BEIS funded demonstration and innovation projects

Yannis Dragotis, Head of Nuclear & Renewable Energy Innovation Delivery



Department for Business, Energy & Industrial Strategy

ERA-NET programmes DemoWind 1 & 2

DemoWind Delivering cost reduction in offshore wind

 DemoWind is an ERA-NET Cofund programme receiving funding from the European Union's Horizon 2020 Framework Programme under grant agreement No. 646517 & No. 691732



- Supporting partners are Belgium (IWT), Denmark (EUDP), The Netherlands (RVO), Portugal (FCT), Spain (CDTI) and the United Kingdom (BEIS)
- Principal objective is to fund public-private projects that develop and demonstrate offshore wind energy technologies
- Aim that technologies are deployed commercially and contribute to cost reduction in offshore wind energy
- Total grant budget of €56.2 million and grants offered for €24.8 million
- Total project budget almost €100 million



DemoWind



- Focus on cost reduction: must provide evidence to show how the innovation to be developed and demonstrated will lead to reduction in the levelised cost of offshore wind energy
- **Technology area:** Technical priority area including turbine components, floating offshore turbines, foundation structures and electrical networks
- Technology Readiness Level (TRL): Advance innovative technologies from Technology Readiness Levels 5 or 6 to Technology Readiness Levels 6 or 7

• Timing:

- DemoWind 1: Constructed and commissioned by 31 December 2018; and projects must be fully completed – including all reporting requirements - by 30 June 2019
- DemoWind 2: Constructed and commissioned by 31 December 2019; and projects must be fully completed – including all reporting requirements - by 30 June 2020
- **Transnational collaboration:** Involve at least two separate private sector organisations from at least two of the DemoWind partner countries/regions
- www.demowind.eu

Demowind- Deutsche Bucht





Project context

Existing foundation technologies sustain high LCOE by being inherently expensive to fabricate and to install with a high environmental impact

The Mono Bucket design will be fabricated in modules using high levels of automation; providing quicker installation, silently and cost effectively with the added benefit of being completely removable.



W Universal Foundation

Specific project objectives

- Design The design will demonstrate a full scale Mono Bucket design configurator and integrated design model
- Build Using a network differentiator approach to supply chain and automated final assembly techniques, fabrication costs will reduce significantly from existing foundation technologies
- Test The test phase of the project will be as rigorous as it gets... Full scale foundations supporting full size wind turbines and power being phased into the main grid connection
- Create A completely new foundation type that can have a positive effect on lowering the LCOE and create an exportable product
- Benefits
- Reduced LCOE, through low cost manufacturing and installation costs
- · Environmental benefit of the elimination of Noise impact during installation
- Ability to fully remove structure at the decommissioning stage



UK Project Value: £7,104,335

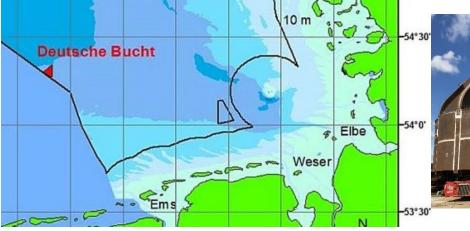
BEIS Contribution: £2,118,895

> Start Date: June 2018

Scheduled Completion Date: December 2019

Van Oord Offshore Wind Germany GmbH are leading the Project In collaboration with:

Universal Foundation, Denmark Sif Offshore Foundations, Holland Harland and Wolff Heavy Industries Ltd, UK





CHEG: Compact High Efficiency Generator

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Project context

Design, Manufacture and Test a 500kW PDD[®] (Pseudo Direct Drive) Generator to demonstrate efficiency savings in Wind Turbine Generation and reduce LCOE (Levelized Cost of Energy)

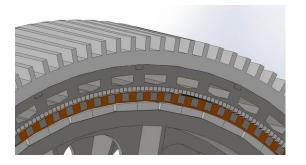
The Aims of the Project are to:

