
EDITRON

Danfoss Power Solutions journey to electrification



Danfoss Power Solutions Key facts

6.815

Employees

22 FACTORIES

in 11 countries

2.11 bUSD

Sales in 2017

**Segment of DANFOSS
GROUP**

**USA, EUROPE and
CHINA**

Top 3 markets

Danfoss Mobile Electrification Key facts

110

Employees

**75 experts in electric
drive train systems**

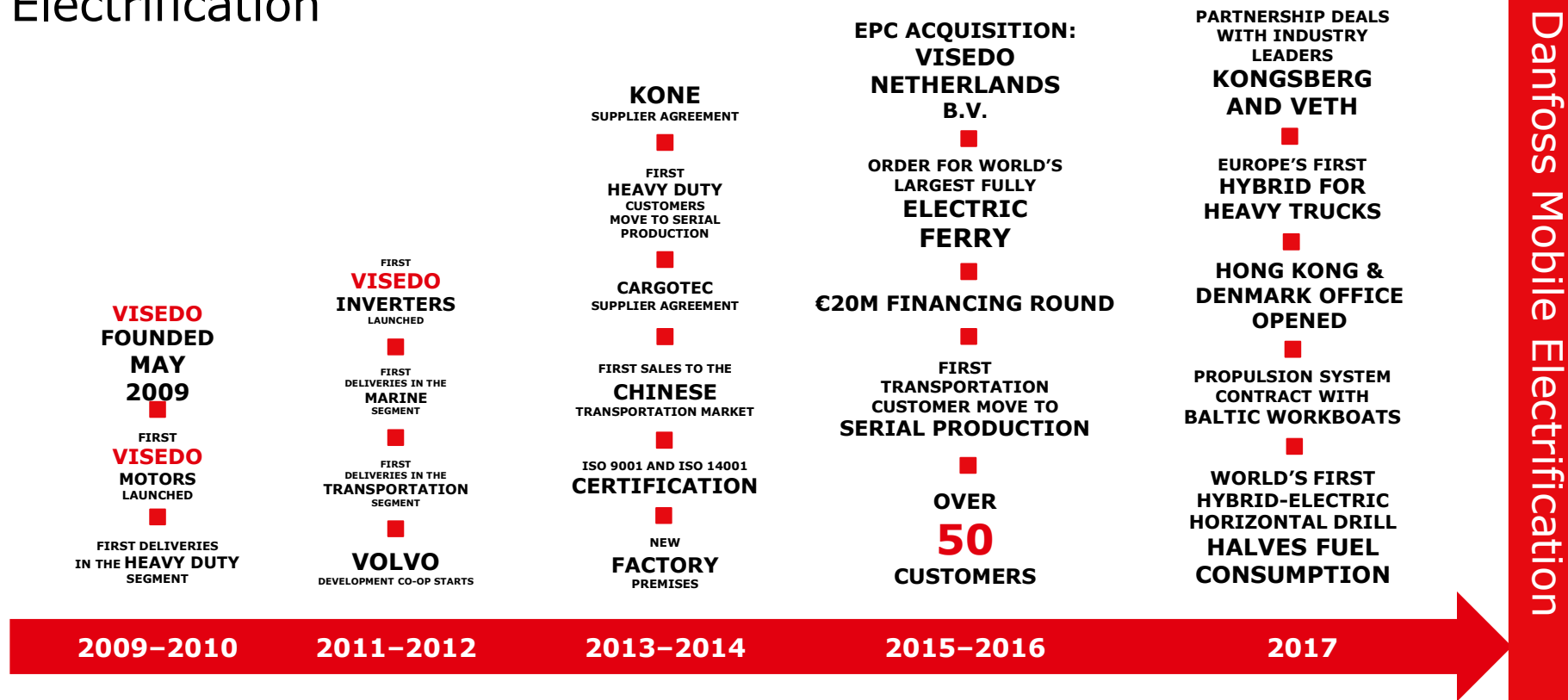
2 FACTORIES
Finland & Netherlands

**Business Unit of
DANFOSS POWER
SOLUTIONS**

Lappeenranta, Finland
Center of excellence



Timeline - The transition from Visedo to Danfoss Mobile Electrification



Core strengths

Success by leading technology and team work

Technological leadership

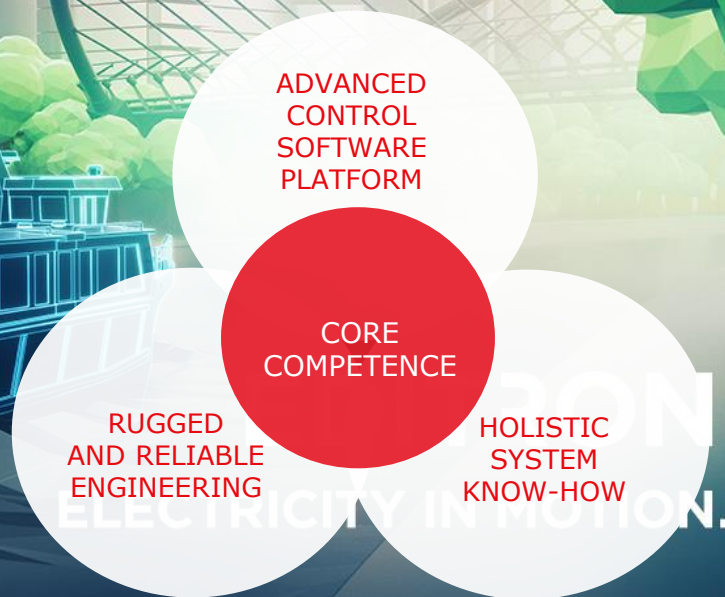
- Market-leading solutions for high-efficiency hybrid and full electric applications

Close customer cooperation

- Flexible, agile approach to customer delivery. High number of completed applications, huge application know-how.

Committed team

- The industry's brightest minds
- 10 PhDs, 40 MSc, 35 BSc, decades of experience in the field
- Mission to 'end pollution through electrification'



Our focus markets

What drives electrification

Global trends driving electrification:

- Demand for lower carbon emissions
- Regulation to cut small particle pollution
- Diesel bans in big cities
- Ongoing expansion of electrification market
- Costs reduction of electrification components
- Increasing demand for energy efficiency

Current focus markets:



