

# Norwegian offshore wind clusters

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# Arena Norwegian Offshore Wind

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# Arena Norwegian Offshore Wind

Arena NOW is an **industrial cluster** of suppliers and operators working together to develop and deliver complete offshore wind power systems.

The cluster comprises 30+ companies and R&D institutions representing the **entire offshore wind value chain** in conducting environmental studies, project development, engineering, supply of infrastructure, installation and operation of wind farms.

Arena NOW aims at supplying both services and products with particular emphasis on **marine and offshore operations**, where the Norwegian industry holds a strong position resulting from 40 years of accumulated experience from the North Sea oil and gas activity.

The Arena program is a national program for **long term development of regional business clusters**. The program offers both advisory and financial support funded by Innovation Norway, SIVA and the Research Council of Norway.





# Arena NOW – Cluster and facilitator activities

## Meeting places

- Arrange cluster meetings and workshops of current interest
- Organize the Offshore Wind Operations conference
- Joint events with NORCOWE

## Internationalization

- Provide international market and tender information to members
- Market the cluster's collective products and services through the "Offshore Wind Index"
- Branding through joint marketing on international conferences and exhibitions
- Positioning of the cluster towards key customers and markets

## Education and recruiting

- Contribute with lectures in master programs
- Contribute with topics and advice for projects and master theses

## Product and technology development

- Identification of innovation projects and collaborations between cluster members
- Dialog with R&D institutions to stimulate collaboration with the industry
- Collaboration with The Research Council of Norway on regional R&D and innovation



# Offshore Wind – Products and services provided by Norwegian industry

Substations

Foundations -  
bottom fixed &  
floating

Service vessels

Helidecks

Power export  
cables

Infield cables

Cable protection  
systems

Communication  
equipment

Lifting equipment

Cable installation  
services

Marine installation  
services

Maintenance and  
operation services

Resource mapping

Meteorological  
and oceanographic  
forecasts

Production  
forecasts

Software for wind  
farm optimization  
and lay out

Vessel traffic  
management  
systems

[www.arenanow.no](http://www.arenanow.no)

## Project Manager



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## Assistant project manager



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+47 913 29 361

The screenshot shows the arena NOW website, which is dedicated to Norwegian Offshore Wind. The header features the logo and a navigation menu with links to Home, Background, Organization, Projects, News, Career, and Contact. A search bar is located on the right. The main banner image depicts several offshore wind turbines in the sea. Below the banner are three buttons: 'Join NOW', 'Members index', and 'Event calendar'. The main content area includes a headline about an industrial cluster of suppliers and operators, a paragraph describing the organization's role in the offshore wind value chain, and a section titled 'Offshore wind power system overview' with a diagram showing the flow from an offshore wind farm through a 3-phase AC cable to an offshore substation, and then via a cable to shore to a land connection point. A 'News' section on the right lists recent articles with dates and titles. Below the news is a 'News archive' section, followed by 'Links & Downloads' and 'Partners'. The footer contains the text 'Developed by Marianne Colvart. Powered by PublikaOnline' and the arena NOW logo with contact information.

arena NOW  
Norwegian Offshore Wind

Home Background Organization Projects News Career Contact

Search

Join NOW Members index Event calendar

**An industrial cluster of suppliers and operators working together to develop and deliver complete offshore wind power system**

Arena Norwegian Offshore Wind (NOW) comprises companies representing the entire offshore wind value chain in conducting environmental studies, project development, engineering, supply of infrastructure, installation, and operations of wind farms.

The cluster aims at supplying both services and products with particular emphasis on marine and offshore operations, where the Norwegian industry holds a strong position resulting from 40 years of accumulated experience from the North Sea oil and gas activity.

Offshore wind power system overview:

Offshore wind farm 3-phase AC Offshore substation Cable to shore Land connection point

**News**

- 02.09 Analytiker: Sælon-geld hømmer R...
- 02.09 Two Met Masts completed at East ...
- 02.09 Offshore pioneer latest to commi...
- 02.09 Framtidens velferd står på spill >
- 02.09 Offshore pioneer latest to commi...
- 02.09 Regentparret ankommer til Skagen...
- 02.09 Gvøyst y Mor offshore wind farm b...
- 01.09 Oljeflykt >
- 01.09 The EEC previews the Autumn 2013...
- 01.09 JEREMIE provides an EU boost to ...

