



*Concerted Action on
Offshore Wind Energy in Europe*



*Review of Offshore Wind Energy
**Research, Projects
and Market Developments***

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Introduction

- Research
- Offshore Windfarms
- Markets
- Other Activities
- CA-OWEE Project





Research

- European & National
- Topics:
 - Resource
 - Wind-turbines
 - Windfarms
 - Installation
 - O & M
 - Also non-wind energy, i.e. wave energy, offshore & coastal engineering



Research

- Some Current Key Projects
 - POWER (resource assessment, *RAL*)
 - WEMSAR (satellite, *Nansen*)
 - RECOFF (design recommendations, *Risø*)
 - OWTES (Blyth, *Garrad Hassan*)
 - ENDOW (windfarm development, *Risø*)
 - Many at national level



Offshore Windfarms

Installed Onshore:

- Last year ~ 4 GW

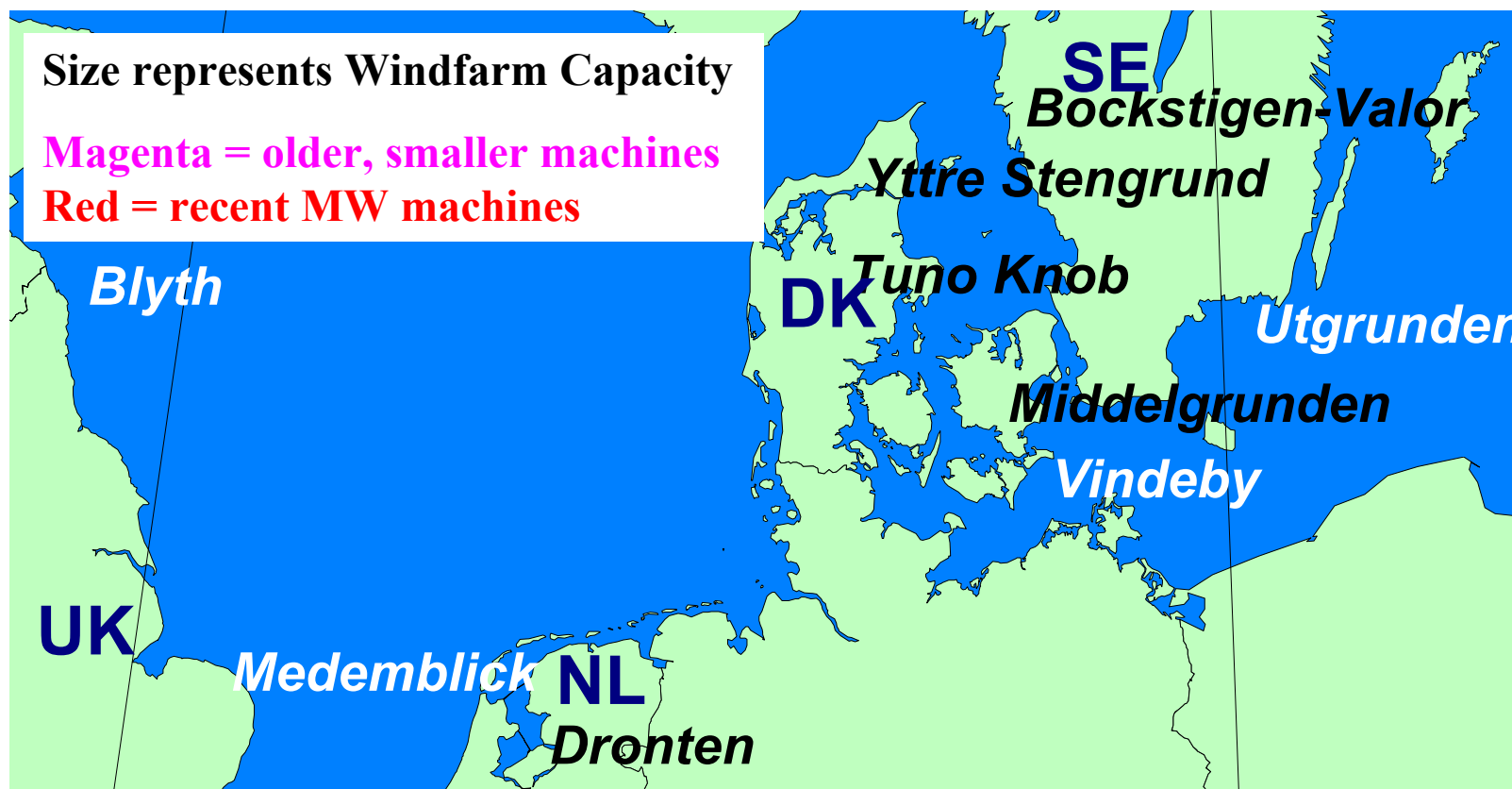
Installed Offshore

- Last year (2000) ~ 54 MW
- This year (2001) = 10 MW
- Next year (2002) ~ 300 MW (?)