- Advance the state of the art in wind turbine generator technology
- Reduce capital costs of wind turbine installations
- Reduce LCOE

Specific project objectives

DNV.GL

- Design, Build and Test a 500kW PDD[®] 210kNm Wind Turbine Generator
- Create a competitive advantage for the European wind turbine supply chain
- Demonstrate the feasibility of multi-megawatt PDD[®] generator systems
- Develop manufacturing techniques to assemble the unique features of the PDD[®] Generator, in particular the additional magnetic components
- Develop the supply chain for the various components of the generator aiming for capability for supply up to multi-megawatt scale variants
- Establish a Technology Roadmap detailing supply chain, technology and process route developments needed to enable large scale PDD[®] generators to be successfully manufactured to meet market demand



UK Project Value: £1,861,752

BEIS Contribution: £1,111,668

> Start Date: May 2016

Completion Date: March 2019

Magnomatics are leading the project in collaboration with:

ATB Laurence Scott UK EDF Energy R & D UK Centre ORE Catapult Development Services Ltd DNV GL Nederland B.V. JL MAG Rare-Earth Co. Europe B.V.

CHEG: Compact High Efficiency Generator



500kW PDD Generator on Test



Largest magnetically geared machine ever built

Benefits

- Higher efficiency, compact size and low O & M Costs
- Significant reductions in Cost of Energy compared to state of the art DDPMG and geared DFIG's
- The PDD[®] will deliver high efficiencies at low speeds, maximising AEP
- Expensive gearbox failures eliminated.
- Lightweight compared with DDPMG

Results and lessons learned

- 500kW PDD Generator was successfully constructed and tested at ORE Catapult
- Technical challenges were overcome through close collaboration with partners
- Working generator attracted significant interest from potential customers and investors
- Generator efficiency was very close to predicted
- Key objectives achieved
 - Design, Build and Test a 500kW PDD Generator
- Lessons learned
 - Modelling and analysis at design phase needed more detail
 - Supply chain contingency needed more robustness
 - Manufacturing Capacity could have been planned more effectively

Next steps for the technology

- Develop & commercialise the PDD at both 2-3MW and 10MW+ for Wind Turbine application
- Develop & commercialise multi-megawatt PDD's for other applications such as industrial drives and marine propulsion where the greater efficiency can contribute to reduced energy consumption and lower CO2 emissions
- Study and de-risk critical components within the PDD at larger scale (multi-megawatt)

WIP: Wind Integrated Platform for 10+MW









Department for Business, Energy and Industrial Strategy



Launch May 2019

Project context

A collaboration between UK and Spanish engineering companies to advance wind power in deep waters. The overall goals of the €1.42 million project are to simulate, implement and demonstrate the technical and economical viability of a twin-turbine floating solution by testing a 1 : 6 scale platform at a sea testing site (PLOCAN, Canary Islands 2019), reaching a TRL of 6. <u>Next stages:</u> larger-scale sea trials. Demonstration of market potential. <u>UK partner:</u> Tension Technology International Ltd., providing specialist input on hydrodynamics and mooring design.

Specific project objectives

- Design, build & sea test 1/6th scale prototype of a 10MW+ floating twin-turbine wind power platform in order to demonstrate platform construction, efficient operation, and control
- Development of cost-effective mooring systems for this platform
- Proof of reliability & condition monitoring to verify full-scale design
- Design, development and costing of commercial (10MW+) units
- Levelised cost of energy studies for array-scale deployments

Benefits

- Demonstrate the advantages of two turbines on one floating platform.
- Increased confidence in scaling-up projections to full commercial size by continuing and extending the performance validation from 100th to 40th scale (achieved) to 40th to 6th scale (in this DemoWind project)
- Bring platform to TRL = 6
- Significantly de-risk further commercialisation of the twin-turbine solution and of wind power in deep waters



