid fish farming vessel: Positive CO<sub>2</sub> balance after 60 days of operation.

*ZEM –Your Solution Partner*



*Towards a Zero Emission Future*

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