**News archive**

**Links & Downloads**

Enter download section >

**Partners**

NorWind

BERGEN ROSENBERG

Developed by Marianne Colvart. Powered by PublikaOnline

arena NOW  
Norwegian Offshore Wind

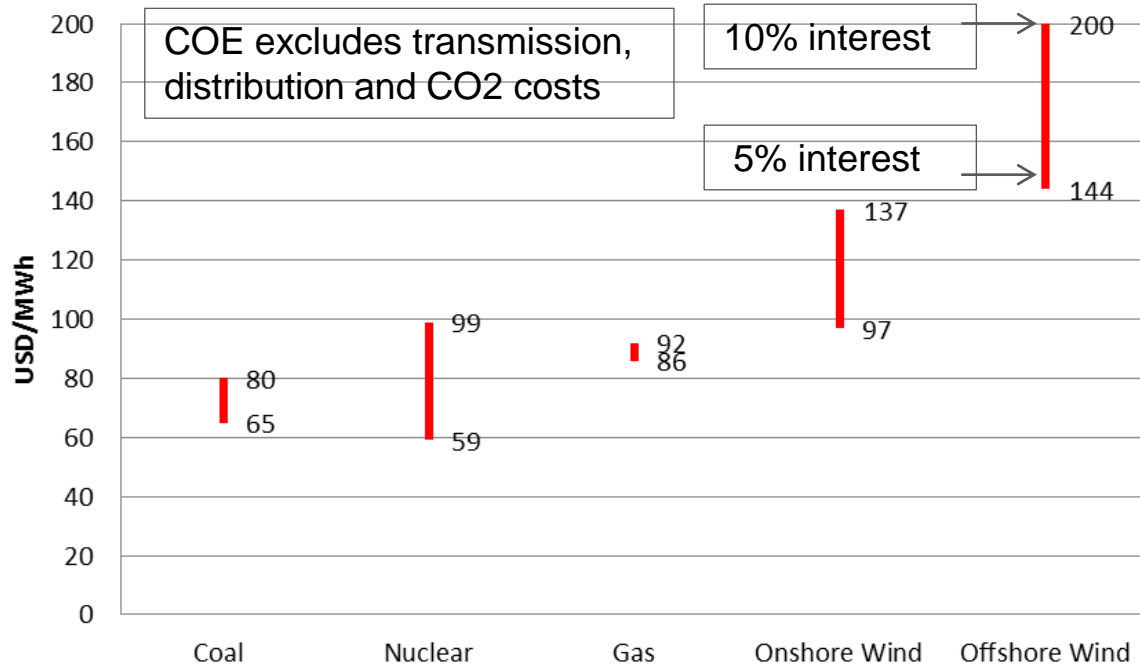
For more information please contact:  
[info@arenanow.no](mailto:info@arenanow.no)

# Arena NOW members



# Offshore Wind CAPEX and OPEX must be reduced

## Cost of electricity - Sensitivity to financing



COE determined by:

- Financial costs
- Cost of construction
- Maintenance costs
- Capacity factors
- CO2 prices
- Fuel prices
- Plant lifetime
- Construction lead time

- A 33% reduction in COE makes offshore wind competitive vs. onshore wind
- A 42% reduction in COE makes offshore wind competitive vs. gas fired power plants

Source: Projected costs of generating electricity, IEA 2010



## Offshore Wind & The Industrial Challenge

- COE is 75% CAPEX related & 25% OPEX related
- Imperative to reduce CAPEX to lower COE!
- A 33% reduction of COE can be realized by:
  - » 35% reduction of CAPEX
  - » 25% reduction of OPEX
- The industrial challenge is to significantly reduce CAPEX (30-40%) whilst improving reliability and lifetime!