Heavy duty & commercial vehicles (OEM) with focus on off-highway market



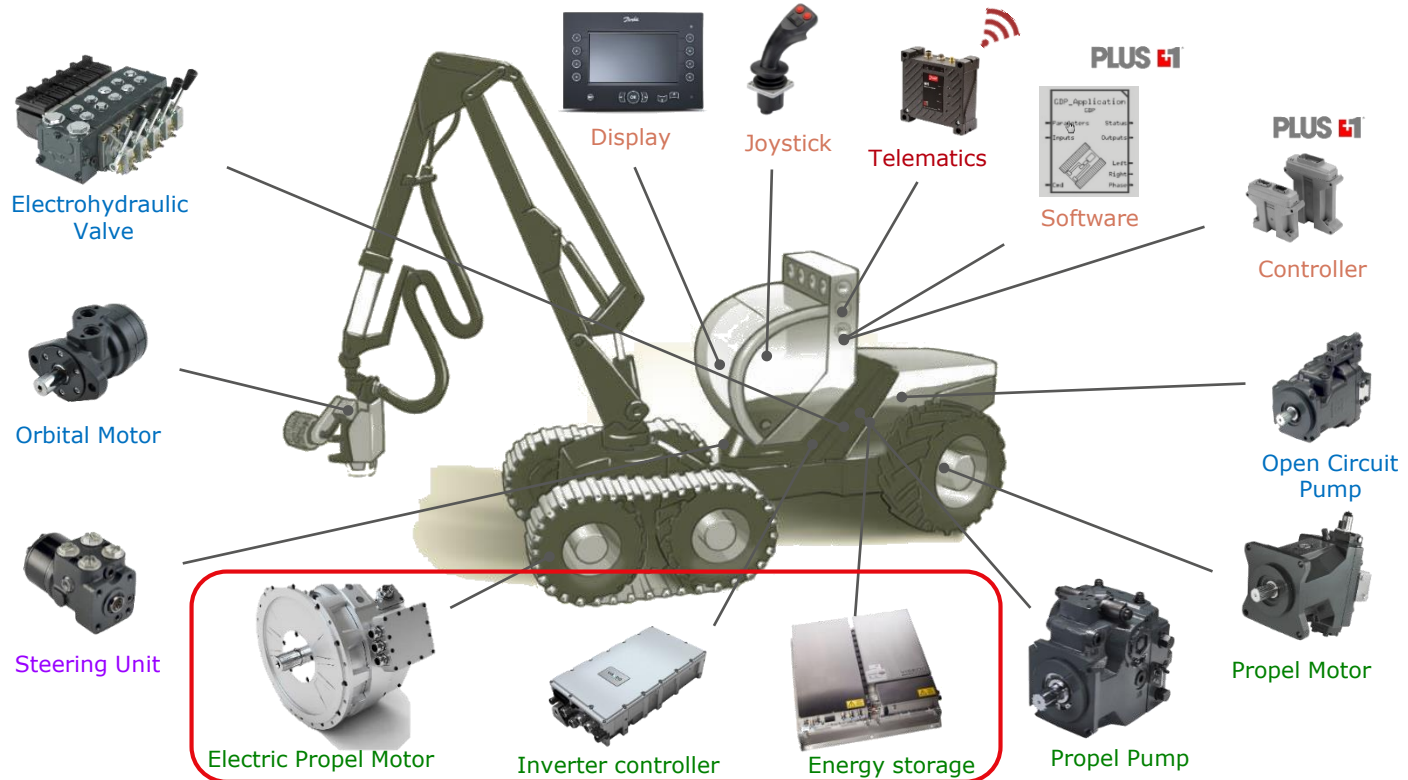
Hybrid & full electric marine

Products and Applications

Danfoss Mobile Electrification

Product portfolio completion with DME components

propel | move/turn | steering | controlling | connected



Converter Portfolio

Motor/Generator Drive, Grid Connection, Micro Grid

Inverter sizes S-L: 50kW – 1000kW, XL-XLe 1600kW-6400kW

S-L -Inverter



XS-4Q



M-4Q



L-4Q



XL(e)-Inverter(4Q)



