The biradial turbine in the OPERA Project
Client: OPERA H2020
Location: Mutriku and BIMEP
Technology: KymanAIR biradial Turbine
Key feature: Integrated High Speed Stop Valve
Type of Intervention: Demonstration
Timeframe: 2016-2019
Description of Work:

- PTO Delivery
- Dry Testing in IST
- Onshore testing in Mutriku
- Offshore testing in BIMEP
Industrial Innovations of the Project:

- Wide range KymanAir® biradial turbine – 50% more power
- Elastomeric Tethers – 50% less cost
- Advanced Control Strategies – 30% power increase
- Shared mooring solution – lower cost, higher survivability

Open access to 2 years of open-sea operating data

Extensive step test campaign

The OPERA biradial turbine in numbers:

- 3000 parts, 30kW, 4000 kg, 30 sensors, 500 electrical connections.
Innovation de-risking test plan

- 6 weeks dry testing in IST turbomachines laboratory - 2017
- Wet testing in the Mutriku Wave Power Plant – 2017/2018
- The final offshore tests, 2018/2019
Mutriku Test Results - efficiency

Average efficiency $\times 1.55$

A VERAGE EFFICIENCY

Biradial vs. Wells turbine

rms (chamber pressure) [Pa]

Wells turbine

Open Sea Operating Experience to Reduce Wave Energy Cost

Wave Energy – making it happen
- Wells turbine vs. Biradial turbine performance at the Mutriku Plant
Client: Bombora Wave Power
Location: Wales
Technology: Unidirectional air turbine
Rated Power: 1.5 MW (prelim.)
Type of Intervention: Design + Supply
Timeframe: 2018-2019
Description of Work:

- Design for Fabrication and Assembly
- Risk Assessment and Management
- Model testing (IST)
- Loads and Performance Analysis (IST)
- Procurement, Build and Test
- Delivery and Commissioning

The contract will be jointly executed by Kymaner and the Wave Energy Group of...
Thank you for your attention