# Forskningscentre for miljøvennlig energi - FME

## **BIGCCS,**

International CCS Research  
Centre

## **NOWITECH,**

Research Centre for  
Offshore Wind Technology

## **CENSES,**

Centre for sustainable  
Energy Studies

## **NORCOWE,**

Norwegian Centre for  
Offshore Wind Energy

## **SUCCESS,**

Norwegian Centre for  
Subsurface CO<sub>2</sub> storage

## **CEDREN,**

Centre for Environmental Design  
of Renewable Energy

## **ZEB,**

The Research Centre on Zero  
Emission Buildings

## **SOLAR UNITED,**

The Norwegian Research  
Centre Solar Cell Technology

## **CICEP,**

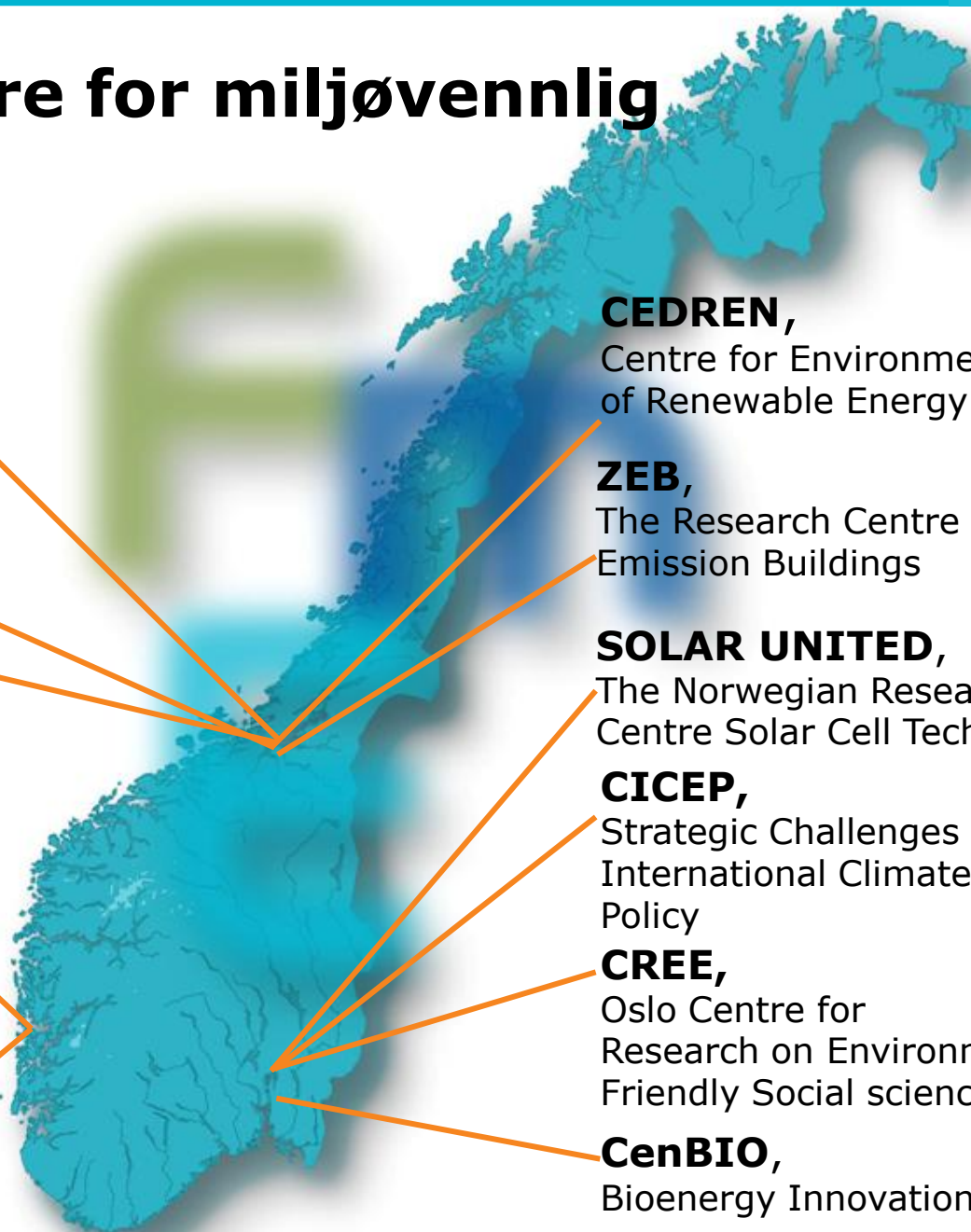
Strategic Challenges in  
International Climate and Energy  
Policy

## **CREE,**

Oslo Centre for  
Research on Environmentally  
Friendly Social science

## **CenBIO,**

Bioenergy Innovation Centre





## **Norwegian Centre for Offshore Wind Energy**

# NORCOWE at a glance

*We build future industry competence through instrumentation, education and research*



- Part of the Research Council of Norway's scheme: Centres of Environment-friendly Energy Research
- Budget of 232 MNOK (29 MEUR; 38 MUSD) for 2009-2017
- Pre-competitive and industry driven research
- Director: Kristin Guldbrandsen Frøysa



# Overall Goal: Reduce Costs for Offshore Wind Energy



# Partners

## R&D partners:

- Christian Michelsen Research
- Uni Research
- University of Agder
- University of Bergen
- University of Stavanger
- Aalborg University (DK)

## Industry partners:

- Statkraft
- Statoil
- Lyse Produksjon
- Aker Solutions
- National Oilwell Varco