UK & Spanish Partners – Prototype Inauguration April 2019

UK Project Value £334,334

BEIS Contribution to UK Partner: £200,600

UK Partner Contribution £133,734

> Start Date: January 2016

Scheduled Completion Date: June 2019

In collaboration with: EnerOcean (lead), Ghenova Engineering, Ingeteam, TTI

UK Partner Tension Technology International Ltd (TTI) role included:

- Hydro & Aerodynamic modelling
- Mooring Design of Nylon-Chain hybrid system
- Commercial scale design
- Market & economic assessments
- Mooring system Procurement
- UK supply chain Bridon-Bekaert (Nylon ropes)

www.tensiontech.com

MDWind: General purpose seabed drill

system









Department for Business, Energy and Industrial Strategy



Project context

To launch a new remotely operated seafloor-based site investigation system into the Offshore Wind (OW) market: MD-WIND

The developed robotic general-purpose submarine drilling machine is tooled for the specific site investigation requirements of OW. The system has been tested at port successfully, and plans are in place to test the unit offshore to simulate a commercial-like scenario.

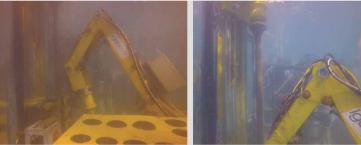
Specific project objectives

- Integration of a piezocone (CPTu) with a Seismic Module
- Recovering high quality samples
- Ultrasonic Inspection device and Software Tools
- Field testing and Track record

Benefits

- Reduce Site Investigation cost and delays
- Improve Acquisition and range of geotechnical data
- Sub-structure optimization
- Cost Control
- Reduce safety factors
- Effective cost reduction





Project Value: £1,052,276

BEIS Contribution: £191,381

> Start Date: December 2015

Scheduled Completion Date:

In collaboration with: IGEOTEST SL (Spain)



www.mg3.co.uk www.igeotest.com

XL-BLADE: Validation of the world's largest offshore wind turbine blade









Department for Business, Energy and Industrial Strategy



Project context

Cost of energy reduction-driven development, manufacturing and in-field validation of the world's largest offshore wind turbine blade.

ODSL carry out testing of the blade designs at our state of the art facilities to verify their performance and support their design development.

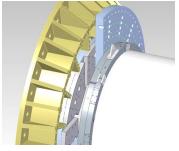
Specific project objectives

- Static and fatigue testing of the world's longest (88.4m) wind turbine blades, produced by Adwen and LM Windpower
- Upgrade of facilities to perform tests at this scale
- Demonstration of an award winning bi-axial blade test methodology at scale, which is much closer to the in-service loads experienced by wind turbine blades
- Deployment of instrumentation on an offshore met mast to create a unique dataset of offshore environmental conditions.
- Use of the above to support blade coating design.
- Dissemination of project findings

Benefits

- The pursuit of scale: Development of an offshore wind turbine with the greatest Annual Energy Production yet
- Significant resulting reductions in the levelised cost of energy from offshore wind
- An improved approach to representative blade testing and verification
- An improved understanding of the offshore environment in the context of blade degradation and erosion





UK Project Value: £1,786,800

BEIS Contribution: £1,072,080

> Start Date: March 2016

Scheduled Completion Date: June 2019

> Collaboration: ODSL Adwen LM Wind Power



https://ore.catapult.org.uk/ourknowledge-areas/blades/bladesproject/xl-blade/

XL-BLADE: Validation of the world's largest offshore wind turbine blade **SIEMENS** Gamesa CATAPULI RENEWABLE ENERGY



Department for Business, Energy and Industrial Strategy

Results and lessons learned

- The specific project objectives were met
- The key outcome of this project was to demonstrate that it is possible to perform bi-axial excitation using a ground-based exciter for the flapwise direction and a resonant mass exciter for the edgewise direction
- Wind drag reduction covers (windbreakers) specific for bi-axial testing have been designed and tested
- TUV Nord have validated that the bi-axial testing methodology conforms with the IEC 61400-23 standard



