



Offshore Renewable Energy Catapult-Tidal Turbine Testing-Stephen Robertson, Head Of Business Development

28/10/2020

Agenda

- Welcome to Offshore Renewable Energy Catapult, Blyth site
- Why test prior to deployment?
- 1MW test rig & 3MW test rig
- Q&A

The Blyth Test Site

cATAPULT
Offshore Renewable Energy



Why Test Prior To Deployment?

Why test prior to deployment?

- Prove performance curve in benign controlled environment
- Reaction to specific events and grid conditions
- Accelerate innovative designs and materials
- Address unknown scenarios, power conversion, bearing, gearbox faults
- Test, analyse focused areas such as heat/cooling effects due to braking
- Assess turbine reactions to faults in pitching, increased load, bending moments
- Validate models



1MW and 3MW test rigs

1MW & 3MW test rigs



FACILITIES: 3MW, Powertrain Facilities
Turbine Bearing Test Facility

FACILITIES: 1MW Torque only prototype or small
scale tidal turbine testing



TIDAL sub 1MW T2 Tocardo

- Test sub 1MW T2 tidal turbine in wet environment
- Develop and test innovative solutions for
- Accelerate innovative designs and materials

FACILITIES: 1MW Torque only prototype or small scale tidal turbine testing



TIDAL 1.5 MW Simec Atlantis

- Assemble Test & validate AR1000 and AR1500 tidal turbine powertrains
- Accelerate innovative powertrain technology, from
- Support development of critical powertrain components: bearings, gearbox, generator
- Grid simulation capability (E-Grid)

FACILITIES: 3MW, Powertrain Facilities
Turbine Bearing Test Facility
Grid emulation system



TIDAL Nova Innovation

- Test & validate D2T2 tidal turbines
- Develop and test innovative solutions for
- Accelerate innovative designs and materials

FACILITIES: 1MW Torque only prototype or small scale tidal turbine testing



TIDAL MCT Siemens

- Test & validate SeaGen power train, included fatigue test regime over 9 months
- Accelerate innovative powertrain technology'

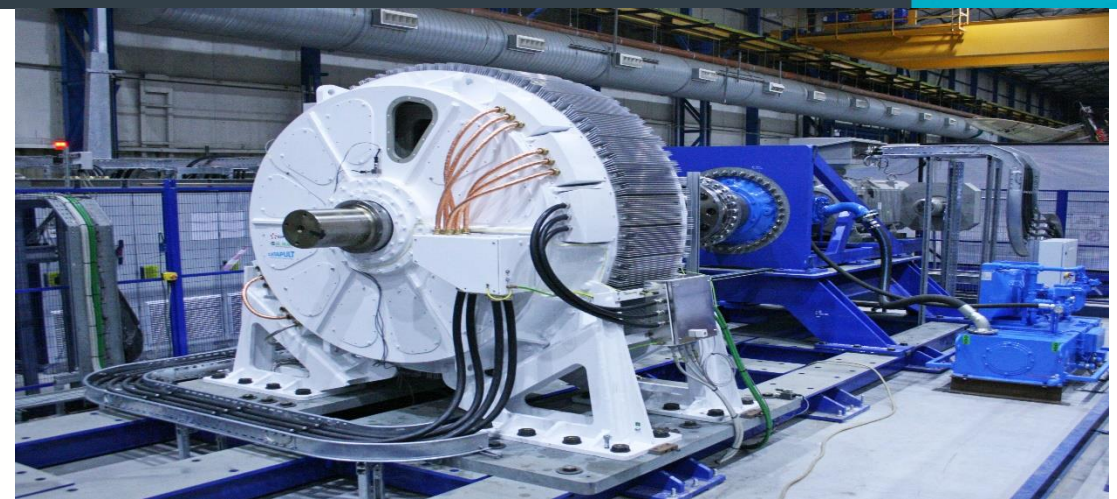
FACILITIES: 1MW, Powertrain Facilities



Component Testing, sub 1MW

- Test & validate ferrous magnet generator
- Develop and test innovative solutions for
- Accelerate innovative designs and materials

FACILITIES: 1MW Torque only prototype or small scale tidal turbine testing



Component Testing sub 1MW

- Test & validate novel turbine magnetic generator
- Accelerate innovative powertrain technology' Sub-1MW
- Support development of critical powertrain components: bearings, gearbox, generator

FACILITIES: 1MW, Powertrain Facilities



BLADES

- Test & validate next generation 100m+ offshore wind turbine blades
- Develop and test innovative solutions for rain erosion (e.g. composite materials)
- Accelerate innovative blade designs and materials

FACILITIES: 100m and 50m Blade Test Halls
Blade Erosion Test Rig
Wind Turbine Blade Test Facility



POWERTRAINS

- Test & validate next generation 10MW+ offshore wind turbine powertrains
- Accelerate innovative powertrain technology, from
- Support development of critical powertrain components: bearings, gearbox, generator

