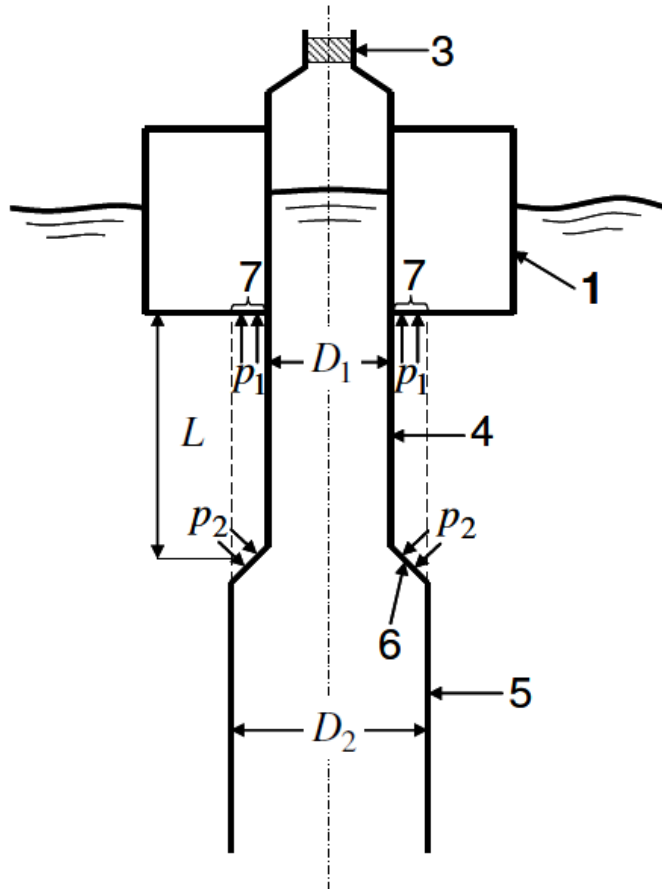


A large, powerful ocean wave is breaking, with a massive curl of blue water and white foam. The sky is a clear, bright blue.

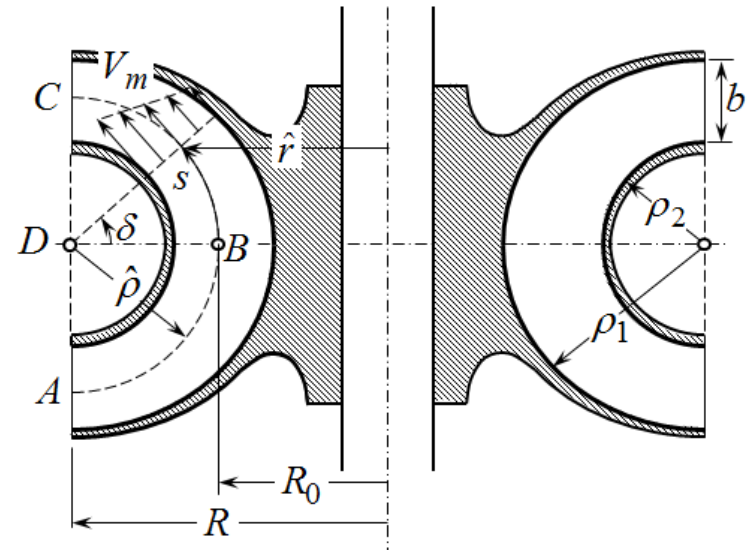
***The OWC option***

- ❑ **Kymaner was created in 2005** to develop Wave Energy in Portugal and remains to this date one of the few Portuguese companies exclusively devoted to this specialty.
- ❑ The strength of its team translates into the remarkable experience of its founding partners and collaborators in domains such as the **Oscillating Water Column and Hydropower**, gathered on the largest installations of this kind developed by Portuguese engineering in the world.

