



VOITH

Engineered reliability.



Powering the Future Marine Energy Opportunities

Portugal

5 November 2009

Voith – Sales and employees by division

Voith AG					
Group Divisions	Voith Paper	Voith Turbo	Voith Hydro	Voith Industrial Services	Group
Sales	1 984 mio. EUR	1 161 mio. EUR	800 mio. EUR	983 mio. EUR	4 934 mio. EUR
Employees	10 548	5 307	3 643	22 871	42 955

Fiscal year 2007/2008

Voith Hydro Wavegen



Inverness

- Headquarters
- Wave tank
- Turbine test rig



Islay

- Grid connected test facility Limpet
- In operation since year 2000



Voith Hydro Wavegen is a pioneer in Wave Energy



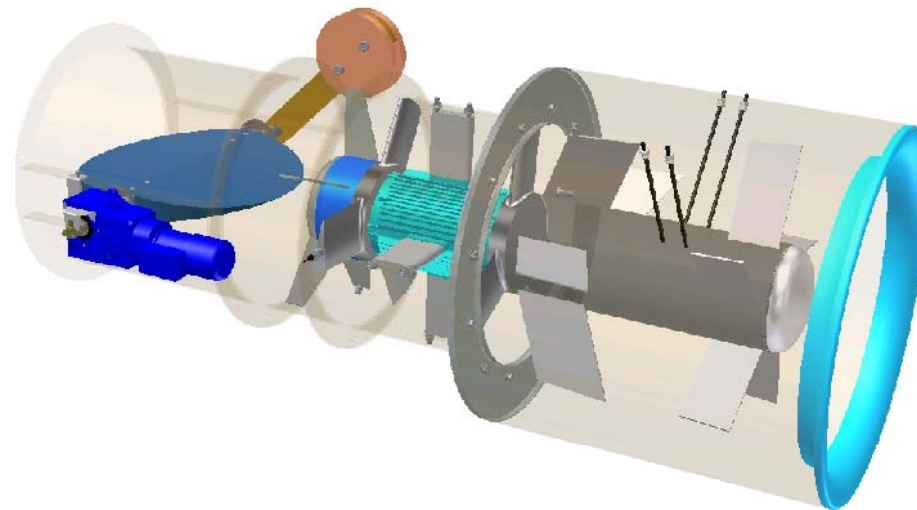
- Formed 1990
- Based in Inverness, Scotland
- 8+ years operating experience
- Wholly owned by Voith Hydro since 2005
- Technology and power take off supplier

