



Norwegian Centres of Expertise

**NCE Maritime CleanTech**

# Out of the blue comes green

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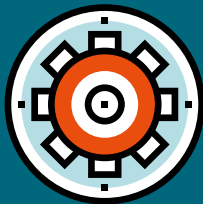
# Out of the blue comes green

NCE Maritime CleanTech (NCE MCT) is a world-leading cluster for clean maritime solutions. Our cluster organisation uses the Norwegian maritime expertise, built up over generations, as a springboard for the development of new energy-efficient and environmental friendly technologies.

We focus on establishing sustainable innovation projects with commercial potential, and work together for new clean maritime solutions.

OUR VISION:

To be the world-leading cluster for clean maritime solutions



ANNUAL R&D INVESTMENTS:

230 235 000

MNOK

31 000

EMPLOYEES



ANNUAL TURNOVER:

23 000 000 000

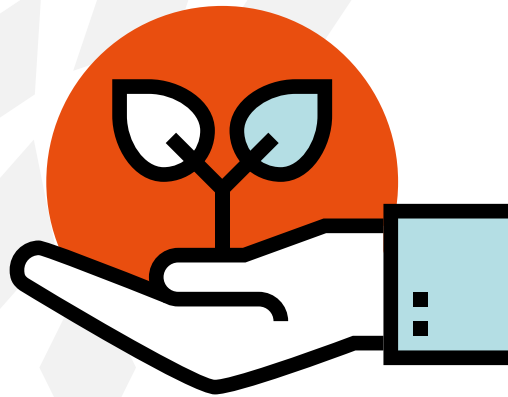
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# Who we are

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NCE MCT was established in March 2011 with main focus on creating forward-thinking, innovative and competitive solutions for the maritime sector that reduce harmful emissions to air and sea. Another important focus area for the cluster is digitalization, and MCT has launched several projects looking into how new technologies can be used to create new business models, in addition to making design and operations more energy effective and more sustainable.

Central in the cluster thinking is a dynamical cooperation between industry companies, research and educational institutions and public bodies. Per May 2017 the cluster has 68 participants covering the entire maritime value chain, from ship design to ship yards, equipment suppliers, ship owners, classification companies and R&D institutions. Electrification of different vessel types also requires cooperation with suppliers of renewable energy. Among the cluster participants are international leaders in their fields, such as the first suppliers to introduce LNG, hydrogen, batteries and other energy carriers on board vessels. In 2016 NCE Maritime CleanTech won the prize as Norway's leading innovation environment.



Research shows that industry clusters leads to increased employment, greater economic growth, higher salaries, improved productivity and more startup companies.

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## The meaning of “NCE”

The role of a Norwegian Centre of Expertise (NCE) is to strengthen the innovation work and increase development in the most expansive and international industry clusters in Norway. The NCE-program is managed through a cooperation between Innovation Norway, SIVA and The Norwegian Research Council. Maritime CleanTech's status as a NCE-cluster secures access to resources which ensure innovation in the industry and strengthen competitiveness of the cluster companies.