**REGION  
BERGEN**



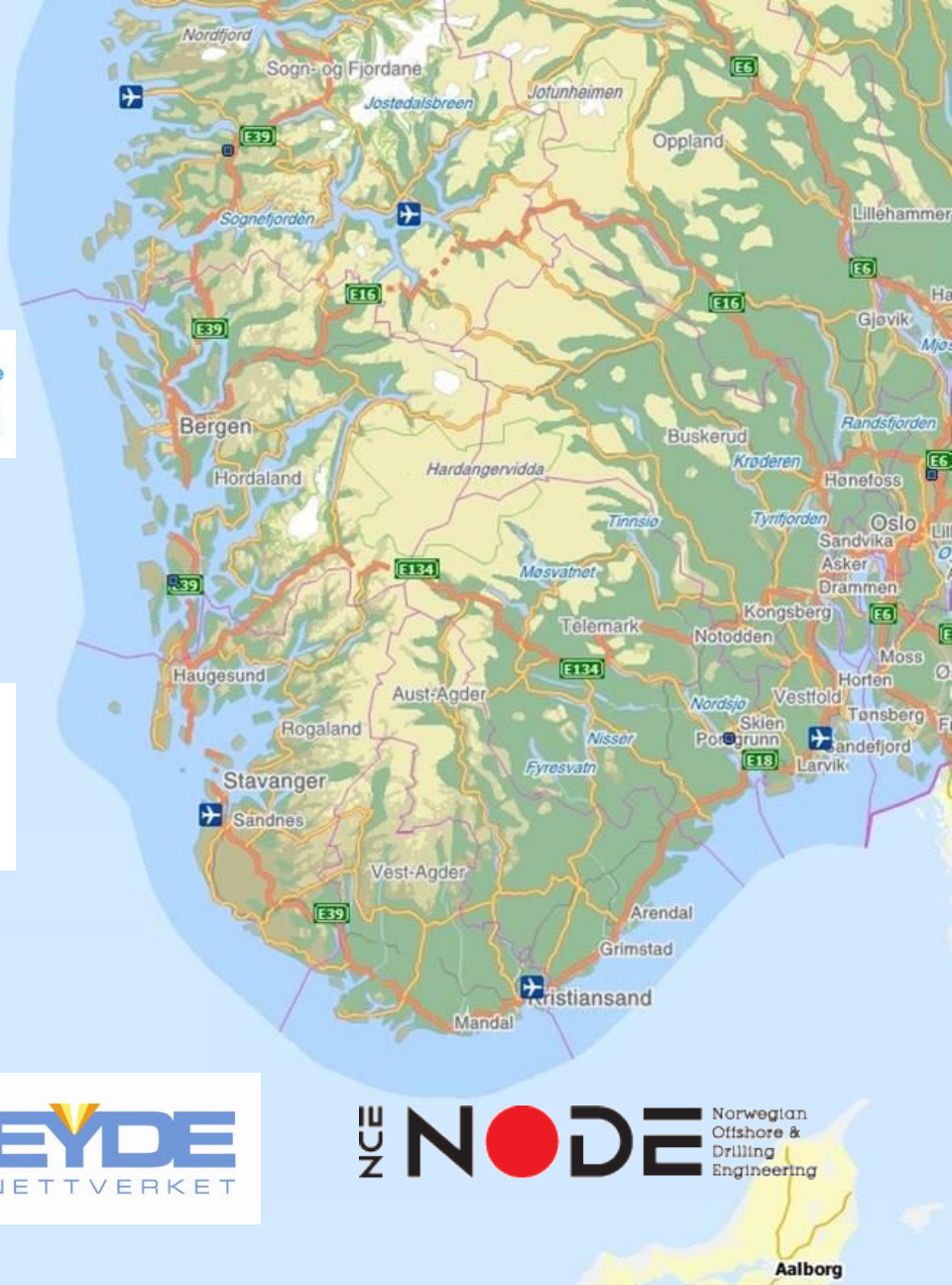
Norwegian Centres of Expertise  
**NCE Subsea**