UK Project Value: £1.786.800

BEIS Contribution: £1,072,080

> **Start Date: March 2016**

Completion Date: April 2019

Collaboration: ODSL Adwen LM Wind Power

Benefits

- The pursuit of scale: Development of an offshore wind turbine with the greatest Annual **Energy Production yet**
- · Significant resulting reductions in the levelised cost of energy from offshore wind
- An improved approach to representative blade testing and verification
- An improved understanding of the offshore environment in the context of blade degradation and erosion

Next steps for the technology

- OREC is working to obtain an extension to its scope of accreditation under IEC/ISO 17025 to include dual axis testing
- As blades get ever longer work is needed in the area of blade handling to ensure safe and efficient testing programmes

WINDSTEP Wind turbine life-minded production management



Department for Business, Energy and Industrial Strategy

Project context

Integrated Health Management System to optimise wind turbine performance through balance between power production and the rate of damage accumulation.

Benefits

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- Optimised performance through increased power production, extended turbine useful life, or both
- Reduced Operation and Maintenance cost
 - Improved Health and Safety and environmental aspects of wind farm operation

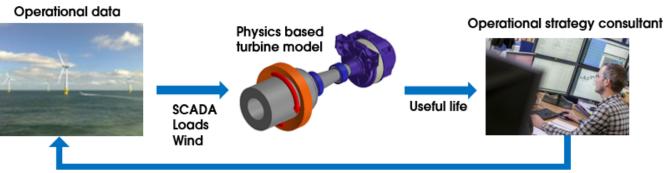
Project Value: £2,058,200

BEIS Contribution: £333,746

> Start Date: March 2016

Scheduled Completion Date: August 2019

In collaboration with: GAMESA Innovation and technology, S.L.

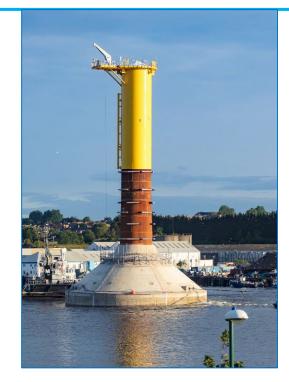


Strategy driven re-rating to optimised long-term revenue



http://onyxinsight.com/

FSFOUND: Development and demonstration of float-and-submerged gravity base foundations (GBF) for offshore wind turbines in attacked to the second sec



Project context

To demonstrate the feasibility of the float-and-submerged gravity base foundation solution at all critical stages: design, manufacture and quayside construction, preparation and loadout, seabed preparation, towing, installation, commissioning and operations.

Specific project objectives

- To move the FS GBF solution from TRL 6 to TRL 7, thereby verifying the RDI initiative.
- To verify the manufacturing and installation methodology and benefit from the lessons learnt in order to optimise plans for the future transnational exploitation of GBFs;
- To minimise potential delays and cost overruns through the development of multiple installation scenarios against a meteorological model.
- To compare the actual costs and performance with the costbenefit analysis performed;
- To design and install a condition monitoring system on two GBFs to monitor their behaviour.
- To assess the structural response to extreme and fatigue loads on the GBF and compare theoretical loads with real ones



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Department for Business, Energy and Industrial Strategy

> Project Value: £3,636,607

BEIS Contribution: £604,957

Start Date: 20/10/2016

Scheduled Completion Date: 01/02/2019

In collaboration with:

Blyth Offshore Demonstrator Ltd & EDF Energy Renewables

EDF Energy R&D UK Centre

ORE Catapult Development Services Ltd. BAM Wind Energy JV

FSFOUND: Development and demonstration of float-and-submerged gravity base foundations (GBF) for offshore wind turbines in the second s

Benefits

- Lower installation costs by employing standard tugs and self-buoyancy rather than specialised vessels.
- Lower costs during the operational phase as a result of reduced inspection and maintenance.
- Fabrication and deploy the GBF in physical proximity to the offshore site
- Increased deployment of WTGs in sites where piling is not technically feasible