How it works

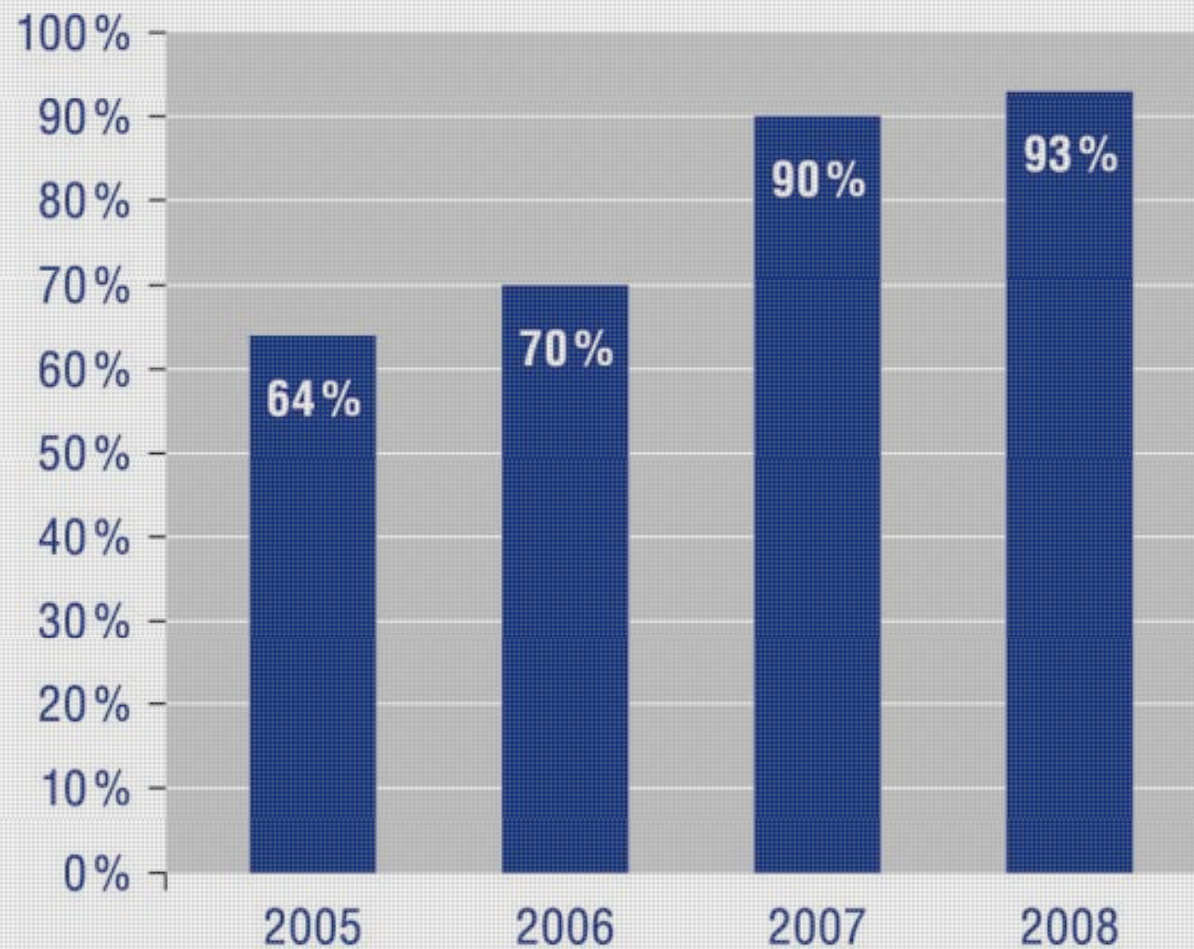


Wells Turbine advantages

- Simple
- Uses air
- No gearbox
- No pitching blades
- Reliable
- Easy maintenance

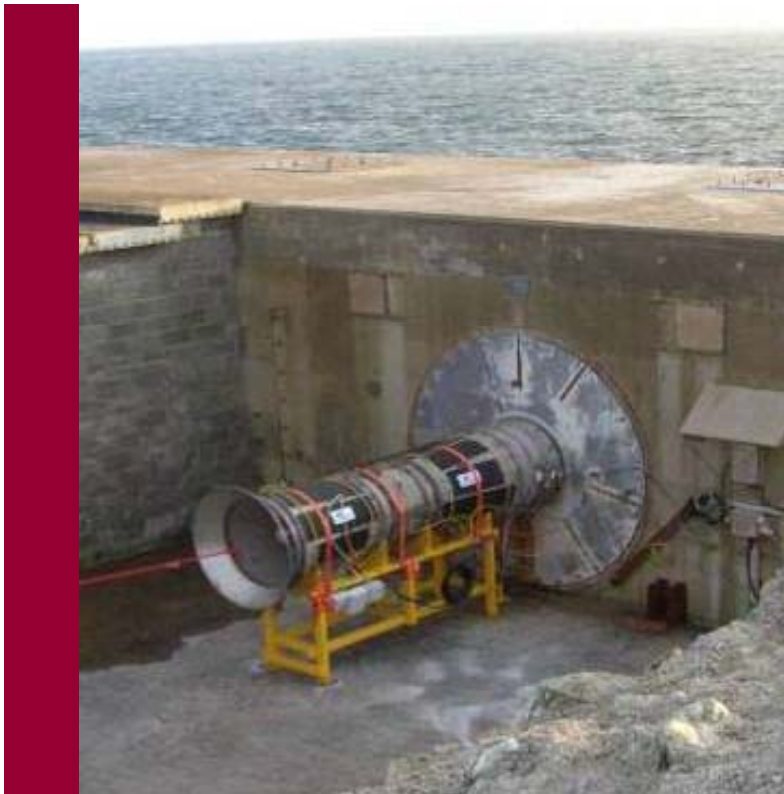


Availability improvements for test machines



Testing Turbines for Mutriku Project

18.5kW, 4 years operation, 22,500 generating hours (2009/03/31)