Existing Offshore Windfarms

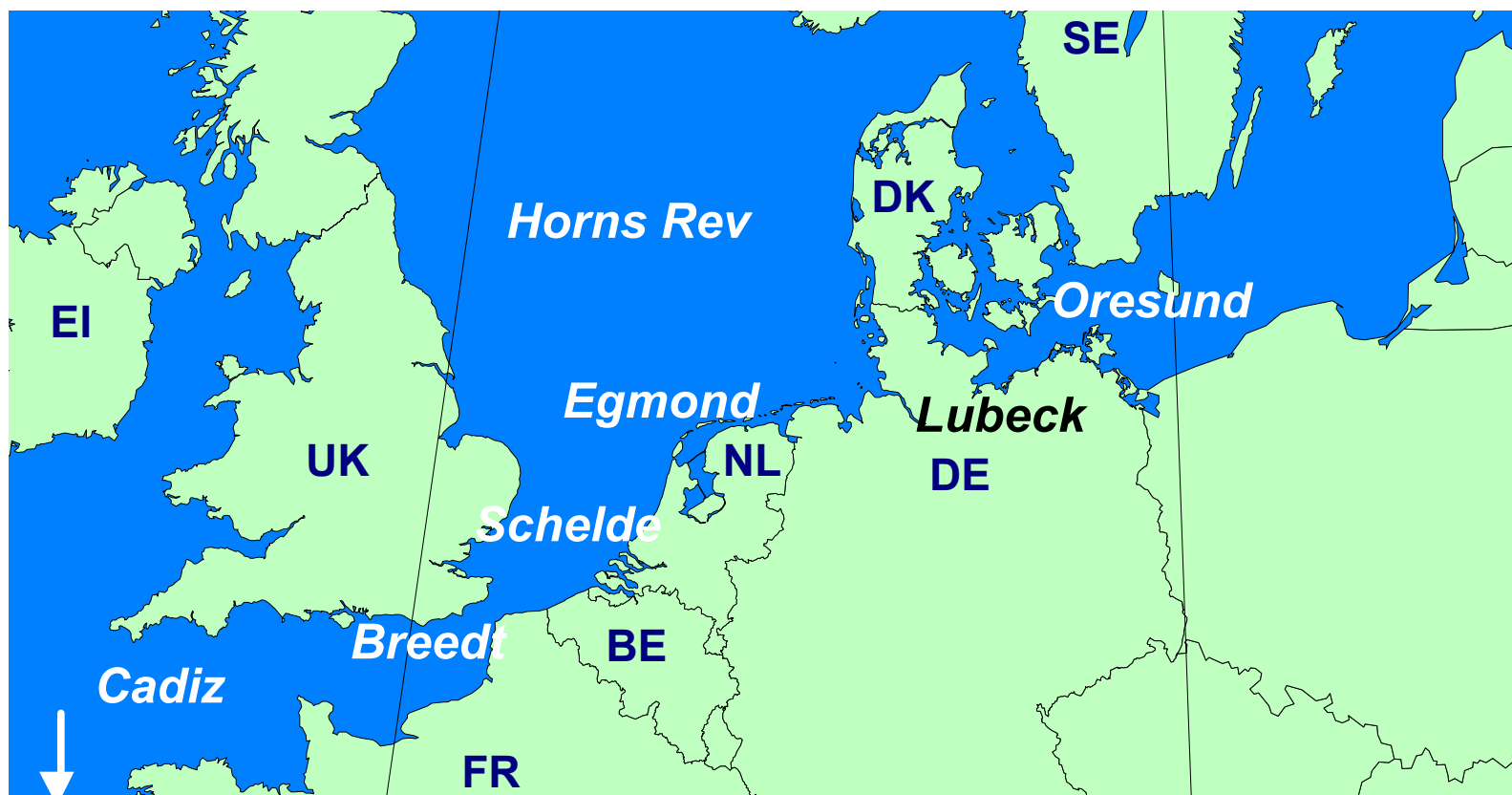
Existing Offshore Windfarms





Planned Offshore Windfarms

Some of the Planned Windfarms





Offshore Windfarms

The First Offshore Wind Turbine

- Nogersund, Baltic (SE)
- Constructed 1991
- 220kW WindWorld Turbine
- In 7m water, 250m from shore





Offshore Windfarms

The First Offshore Wind Farm

- Vindeby (DK)
- Constructed 1991
- 11 x 450kW Bonus Wind Turbines
- In 3-5m water, 1.5km from shore
- Gravity-base foundation





Offshore Windfarms

Further Early Prototype Farms with Small Turbines [500-600 kW]

- Medemblik (NL); 1994; 4 turbines; monopile; inland-sea





Offshore Windfarms

Further Early Prototype Farms with Small Turbines [500-600 kW]

- Tunø Knob (DK); 1995; 10 turbines; similar to Vindeby
- Dronten (NL); 1996; 28 turbines; 20m from shore; inland-sea
- Bockstigen-Valor (SE); 1998; 5 turbines; monopiles in Baltic



Offshore Windfarms

Recent Prototype Farms with Large Turbines [>1 MW]

- Middelgrunden (DK); 2000; 20 x 2MW Bonus turbines; gravity-base; 3km off Copenhagen shore
- Utgrunden (SE); 2000; 7 x 1.4MW Enron turbines; monopile; on 7-10m deep reef 8km from shore in the Baltic
- Yttre Stengrund (SE); 2001; 5 x 2MW NEG Micon turbines



Offshore Windfarms

Recent Prototype Farms with Large Turbines [>1 MW]

- Blyth (UK); 2000; 2 x 2MW
Vestas turbines; 8m water
800m from shore in the
North-Sea





Plans & Markets

- National Offshore Windenergy Targets
 - Denmark 4,000 MW by 2030
 - Netherlands 1,250 MW by 2020
 - United Kingdom 2,600 MW by 2010
- National Renewable Energy Targets
 - all other countries



Other Activities

- Information Resources
 - Electronic / Internet Sites
 - Print
- Education
 - MSc in Renewable Energy
 - MSc in Wind Energy
- Conferences & Seminars
 - From Wind Energy Community
 - From Offshore Engineering



Other Activities

- Conferences & Seminars
 - From Wind Energy Community
 - From Offshore Engineering
- Organisations
 - International: EWEA
 - National: OWEN,



