

## Advancing Renewable Energy

### Proving wave and tidal technologies for future market consolidation and utility-scale deployment

*Narec is a development partner for wave and tidal prototypes and offers a controlled testing ground, supporting projects through all stages from idea generation to design fulfilment and installation in the field.*

*The commercial potential for marine renewables is yet to be exploited but with advanced grid connected tidal stream devices and wave energy conversion projects now delivering power into shore side electrical grids, generation is forecast to grow significantly in the coming years.*

*Narec has collaborated with various UK and European organisations on wave and tidal projects to enable developers to progress from early stage prototype stages to large scale deployment. Narec is an adviser to UK Government and is an active member of industry associations globally.*

#### Services

- **Prototype Design and Development**
  - Technical Due Diligence
  - Feasibility Studies
  - Power Takeoff Design and Build
- **Testing and Analysis**
  - 3MW Drive Train Rig (operational in 2011)
  - Tidal Test Facility
  - Wave Flume Tank
  - Linear Test Rig
- **Control Systems**
  - Third Party Data Validation
  - Infield Measurement and Analysis
- **Research and Development**

#### Track Record

**In addition to several confidential projects, Narec has supported the development of the following technologies:**

- Oyster® Wave Energy Device from Aquamarine Power
- Wave rotor Device from Ecofys
- Novel Wave Energy Device from GreenCat Renewables
- Novel Wave Energy Converter from OWEL Limited
- The Manchester Bobber Project
- 'TidEL' Tidal stream generator from SMD Hydrovision
- Novel wave energy converter from Trident Energy
- 'Evopod' Tidal Turbine from Ocean Flow Energy



'TidEL' Tidal stream generator from SMD Hydrovision



'Evopod' Tidal Turbine from Ocean Flow Energy



Oyster® Wave Energy Device from Aquamarine Power

## Areas of Focus

### Realising early stage wave and tidal concepts

Material and resource costs to develop new technologies are high and access to the funding available to support novel ideas can be complex.

Narec has a highly flexible approach to assisting marine developers depending upon their concepts maturity and their specific requirements. We mentor clients through Proof of Concept (POC) fund raising and can take the lead on R&D grant applications. Resource assessment, technical due diligence, concept design and modelling through to small demonstration can also be undertaken to progress early stage designs.

### Power takeoff and installation

Closer to commercialisation, the major challenge for developers is deploying the first full-scale devices at sea followed by their continual operation.

Our electrical technology laboratory enables technology developers to identify, investigate and understand issues around network integration and operational characteristics of new power technologies under 'real world' conditions.

Narec has built and integrated power take off systems into full-scale installations. Our complementary experience in materials and foundation design, working with the offshore wind industry supports deployment.

### Accelerated prototype development

The UK has the best wave and tidal resource in Europe and many device developers have now successfully 'tank tested' scale prototype devices.

Narec fills the link in the technology route map from the laboratory to open sea testing infrastructure to prepare devices for operation in the field.

We design, build and test large bespoke engineering systems for the offshore deployment of marine devices close to commercialisation.

### Improving reliability and technology consolidation

Ocean energy technologies are not yet economically competitive with more mature renewables, such as wind. Technology consolidation will be essential over the coming years to overcome this barrier to commercial success.

Narec's independent sector expertise, electrical and mechanical engineering capability, and controlled testing facilities make us the ideal development partner to work with 'winning' concepts to increase their reliability, while reducing costs.

#### Sales and Proposals

**Ian Finch** Key Account Manager  
01670 357 727 | [ian.finch@narec.co.uk](mailto:ian.finch@narec.co.uk)

**Stephen Robertson** Commercial Manager  
01670 543 053 | [stephen.robertson@narec.co.uk](mailto:stephen.robertson@narec.co.uk)