Electric motor and generator portfolio

Available frame sizes XXXS-L: 15kW – 1MW. Up to 10 000 RPM and 8 600 Nm

XXXS

XXS

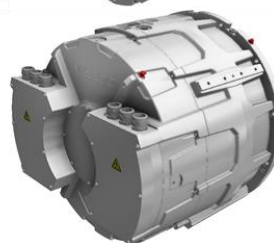
XXSe

XS

XSe

M/Me

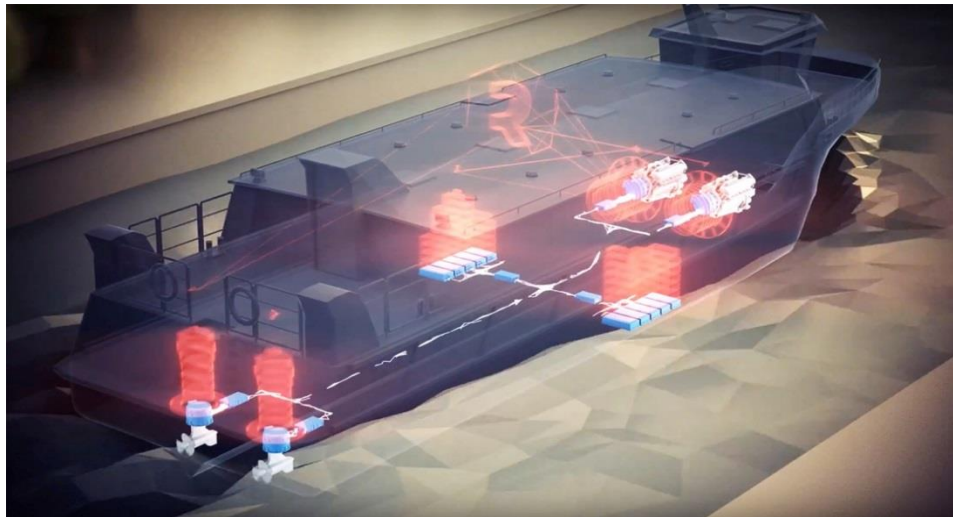
Ls/L



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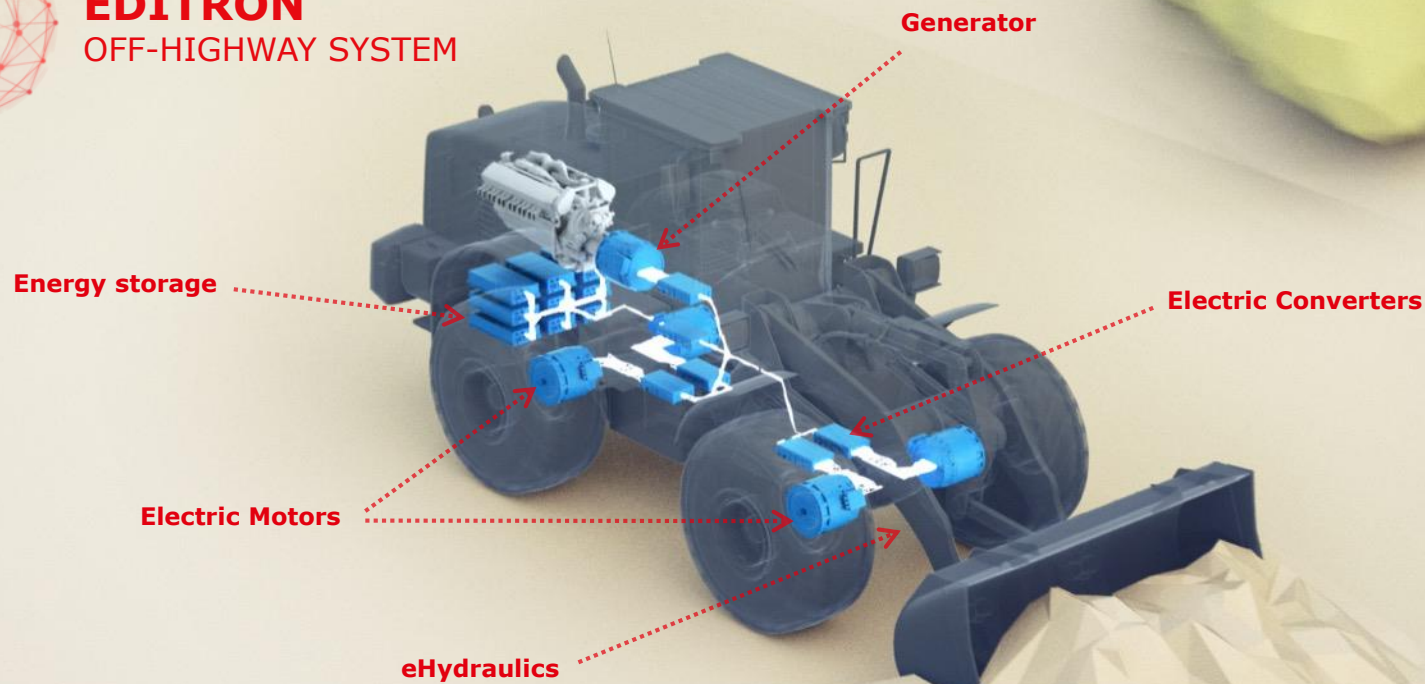
**OEM-
SYSTEMS**



**MARINE-
SYSTEMS**



EDITRON OFF-HIGHWAY SYSTEM



Mobile off-highway applications



Volvo LX1 hybrid

Hybrid 20 ton wheel loader

- Volvo CE, Sweden, 2014
- Serial hybrid (with 4 traction motors)

Results:

