



Norwegian Centres of Expertise

NCE Maritime CleanTech

Green maritime solutions by cluster collaboration

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Norway – a maritime superpower



The worlds

- 4th largest fleet in terms of value
- 6th largest fleet measured in number of ships
- 8th largest fleet in terms of tonn





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NCE Maritime CleanTech

EQUIPMENT AND SERVICE SUPPLIERS



YARDS



SHIP OWNERS



Through cluster cooperation we create new innovative and competitive solutions for the maritime sector that reduce harmful emissions to air and sea.

POWER COMPANIES



R&D AND EDUCATION



PUBLIC SECTOR



STAKEHOLDERS - REGULATORS



FINANCE



Cleaner maritime concepts



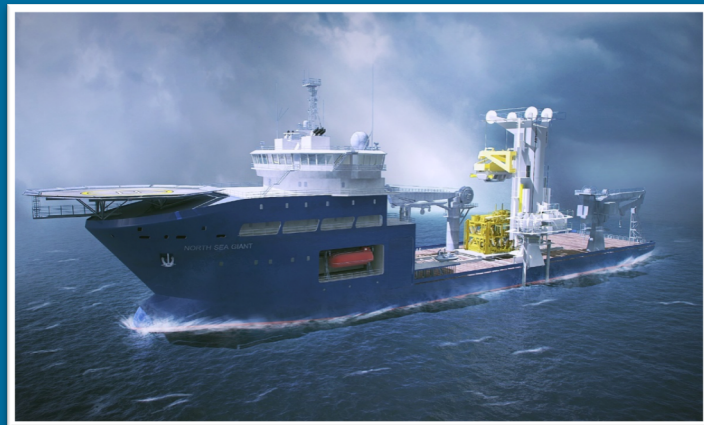
Cargo vessels



Passenger transport



Fishing / fish farm vessels



Offshore vessels



Car ferries



Inductive charging

Political decisions and public purchasing criterias as drivers for innovation

LNG

1995: The Norwegian Parliament decided to establish a project with ferries powered by natural gas. This should contribute to further development of the Norwegian maritime industry.

2000: The world's first LNG-driven ferry "Glutra" was put into operation

Today: 19 LNG ferries in operation in Norway



Battery

2013: Electrical ferry development contract launched from the Public Road Administration

2015: The Norwegian Parliament made a resolution saying that all upcoming ferry contracts should have low or 0-emission technologies



Hydrogen

2016: Development contract launched from the Public Road Administration for a hydrogen electrical ferry. Shall be in operation from 2021

2018: Trøndelag county region launches a development contract for zero emission speed boats from 2021. The development contract start with a competition bringing forward the best technological solutions



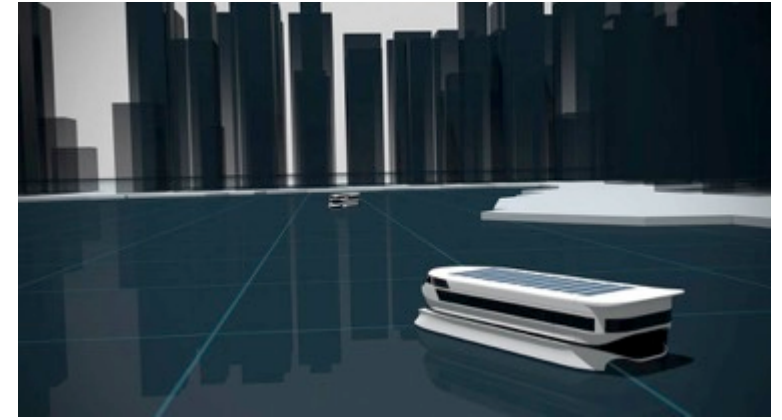
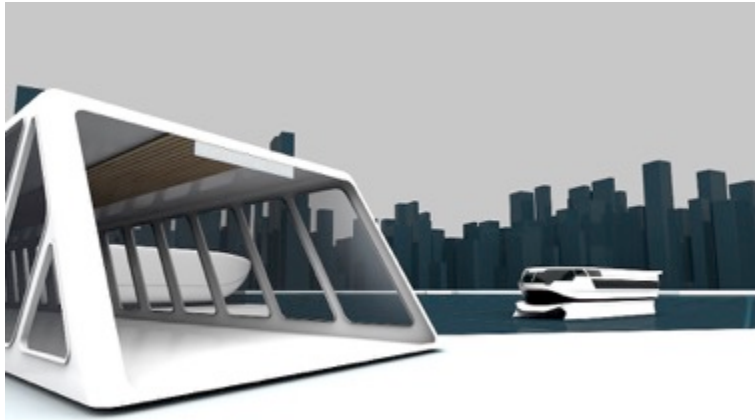
Ampère: The start of an electric revolution



- The world's first electric ferry
- Fuel cost reduced by 70%
- Start of an electric revolution in the Norwegian fjords:
 - By 2020 more than 50 electrical ferries will be in operation.
- From 2015: Strict environmental demands in all new ferry tenders.

The Urban Water Shuttle

- a zero emission fast going vessel



High flexibility

A complete transport system with minimal requirements for investments and land.

Zero emissions

The shuttle utilizes known and proven zero emission technology.

Low cost

Sustainable materials secures an energy efficient vessel with lower costs.

Norwegian cleantech in India: Greening the Indian Transport Sector



The market potential

India has an extensive network of inland waterways in the form of rivers, canals, backwaters and creeks.

Of the total navigable length of 14,500 km, 5200 km of the river and 4000 km of canals can be used by mechanized crafts. Freight transportation by waterways is highly underutilised in the country as compared to countries and regions like the United States, China and the European Union.

India has recognized **106 waterways of which 6 are declared as national waterways**. Economic viability of a waterway to carry traffic as an alternative to rail and road depends on its length which should be a minimum 500 km and 250 km for both cases respectively



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Environment-friendly mobility: Norway's high-voltage EV push offers a template for India

It's not just cars. The Norwegians believe in taking their electric car push to seemingly ridiculous levels, including the world's first commercial ferry operating with high-power wireless charging capability for its lithium-ion batteries – a project that potentially represents a breakthrough in the evolution of plug-in electrically operated vessels. A ferry – Ampere – is owned by Norled AS, one of Norway's largest ferry operators, and has been in service since May 2015 and covers a six kilometres across a fjord between the townships of Lavik and Oppedal, Lars Jacob Engelsen, Deputy CEO of Norled said. The stretch of water is part of the European waterway E39, which is about 1.5 hours north of Norway's second largest city,



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