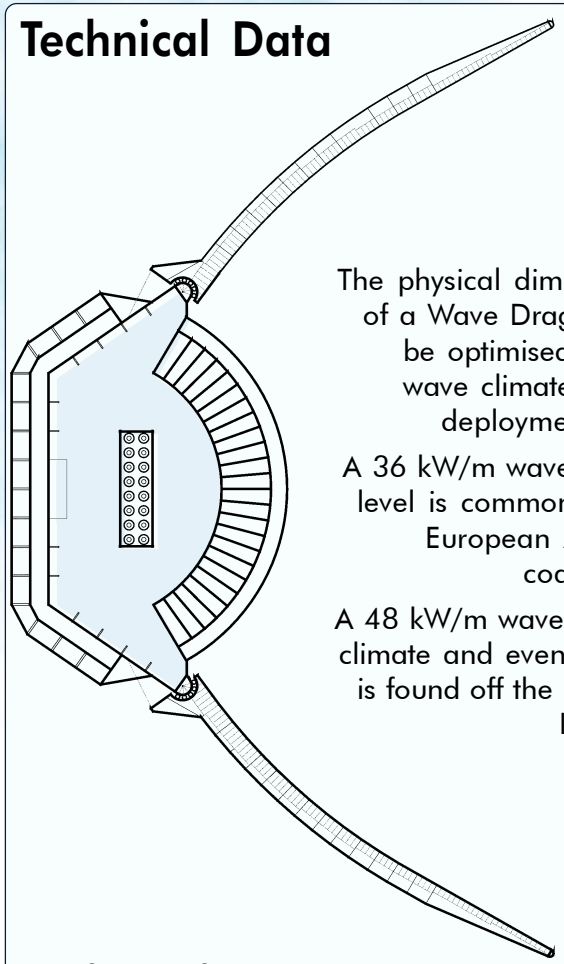
Technical Data



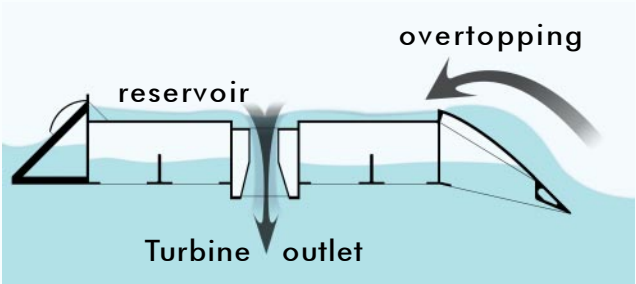
The physical dimensions of a Wave Dragon will be optimised to the wave climate at the deployment site.

A 36 kW/m wave power level is common along European Atlantic coastlines.

A 48 kW/m wave energy climate and even higher is found off the UK and Ireland.

Key figures for Wave Dragon units in three different wave energy climates:

Climate:	24 kW/m	36 kW/m	48 kW/m
Width:	260 m	300 m	390 m
Weight:	22,000 t.	33,000 t.	54,000 t.
Power Production:	12 GWh/y	20 GWh/y	35 GWh/y



Wave Dragon Partners

The development of the Wave Dragon wave energy converter is the result of a fruitful cooperation with industrial and scientific partners with key competences in offshore design and construction, mooring systems, power production and grid connections, turbines and wave energy.

The Wave Dragon development activities are managed by Wave Dragon Test ApS founded by:

- Erik Friis-Madsen, Löwenmark F.R.I, Consulting Engineer (DK), inventor
- H.C. Sørensen, SPOK ApS, Project Management Consultancy (DK), Project coordinator

Partners in the consortium:

- Aalborg University Hydraulics & Coastal Engineering Laboratory (DK)
- Armstrong Technology Associates Ltd. (Babcock Design & Technology), Naval Architects (UK)
- Balslev A/S, Consulting Engineers Electrical and automation systems (DK)
- DHI Water & Environment Wave forecasting models (DK)
- ESBI Engineering Ltd Power technology consultancy (IE)
- Kössler Ges.m.b.H. Hydro turbine manufacturing (A)
- MT Højgaard A/S, Construction Enterprise (DK)
- Nöhrlind, Research & Development Business strategy development (UK)
- Technical University Munich Hydro turbine testing and CFD modelling (D)
- VeteranKraft AB, Consulting Engineers Hydro turbine design (S)

Supported by: DEA, Danish Energy Authority, EU, 5th framework Programme & Elkraft System's RTD fund

Wave Dragon

a large offshore wave energy converter

reliable electrical power production

www.wavedragon.net

Basic Principles

The Wave Dragon is a floating slack-moored energy converter of the overtopping type. It basically consists of two wave reflectors focusing the waves towards a ramp. Behind the ramp there is a large reservoir where the water that runs up the ramp is collected and temporarily stored. The Wave Dragon is designed to maximise the energy content in the water that overtops into the reservoir.

Power Take-off

The water leaves the reservoir through hydro turbines' which utilise the head between the level of the reservoir and the sea level. The potential energy in the stored water is in this way converted into power. The use of a large number of relatively small turbines facilitates a smooth power production.

The only moveable parts of the turbines are the rotors. The actual pressure head changes the revolving speed by use of power electronics as in the latest generation of wind turbines.