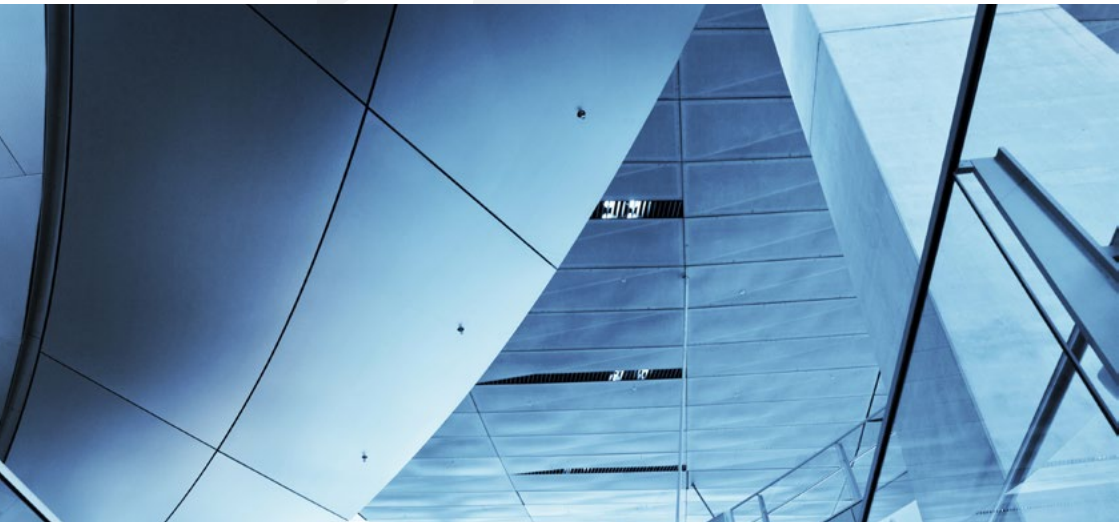
### **COOPERATION WITH OTHER NETWORKS AND CLUSTERS**

NCE Maritime CleanTech collaborates with the other ocean clusters in the Hordaland region; GCE Subsea, NCE Seafood Innovation and Maritime Bergen. The collaboration supports the emergence of new value chains through cross-sectorial cooperation and increases our members' performance and competitiveness.

### **IMPROVING THE POLITICAL FRAMEWORK**

Improved political framework for the marine industry and the introduction of new environmental technology are important focus areas for NCE MCT. We have a continuous focus on communicating the important role the public authorities have in being a demanding and environmentally-conscious customer. In this process monitoring of the political decision processes for the introduction of low and zero emission solutions in the passenger vessel market has been a key activity for the cluster.

NCE MCT is continuously meeting with Norwegian ministers, parliamentarians and local politicians. Our contact with bureaucrats creating legislations is also of key importance.

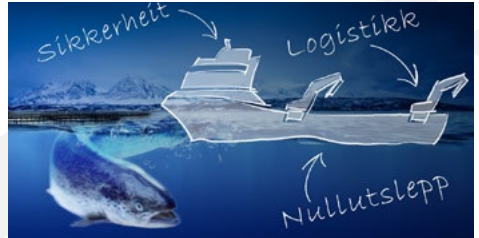


# Our projects



## MS Ampere

Delivered in March 2015 MS Ampere was the world's first fully electrical ferry. The ferry operates a passenger route crossing the Sognefjord in Norway. The batteries are charged with the use of renewable hydropower from the grid on shore. This battery pack on board, like the ones on each pier, corresponds to the effect of 1600 standard electrical car batteries. Project participants: Norled, Siemens and Fjellstrand.



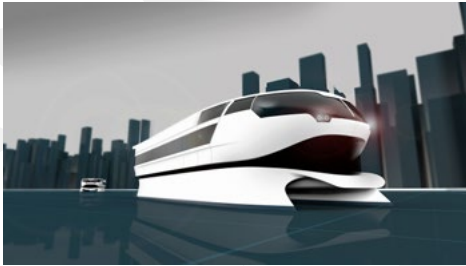
## Green fish farming

In 2016 NCE Maritime CleanTech started the development of the future's vessel for the seafood industry. The project objective is to develop new, effective vessel concepts with less emissions that meets the fish farming industry's changing requirements for energy efficiency, zero-emission and safety. By using design methodology, the project partners will develop vessels that fully meet the user's needs and expectations. Project participants: Bremnes Seashore, CMR Prototech, SKL, Westcon, Greenstat and Wave Propulsion.

## Big Data in shipping

New ways to exploit data in maritime sector is central in the new project in our cluster. In our big data project the three ship owners Knutsen OAS Shipping, NorthSea Container Line and Solstad Shipping collaborate on the use of data collection to create more efficient operations. NCE Maritime CleanTech is financing the project management delivered by Uni Research Computing.





