

Forskningsaktiviteter i Norge

Terje Gjengedal



Statkraft
REN ENERGI

Finansiering av FoU

- > Norges Forskningsråd (Norwegian Research Council)
 - 25-50% fra forskningsrådet
 - 50-75% fra bransjen
- > EBL-Kompetanse: fellesfinansiert bransjeprosjekter
- > EU finansierte prosjekter
- > Bilaterale prosjekter
 - Bedrifter- Fou institusjoner
 - Bedrifter – universiteter
- > Universitetsprogrammer

EU prosjekter

- EU IEE “TradeWind” (2006 – 2008),
- EU IEE “WINDSPEED” (2008-2011, roadmap for offshore wind)
- EU IEE “Offshore Grid” (2009-2011), techno-economic assessment of different design options

Forskningsrådet (Research Council)

- > “Development of offshore wind technology” (2007-2009)
- > Ny generatorteknologi – permanentmagnet
- > Hydraulisk kraftoverføring (hydraulikk i stedet for gir)
- > Offshore Transmission Technology
 - Power electronics, cable technology,...
- > Phd’s within
 - Power systems, grid integration, turbine and system control
 - New materials for blades etc

Andre prosjekter

- Vindkraft i kaldt klima
- Vindkraft og fugl
- Vindkraft og reinsdyr
- Samfunnsmessige virkninger og aksept av vindkraft
- Vindkraft og HMS
- Vindkraft og støy
- Operations & Maintenance onshore

Statkraft Ocean Energy Program

- Universitetsprogram over 4 år
- Vindkraft, tidevann og bølgeenergi
- NTNU, Uppsala, DTU
- 40 mill fra Statkraft
- 40 mill fra universitetene

Etableres 3 nye research centres

- > 50% finansiering fra Forskningsrådet
- > 50% finansiering fra bransjen
- > Sintef Research Centre of Offshore Wind Technology (2009-2016) (40 mill pr år)
- > Christian Michelsen Research: Offshore Wind Power (2009-2016) (30 mill pr år)
- > Sintef Centre of Environmentally Design of Renewable Energy (2009-2016) (20 mill pr år)

Research Centre for Offshore Wind Technology

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- **Objective:**
Pre-competitive research laying a foundation for industrial value creation and cost-effective offshore wind farms. Emphasis on deep sea (+30 m).
- **Partners (R&D):** SINTEF, IFE, NTNU + international: Risø DTU (DK), NREL & MIT (US)
- **Partners (funding):** Statkraft, StatoilHydro, Vestavind, Dong Energy, Lyse, Conoco Phillips, Statnett, Umoe Mandal, Aker Solutions, SmartMotor, ChapDrive, ScanWind, Veritas, SWAY, Vestas, Oceanor, Devold, ++
- **Work packages:**
 1. Numerical design tools (including wind and hydrodynamics)
 2. Energy conversion system (new materials for lightweight blades & generators)
 3. Novel substructures (bottom-fixed and floaters)
 4. Grid connection and system integration
 5. Operation and maintenance
 6. Concept validation, experiments and demonstration



- **Total budget: NOK 320 millions including 25 PhD/post docs**
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- **Application granted by Research Council of Norway 4 February 2009**
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Research Centre for Offshore Wind Technology

WP 4: Assessment of grid connection and system integration of large offshore wind farms. The goal is to develop technical and market based solutions for cost-effective grid connection and system integration of offshore wind farms.

- **Internal electrical infrastructure for offshore wind farms**
- **Grid connection and control**
- **Market integration and system operation**

Budget for WP4: NOK 48 millions over 8 years