- **Diesel consumption: -50%**
- **Improved control and lower noise**



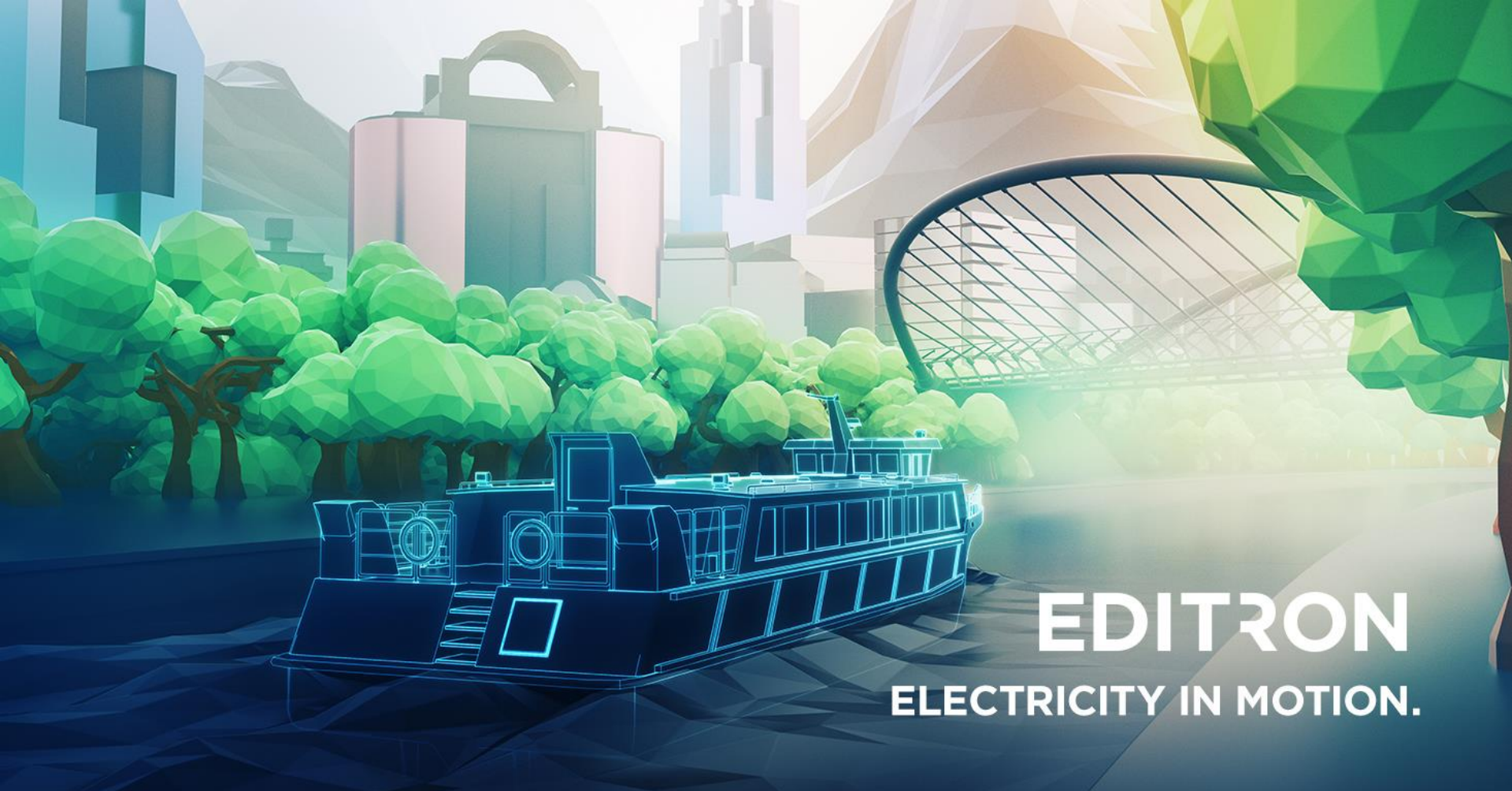
LOGSET 12H GTE Hybrid

World's most powerful harvester – 380 kW

- Logset Oy, Finland, 2016
- parallel hybrid

Results:

- **Productivity: +40% (m³/h)**
- **Diesel consumption: -25%**



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ELECTRICITY IN MOTION.