Next steps for the technology

- · Factory style manufacturing
- Design Optimisation (shaft length & thickness)
- Removal of concrete ballast stage
- GBFs to be used at Fecamp (498 MW)

Results and lessons learned

- Limitation of the Dry Dock (tight tolerances)
- Challenging installation of CM sensors
- BIM was vital in co-ordination of multiple parties
- Prognostic analysis indicated GBFs were within design tolerances
- Large drop off/failure of sensors within two years of operation



Department for Business, Energy and Industrial Strategy

> Project Value: £3,636,607

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Start Date: 20/10/2016

Scheduled Completion Date: 01/02/2019

In collaboration with:

Blyth Offshore Demonstrator Ltd & EDF Energy Renewables

EDF Energy R&D UK Centre

ORE Catapult Development Services Ltd. BAM Wind Energy JV

SPOWTT: improving Safety and Productivity of Offshore Wind Technician Transit **SIEMENS** Gamesa UNIVERSITY OF Hull **BMO** OFFSHORE

ECN



Department for Business, Energy and Industrial Strategy



CATAPULI

Project context

A significant part of the lifetime cost of an offshore windfarm is down to failed crew transits or workers having to abandon their missions due to rough and unpredictable sea conditions.

The project is using data captured at site, analysis of human fatigue and digital technology to create an inexpensive decision-making tool for marine coordinators and operations managers.

Specific project objectives

- Quantify the physiological and psychological impacts of technician transit in a crew transfer vessel (CTV)
- Understand the impact of technician experience in transit on vessel utilization and technician productivity, health and wellbeing.

MARIN

- Define a common framework for the industry to match CTVs to the environmental conditions
- Define safe environmental limits for a vessel and propose control measures to minimise in-vessel impacts
- Development of the first commercially available decision making tool, which includes this model

UK Project Value: £2M

BEIS Contribution: £0.9M

Start/end Dates: Nov 2017 - Dec 2019

Project Lead: ORE Catapult Development Services Limited

In collaboration with: Siemens Gamesa Renewable Energy University of Hull Specialist Marine Consultants Ltd (SMC) Energy research Centre of the Netherlands (TNO) MARIN **BMO Offshore**



Benefits





SPOWTT: improving Safety and Productivity of Offshore Wind Technician Transit Department for Business, Energy and Industrial Strategy SIEMENS Gamesa **ECN** + **TNO** innovation for life CATAPUL 「「「「」」 UNIVERSITY OF Hull BMO Achievements so far **Next steps** Upscale data collection in phase 2 to Development of methodology for which data to \triangleright \geq continental European windfarms and capture additional UK sites Creation of app for capturing subjective state of \geq Further validation of trends and creation of technicians in transit \geq model to describe factors that affect human fatigue Undertaking of sea trial at x3 UK windfarms in \geq first phase of project Upscaling of testing of decision support tools \geq Captured both subjective and physical state data \geq Develop understanding of potential control \geq measures \geq Initial analysis and identification of trends in what causes human fatigue \geq Development of decision support tool framework Initial testing of decision support tool at x1 UK \geq site

ODB: Offshore Demonstration Blade





Project context

The objective of the ODB project is to reduce the Levelised Cost of Energy of offshore wind by demonstrating a set of blade technologies aimed at increasing the rotor energy performance and reducing its O&M costs.

ODB is a two-year project supported through the DemoWind2 programme and being delivered by a consortium of ten European Partners from four countries. The project has a total combined project cost of EUR €4m.