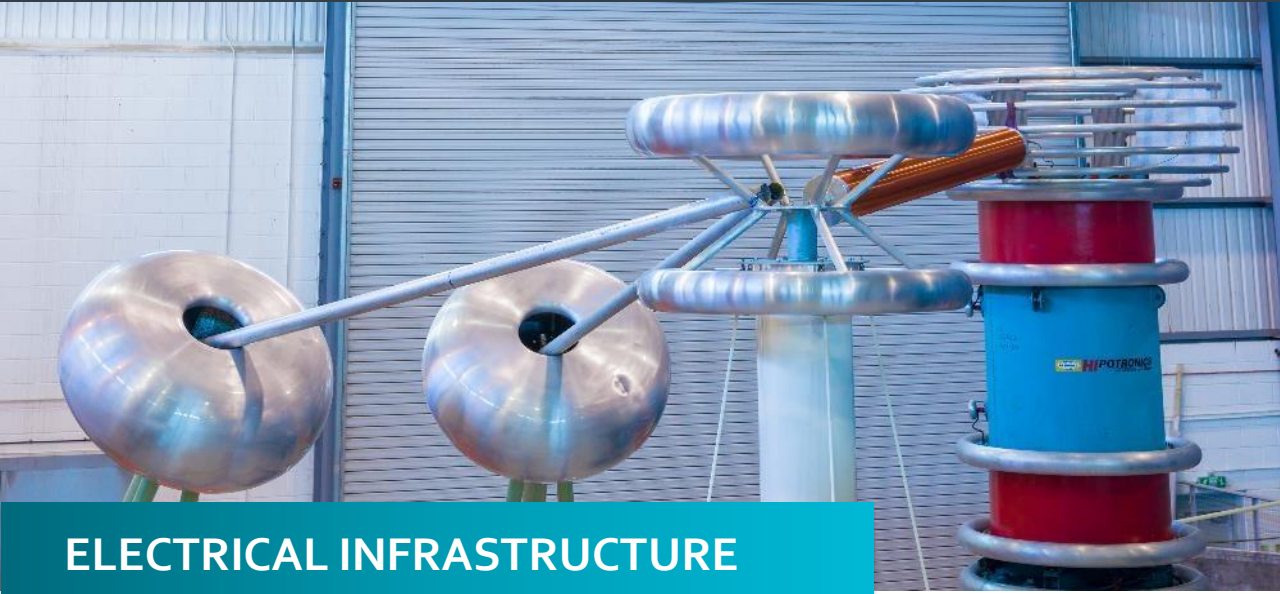
FACILITIES: 15MW Powertrain Facilities
Wind Turbine Bearing Test Facility



POWERTRAINS

- Test & validate next generation 12MW GE Haliade X offshore wind turbine powertrains
- Accelerate innovative powertrain technology, from
- Support development of critical powertrain components: bearings, gearbox, generator

FACILITIES: 15MW Powertrain Facilities
Wind Turbine Bearing Test Facility



ELECTRICAL INFRASTRUCTURE

- Test & validate the market's largest cables through ageing, insulation breakdown and failure analysis
- Dynamic cable fatigue testing - for the future development of semi-submersible floating structures

FACILITIES: HV and Materials Labs
Pre-qualification bays
Dynamic cable rig



O&M TECHNOLOGY TEST & VALIDATION

- Test robotics & autonomous systems (RAS) using controlled subsea dock environment, training tower (drones) and blades (blade inspection)
- Wet and dry controlled dock environment testing:
 - Cable inspection, protection and connection systems
 - Subsea turbine inspection ROVs

FACILITIES: Subsea docks
Training tower
Blade sections

ORE Catapult's role

- Help position the UK as an internationally recognised centre of excellence for operating offshore renewable plant
- Assist UK innovators to develop products and services to build and maintain a UK based supply chain
- Boost productivity of UK businesses and create an exportable commodity

Collaboration and Partnerships

- Owner/operators and OEMs – to understand common engineering and operational challenges
- Supply chain and cross sector - to develop solutions to challenges
- Develop offshore wind supply chains
- Wind and wave data collection



- Bi-axial blade test
- Deep technical and research expertise in strategic areas



WIND BLADE RESEARCH HUB

- Partnering with University of Bristol
- Blade design, manufacture & integrity (materials, NDT, condition monitoring & aero-elastic properties)
- £2.3million budget secured
- £700k provided by ORE Catapult



ELECTRICAL INFRASTRUCTURE RESEARCH HUB

- University of Strathclyde & Manchester University
- Component reliability & availability, system & sub-system optimisation, smart energy systems of the future (energy storage)
- £700k from ORE Catapult
- £2.4m match funding from university partners



- Centres of academic research hubs with selected UK universities
- Deep technical and research expertise in strategic areas



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Thank you, any questions?

Contact us

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