EDITRON MARINE SYSTEM

Energy storage

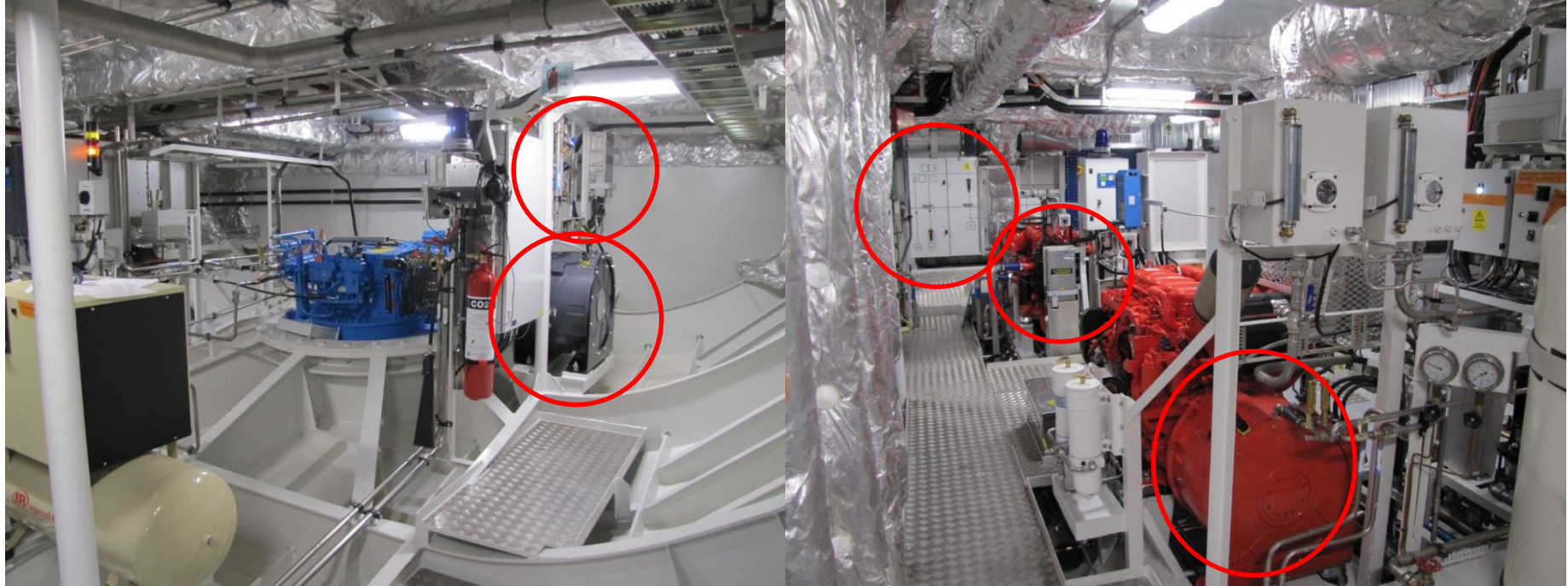
Generator

Electric Converters

Electric Motors

EDITRON – Marine System

The whole propulsion in one room



E-FERRY

- Worlds biggest full electric ferry

Builder: Søby Shipyards Ltd.