Specific project objectives

Progressing the research, development, and demonstration of a seven novel blade technologies;

- Aerodynamic low drag add-ons
- Metallic leading edge insert for erosion protection
- Structural stiffener
- Fibre optic cross sectional shear distortion sensor
- Fibre optic erosion sensor
- High-performance hybrid coating for leading edge protection
- · Aerodynamic next-gen blade add-ons to increase AEP

Benefits

Developing retrofit technologies to reduce LCOE in offshore wind farms by;

The cumulative effect of these technologies has the potential to reduce

Improving aerodynamic performance

LCOE of offshore wind by up to 4.7%

- Protecting against leading edge erosion
- Reducing damage due to shear distortion
- · Monitoring blade characteristics with fibre optic sensors, and
- Reducing aerodynamic noise from near-shore wind farms.

Department for Business, Energy and Industrial Strategy

> UK Project Value: £849,967

BEIS Contribution: £509,980

> Start Date: Jan 2017

Scheduled Completion Date: Feb 2019

ODSL are leading the Project In collaboration with: Aerox Bladena CENER UCH-CEU DIS DTU Siemens Gamesa Renewable Energy TNO Total Wind











Project context

- Developing foundation design solutions for next generation turbines –fixed and floating
- Concept Design of 2 blade turbines >12MW
- O&M Innovation
- Delivering LCOE forecasts to support further investment
- Developing sites to accommodate demonstration

Specific project objectives

- Design Analysis of 2 v 3 blade rotor
- Design Comparisons 6M &12MW fixed & floating foundations (2 and 3 blades)
- Design & Validation of operational strategy: 2
 blade with helicopter landing
- 2 Blade full jacket offshore design 6MW &12MW (2 blades)
- Installation analysis for all fixed foundation options



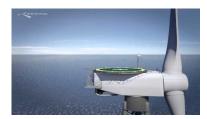
UK Project Value: £1,750,000

BEIS Contribution: £924,240

> Start Date: Dec 2016

Completion Date: March 2019

In collaboration with: 2B Energy New Waves Solutions Saitec S.A



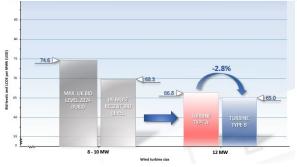


Department for Business, Energy and Industrial Strategy

Results and lessons learned

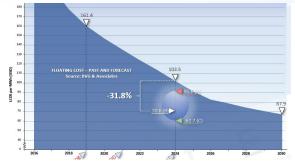
- Cost reduction trajectory is steeper for Floating Foundations
- Stretching of 12 MW platforms can reduce LCOE further (10 15%)
- 2 bladed rotor has a 3% upside to the 3 bladed rotor
- Floating foundations in larger projects can be competitive with fixed well before 2030 (Technically as early as 2024).
- 12 MW turbine and FLF in general will need to mature, including need of infrastructure to reach the low LCOE levels

Fixed Offshore wind – Recent tenders vs. new 12 MW (2 and 3 blades) Floating Offshore wind cost – Next generation 12 MW - Impact of Windspeed



Benefits

- Validation of cost benefits of 2 Blade turbines (fixed and floating)
- Clear opportunity defined for LCOE reductions for >12MW floating wind designs
- Validation of option for helicopter landing on 2 blade turbines



Next steps for the technology

- Securing route to market for 12MW integrated floating design
- Detail design of 12MW (2 blades) for further cost reduction
- Potential for integration of alternative fuel conversion technologies on floating wind platforms

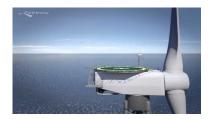
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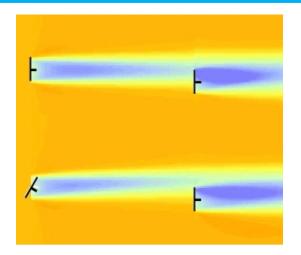
Completion Date: March 2019

In collaboration with: 2B Energy New Waves Solutions Saitec S.A



www.ciercoenergy.com





Mathematical model showing effect of wake steering. Yawing the upstream turbines away from the oncoming wind means the wakes can be diverted away from downstream turbines

Project context

Aim of WFCT project is to implement Wind Farm Control (WFC) strategies on a full-scale offshore wind farm; conduct a measurement campaign to demonstrate better lifetime economic performance through increased power production, reduced O&M costs, and lifetime extension of existing and future assets.