**arena NOW**  
Norwegian Offshore Wind

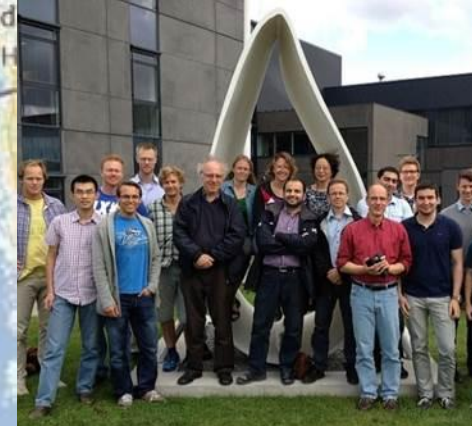


**EYDE**  
NETTVERKET

**EN NØDE** Norwegian Offshore & Drilling Engineering





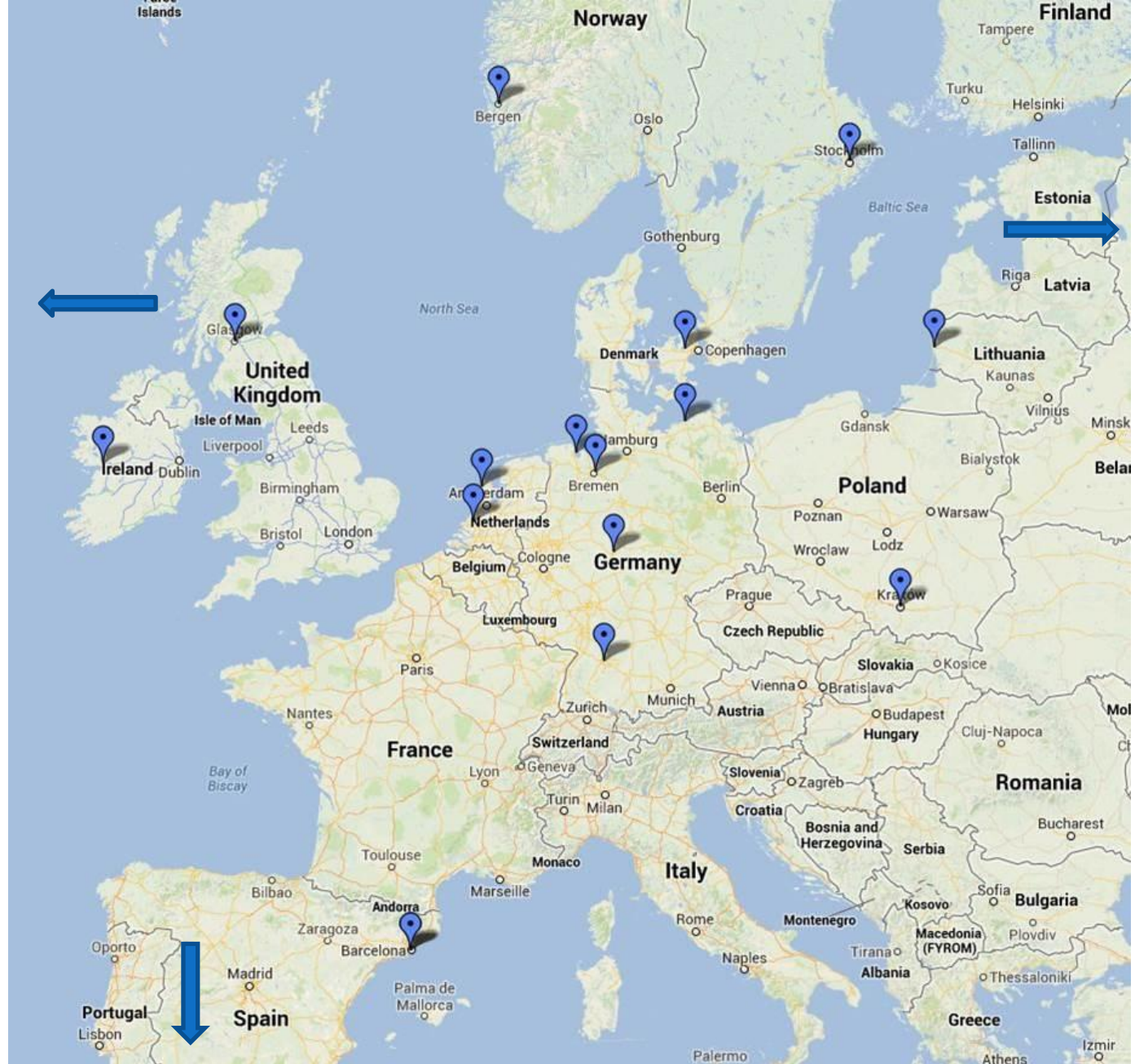




# Memorandum of Understanding

- DTU Wind
- Fraunhofer IWES
- The National Renewable Energy Lab
- Arena NOW

Collaborations  
also in USA,  
South-Africa and  
China



## Other industry collaborations

- StormGeo
- Origo Solutions AS
- EDF
- Siemens
- Subsea 7
- Prototech
- Kjeller Vindteknikk
- OWEC Tower
- Vestas
- BAUER
- Menck
- Prekubator
- DONG

## Other institutions

- The Crown Estate
- Carbon Trust



## Contact us!

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[kristin@cmr.no](mailto:kristin@cmr.no)