Type: Battery electric

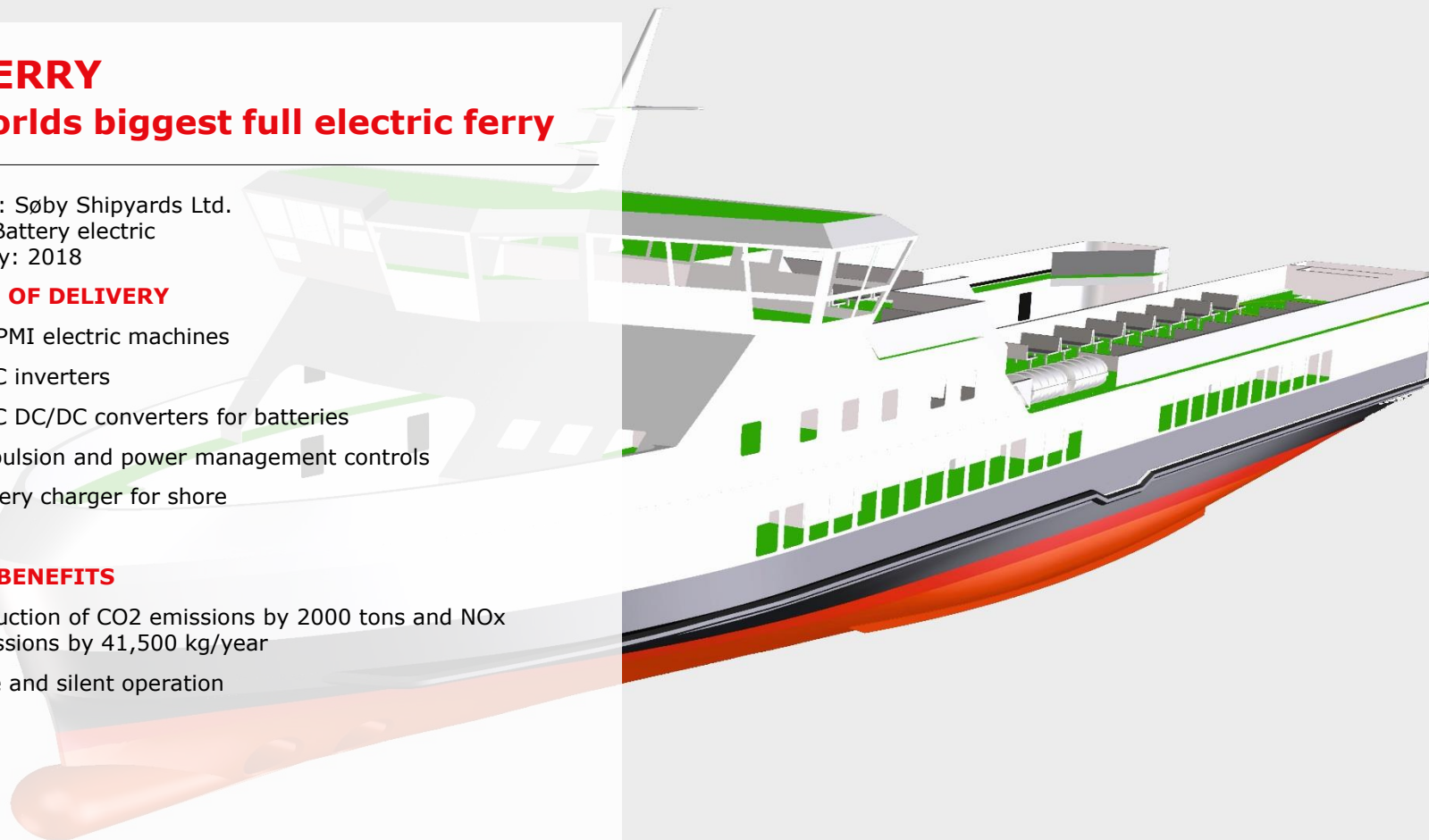
Delivery: 2018

SCOPE OF DELIVERY

- EM-PMI electric machines
- EC-C inverters
- EC-C DC/DC converters for batteries
- Propulsion and power management controls
- Battery charger for shore

MAIN BENEFITS

- Reduction of CO₂ emissions by 2000 tons and NO_x emissions by 41,500 kg/year
- Safe and silent operation





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ELECTRICITY IN MOTION.

Full-electric city buses

- Cleaner cities

Manufacturer: Linkker Oy

Type: Battery electric

Delivery: 2015

SCOPE OF DELIVERY

- EM-PMI motor
- EC-C Inverters

MAIN BENEFITS

- High efficiency power train guarantees longer range
- Energy consumption less than 0.7 kWh of energy per km
- Over 40% better energy efficiency in Helsinki city EV-Bus test
- Six different electric buses from Europe and China tested





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Electricity in motion.