Specific project objectives

- Implement and test WFC concepts at an offshore wind farm
- Optimize WFC concepts; evaluate and validate the effects and benefits
- Improved understanding of use of LiDARs in offshore environments
- Analyse the effects of optimized WFC concepts on the annual energy production (AEP) and loads
- Demonstrate economic benefits of WFC
- Reduce technical and economic risks to overcoming technical and market barriers

Benefits

Models suggest an 0.5-3.5% increase in energy yield (AEP), load reductions of up to 50% for some turbine components, O&M cost reduction by up to 4% and lifetime extension of up to 3%

Increased understanding of how to optimize wind farm operation to maximize economic benefits

The prospected field tests will reduce the uncertainty in the predictions of the economic benefits of WFC, lowering the risk of the technology, increasing its acceptance and TRL level. Project Value: £2.3M

BEIS Contribution: £507,300

> Start Date: March 2017

Scheduled Completion Date: November 2020

In collaboration with: Carbon Trust, TNO, Innogy SE, Frazer-Nash Consultancy, DTU, Windar Photonics, E.ON Climate & Renewables, EnBW Energie Baden-Württemberg, Equinor, SSE, Shell, Vattenfall Wind Power

Compact Holistic Efficient Floating *Turbine*







Department for Business, Energy and Industrial Strategy

Project context

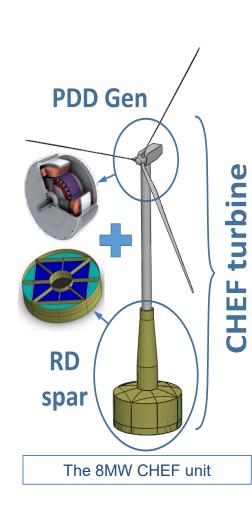
(CHEF)

Design an 8MW offshore, floating wind turbine solution that encompasses a low cost floating concrete spar and an efficient, lower mass magnetically geared PDD[®] generator.

A scaled version of this floating wind turbine will be tested in a wave basin to demonstrate the active heeling compensation system as part of the reduced draft concrete spar.

Specific project objectives

- Design and Outfitting of an 8MW solution
- Reduced Draft Spar design- structural analysis, stability, seakeeping, transportation, installation and operational conditions
- Active Heeling-Compensation- system design and control system design
- Analysis of the CHEG generator incorporating the motions and accelerations of a floating solution
- Extensive performance and resilience testing of the 500kW prototype generator from DemoWind 1 (CHEG) on a bespoke wind turbine test rig using WT control algorithms
- Platform tests of a 1:30 scale model of the CHEF turbine



Project Value: Total - £1,238,912 UK - £384,674

BEIS Contribution: £230,805

> Start Date: January 2017

Completion Date: March 2019

In collaboration with: Magnomatics Ltd. (lead UK partners)

Norvento Wind Energy UK Ltd.

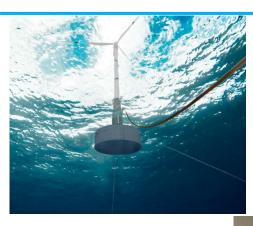
Compact Holistic Efficient Floating *Turbine*







Department for Business, Energy and Industrial Strategy



(CHEF)

8MW Floating Spar Solution

500kW CHEG PDD on test at Norvento

Benefits

- Greatly reduced LCOE
- 23% lower CapEx
- 29% lower OpEx
- Higher generator efficiency and lighter nacelle by using Magnomatics PDD Technology
- Cheaper solid ballast for the platform
- Simplified transportation and installation (assemble in port)
- No sheer leg cranes needed for installation
- Easier mooring and unmooring
- Major repairs and decommissioning are simplified

Results and lessons learned

- 500kW CHEG Generator successfully tested under turbulent wind turbine aeroelastic loads
- 8MW Reduce Draft Spar designed and scaled model successfully tested under representative conditions.
- 8MW PDD Designed and modelled with representative movements and accelerations
- All key objectives were met
 - Design an 8MW floating offshore wind turbine solution incorporating a PDD Generator and a reduced draft spar system
 - Build and test a scaled model of the 8MW Floating Reduced Draft Spar system.
- Key lesson learned was that the test rig for the CHEG Generator could have been more robustly planned with respect to the grid connections.