Ocean Waves

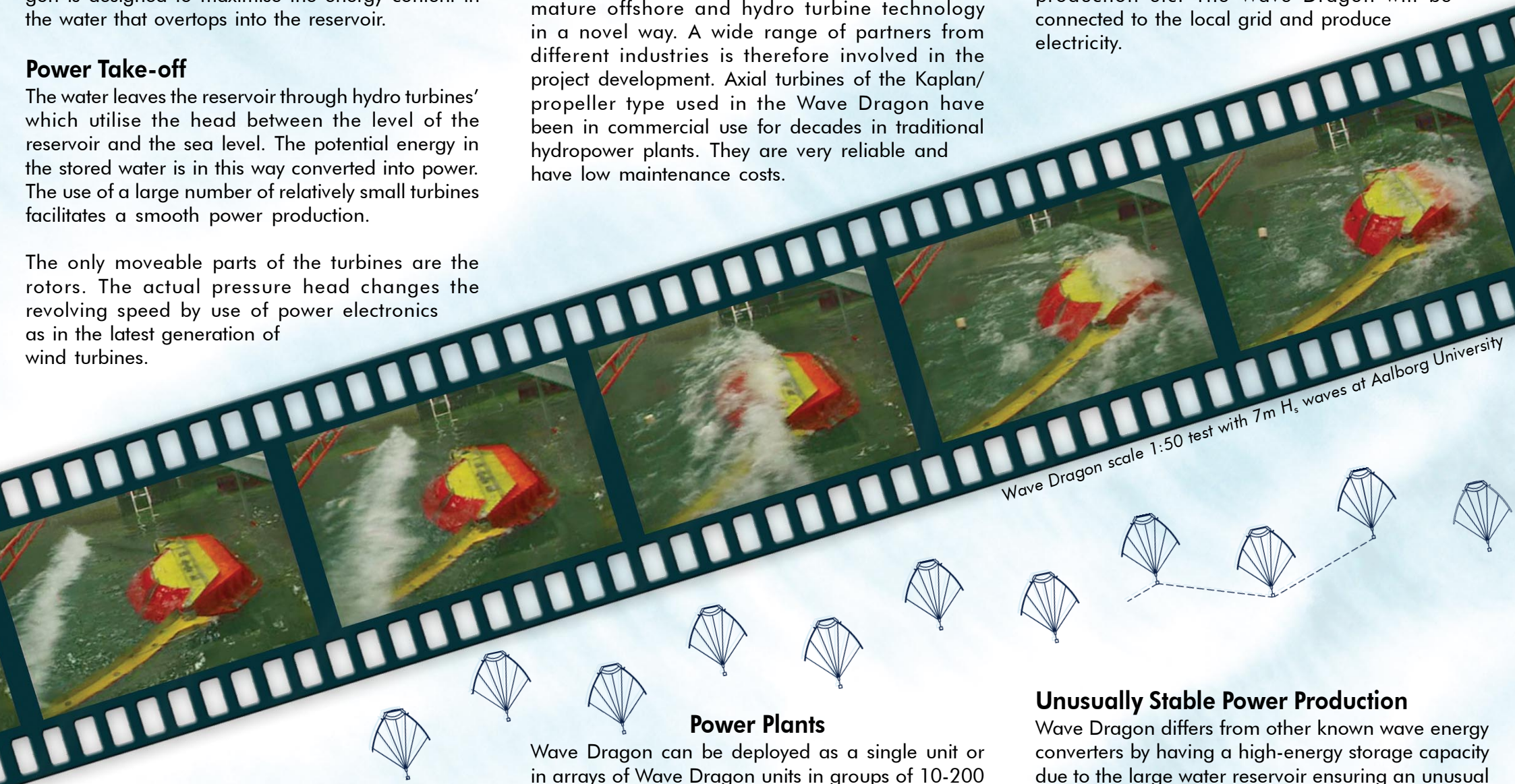
The Wave Dragon will be deployed at water depths above 20-30 meters to take advantage of the high-energy ocean waves.

Mature Technology in a Novel Way

The Wave Dragon concept combines existing, mature offshore and hydro turbine technology in a novel way. A wide range of partners from different industries is therefore involved in the project development. Axial turbines of the Kaplan/ propeller type used in the Wave Dragon have been in commercial use for decades in traditional hydropower plants. They are very reliable and have low maintenance costs.

Real Sea Testing at Nissum Bredning

The construction and real sea testing of a 57 m wide and 261 tonnes weight Wave Dragon has started (scale 1:4.5 of the North Sea size). Situated in Nissum Bredning in northern Denmark this 7 turbine Wave Dragon will be used for thorough testing of hydraulic behaviour, turbine strategies, power production etc. The Wave Dragon will be connected to the local grid and produce electricity.



Wave Dragon scale 1:50 test with 7m H_s waves at Aalborg University

Power Plants

Wave Dragon can be deployed as a single unit or in arrays of Wave Dragon units in groups of 10-200 resulting in a power plant with a capacity comparable to traditional fossil based power plants

Unusually Stable Power Production

Wave Dragon differs from other known wave energy converters by having a high-energy storage capacity due to the large water reservoir ensuring an unusual stable power production and high conversion efficiency.

Graphic design & layout: earth-vision.biz
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