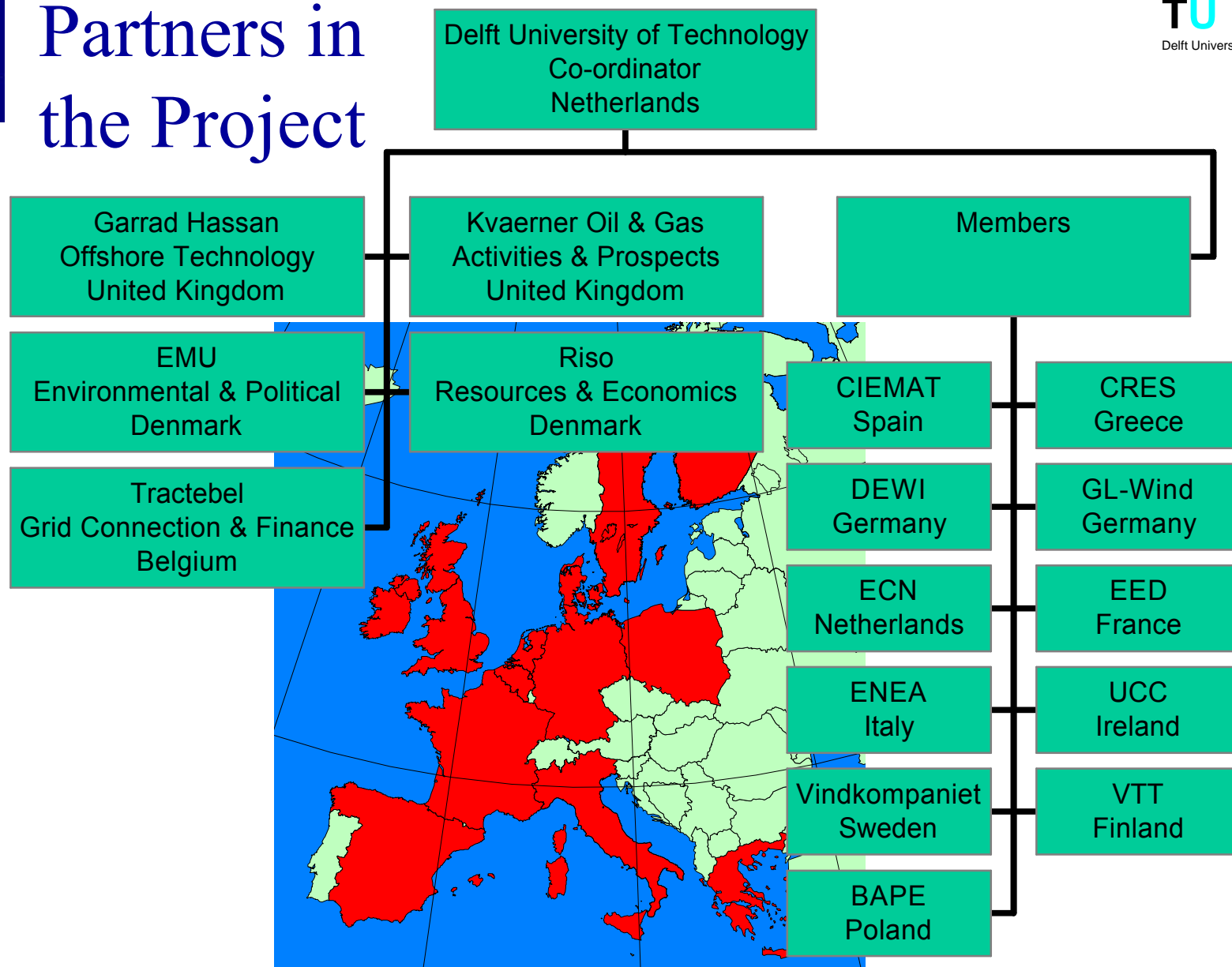
CA-OWEE Project

Concerted Action on Offshore Wind Energy in Europe

- Objective: Define the State of the Art
- 17 partners from 13 countries
- Finish at the end of this year
- Information freely available, via:
 - The EWEA Special Topic Conference, here
 - Internet site www.offshorewindenergy.org (December 2001)
 - Report (at end of project)
- Funded by the European Commission