Next steps for the technology

- Engage with potential OEM's to give definition to the next stage of the design.
- Design a scaled up Reduced Draft Spar system and test in a representative environment to demonstrate the potential savings and viability at multi-megawatt scale. This could incorporate a scaled up PDD generator at multi-megawatt size.
- Study and de-risk critical components within the PDD Generator at larger, multi-megawatt scale

Other Programmes



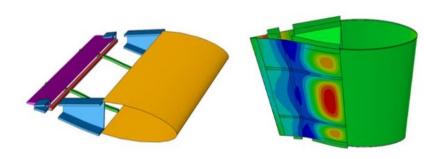
Department for Business, Energy and Industrial Strategy

- ACT BLADE
- OFFSHORE WIND INNOVATION HUB
- UK MANUFACTURING TECHNOLOGY FOR NEXT GENERATION TURBINES

ACT BLADE

Project context

This project will develop and test a 13m version of an ACT Blade prototype. It will also optimise the textile development for environmental performance offshore. Following the success of this project, the blade design will be tested on an turbine operational final as а demonstration prior to commercialisation.





Department for Business, Energy and Industrial Strategy

> Project Value BEIS Contribution (via IUK): £1,461,000

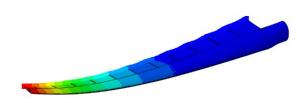
> > Start Date: January 2019

Completion Date: Sept 2020

In collaboration with: ACT Blade Ltd. (lead UK partners)

OREC AFRC/LMC University of Sheffield (AMRC)

www.actblade.com



Benefits

- Greatly reduced LCOE
- A lighter blade can be longer whilst remaining within the load limits of the rest of the turbine, and therefore have higher annual energy production
- The textile covered blade construction enables blades to be produced with reduced up-front investment and reduced ex-works transportation costs.

OFFSHORE WIND INNOVATION HUB

Project context

The Offshore Wind Innovation Hub is the UK's primary coordinator for innovation, focusing on offshore wind energy cost reduction and maximising UK economic impact.



Objectives

- Act as a central focal point for the offshore wind industry and public sector to enable increased engagement, coherence, collaboration and knowledge sharing.
- Provide government and industry with a primary validated source of information on the key challenges and priorities within the sector.
- Increase UK content and contribute to LCOE reduction by monitoring progress in technology innovation and developing a clear, tangible roadmap of activities & priority areas.
- Shape the priorities of international innovation programmes and strengthen exports by promoting UK industry interests abroad.



Department for Business, Energy and Industrial Strategy

> Project Value BEIS Contribution (via IUK): £1,2 M

> > Start Date: April 2018

Completion Date: March 2020

In collaboration with:

OREC

https://offshorewindinnov ationhub.com/

UK MANUFACTURING TECHNOLOGY FOR NEXT GENERATION TURBINES

Project context

Feasibility study that will produce a detailed business case of specific components required to deliver a 20 MW scale offshore wind turbine.



Department for Business, Energy and Industrial Strategy

> Project Value BEIS Contribution £384,000

> > Start Date: Sept 2019

Completion Date: March 2020

In collaboration with:

OREC NCC

<complex-block>

Outcomes

- 1) produce a specification for a reference 20MW device based on known concepts and
- 2) will outline the business case and development plan to deliver components and sub-components that will validate and demonstrate the proposed 20MW technology platform.

Thank you

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