HyWave 750



Turbine hall & acoustic attenuator

Mutriku breakwater project



Ente Vasco de la Energía (EVE)

Power plant integrated into breakwater

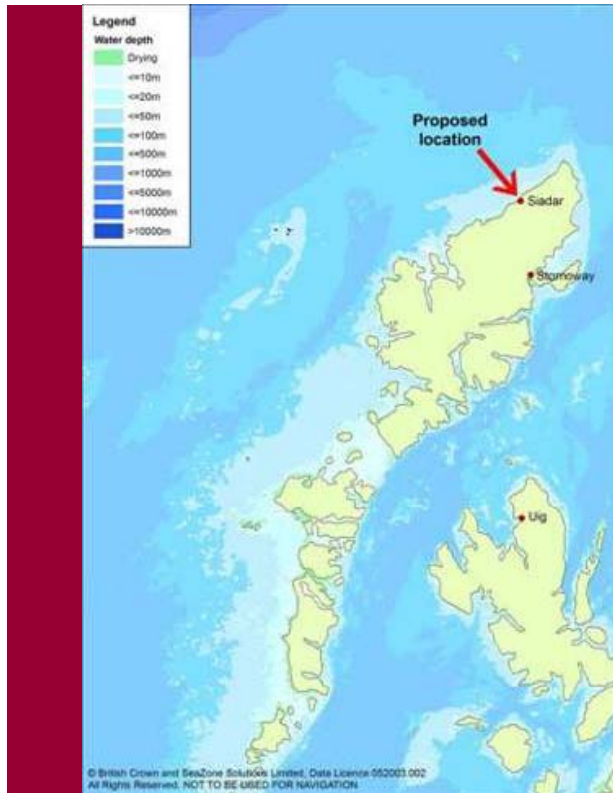
300kW (16 turbines)

Part funded from EU 6th Framework

Siadar Project



Demonstrating next scale – purpose built ‘active’ breakwater



- One of the most aggressive wave energy resources in Europe.
- 4MW, 200m long breakwater.
- Planning consent granted by Scottish Government in January 2009.
- The only active fully consented wave energy project in Scotland.

Isle of Lewis, NW Scotland



Douglas County Project

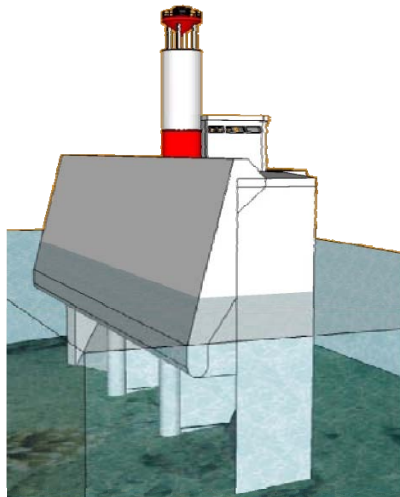


Project led by Douglas County Board of Commissioners

Preliminary FERC license granted April 2007

Funding for preliminary analysis work granted by OWET

Tahiti, Polynésie Française



- 0.5MW grid connected pilot on Tahiti.
- Then roll-out to outlying islands.
- Planning permit.



Unrivalled experience

- Over 40,000 hours of generating time.
- Over 93% availability demonstrated.
- Mutriku project will be first grid connected Wave Energy Plant in Spain.
- Siadar Wave Energy Project – largest and only active consented marine project in Scotland.
- Wavegen has provided guarantees for:
 - Delivery
 - Performance
 - Availability




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