## Urban Water Shuttle

The Urban Water Shuttle (UWS) is a concept for a zero emission fast going passenger ferry. The full electric shuttle is equipped with zero emissions technology and leaves nothing but clean air and zero impact on the environment. In 2016 the concept was developed further, by means of financing from both Bergen municipality, Innovation Norway, The Norwegian Research Council and Enova. Project participants: Fjellstrand, Wärtsilä Norway, Wärtsilä Ship Design, Servogear, Hydro, Sapa, Grenland Energy, CFD Marine and Storm Industrial Design



## MF Folgefonn

MF Folgefonn traffics the route between the municipalities Tysnes and Stord in Hordaland. The ferry is a floating “Clean Tech” laboratory where cluster participants have collaborated over several years to test battery technology while the ferry has been in operation. During 2017 the MF Folgefonn is being launched as the world’s first ferry with an inductive charging system for the batteries on board. Project participants: Wärtsilä Norway, Haugaland Kraft, Apply and Fjellstrand.

## Short Sea Pioneer – From land to sea

The Short Sea Pioneer is a revolutionary eco-friendly solution that will make coastal transport more competitive than road transport. The Short Sea Pioneer consists of two ship types: A mother vessels and a daughter/feeder vessels. The combined use of the ships creates a logistic system that shall contribute to moving cargo from road to sea through offering regularity, flexibility and availability. Project participants: NorthSea Container Line, Wärtsilä Ship



Design, Westcon, Servogear and the Norwegian School of Economics.



## Viking Energy

Cluster partners have collaborated to install a battery system on board the offshore vessel Viking Energy, making it the world's first hybrid offshore vessel with dynamic positioning. The project received funding from NCE Maritime CleanTech's Innovation program. Project participants: Eidesvik, Westcon and Zem.



## Collaboration between industry and R&D institutions

*The cluster administration in NCE Maritime CleanTech are working to tie research and education actors with industry companies within the cluster. This has resulted in several collaboration projects and applications.*

### **RISKOP – RISKS IN OFFSHORE OPERATIONS**

The Western University of applied science is working with Knutsen OAS Shipping, Solstad Offshore, Westcon, Eidesvik and Østensjø Rederi in a project identifying risks related to management of IMR operations on vessels.

### **CLEAN HIGHLY EFFICIENT OFFSHORE POWER (CHEOP)**

CMR Prototech is developing a robust 10Kw solid oxide fuel cell (SOFC) ideal for use in offshore applications. The project is also developing a MW-scaled system for future use in other applications. The other project partner from the cluster is Statoil.

### **THE BALLASTFLOW PROJECT**

The ship owner company Knutsen OAS Shipping has developed a ballast water treatment system (KBAL) with the capacity to cleanse 3000 m<sup>3</sup> water per hour. The project is highly relevant due to IMO's ballast water convention coming into force in 2017. The Western University of applied science is the R&D project partner.

### **REDUCTION OF NOISE AND VIBRATIONS IN INDUSTRY AND CONSTRUCTION**

Uni Research Polytec received funding from the cluster's Innovation Programme and the Regional Research Fund to develop technology to reduce noise in vessels and construction with 97,5 %. The ship owner Østensjø is also involved in the project. Noise is a huge problem, especially in ships, because it can lead to hearing damages, stress and reduced concentration for the crew. The company Xilentech has been established to develop and commercialize the project technology.



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## NCE **Maritime CleanTech**

NCE Maritime CleanTech is a world-leading cluster for clean maritime solutions. With partners covering the entire maritime value chain we represent one of the world's most complete maritime commercial hubs. Our cluster participants use their Norwegian maritime expertise, built up over generations, as a springboard for developing and launching new energy-efficient and environmental friendly technologies.

Learn more at [maritimecleantech.no](https://maritimecleantech.no).