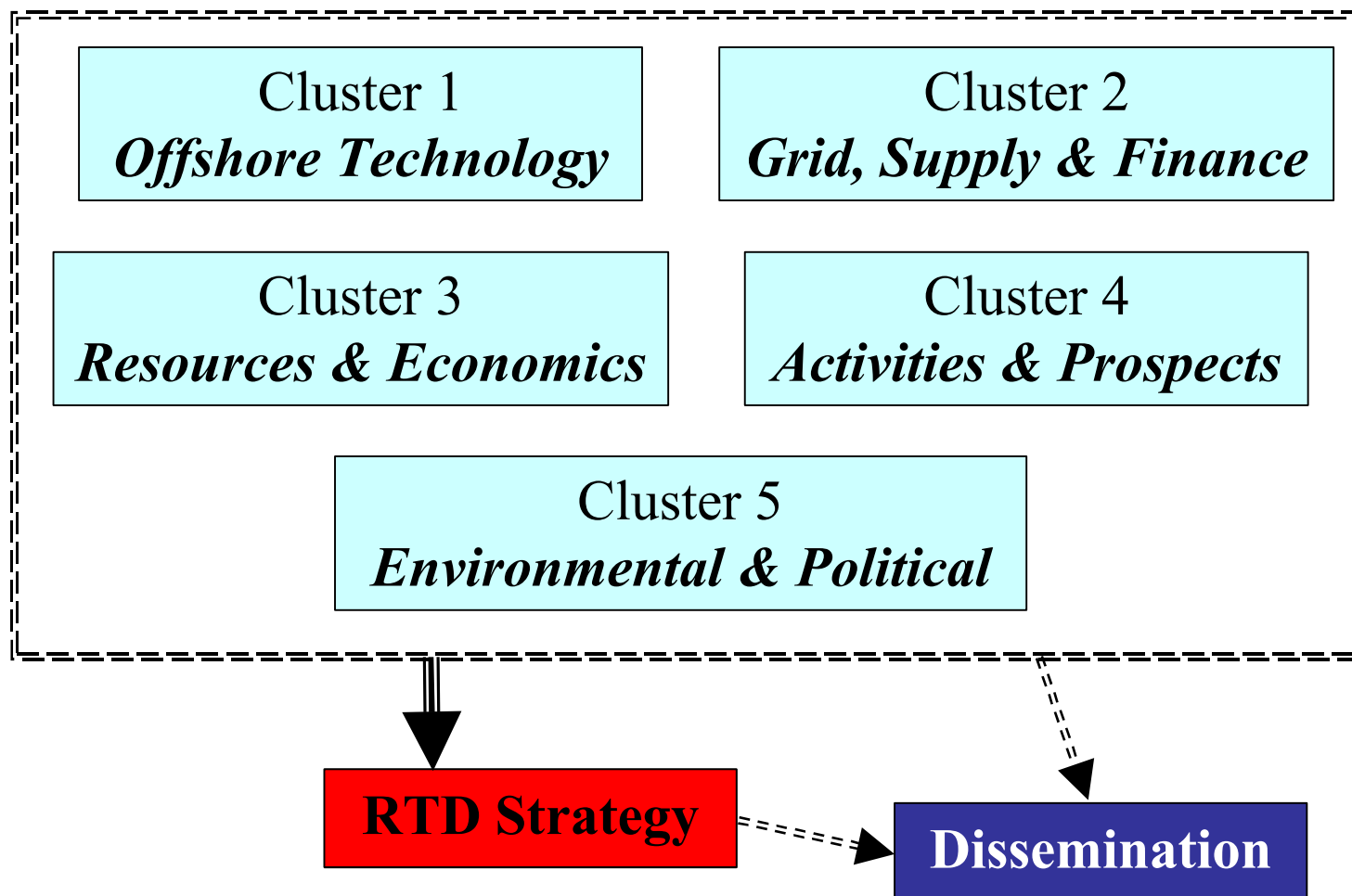


Partners in the Project





Project Tasks





Internet Site - Welcome

MEMBERS **CONTACT**

Concerted Action on Offshore Windenergy in Europe

Welcome to the website of CA-OWEE.

This website is the result of a Europe-wide information gathering initiative, undertaken by 17 organisations from 13 countries active in offshore wind energy. The results, in the form of a report, are available at this website. The work was funded by the European Commission.

ABOUT CA-OWEE **REPORTS** **OTHER INFO** **SITEMAP** **SEARCH**



More Information

If you would like further information about the CA-OWEE project, please:

- Visit the website at www.offshorewindenergy.org
- Read the [report](#) (in the delegate bag)
- Contact me here or email me at A.Henderson@CiTG.TUdelft.nl