**SPAR Buoy floating OWC**



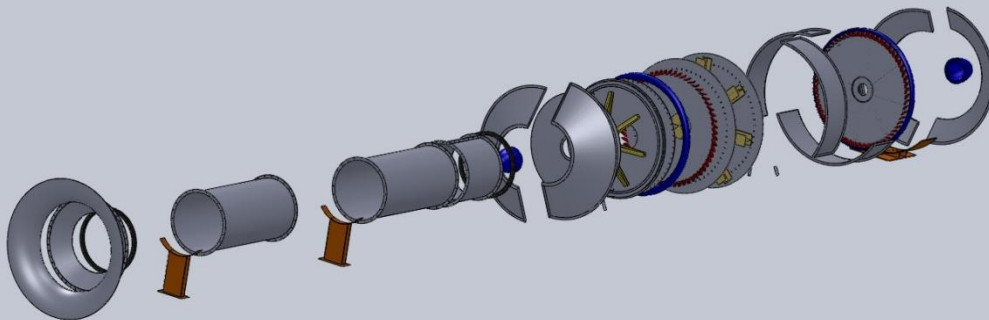
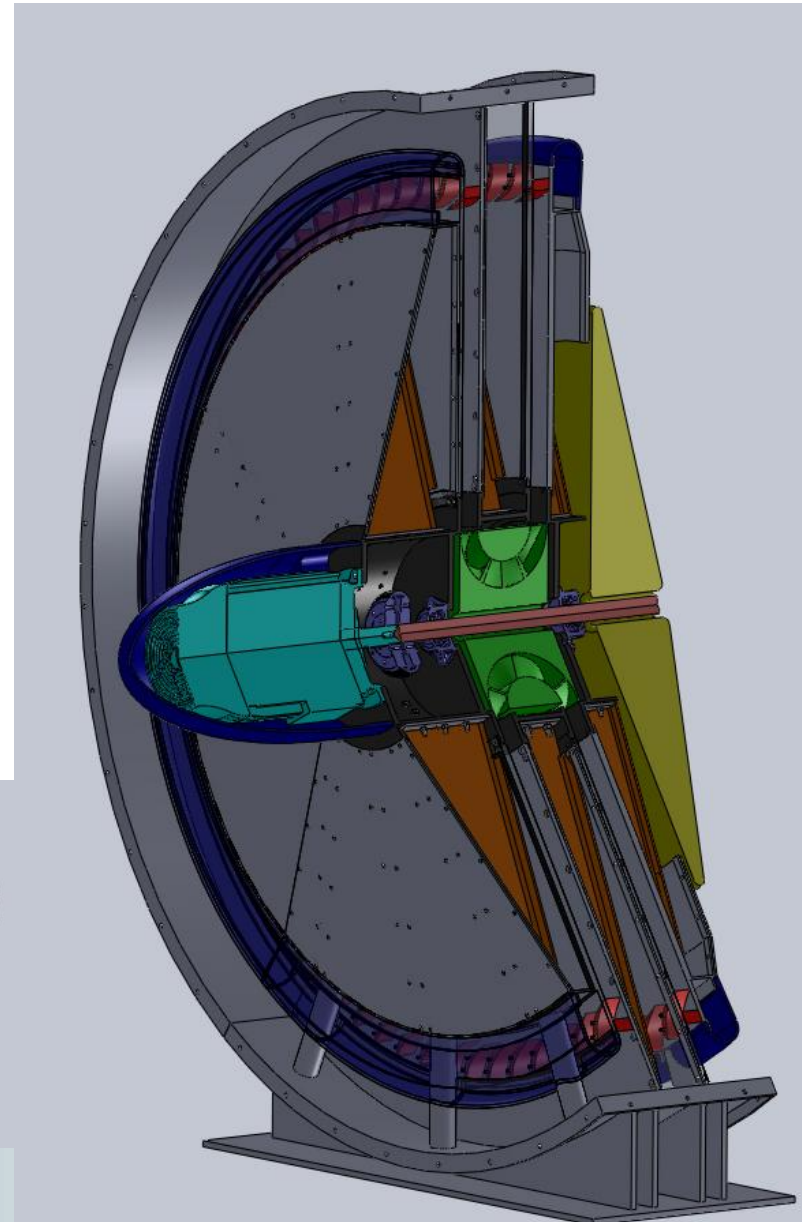
**Bi-radial air turbine**



- Highest known efficiency amongst air turbines, peaking at about 80%
- Suitable for a wide range of installations including those > 1 MW
- Accommodates large pressure heads (floating OWCs).
- Extremely compact axially
- Low aerodynamic noise
- Easy integration of safety valve
- Wide operational bandwidth in a large variety of s
- Mechanically simple and reliable



- **Supply Chain build up**
- **Design of Test rig**
- **Turbine Delivery**
  - Detail Design
  - Fabrication and Assembly
  - Instrumentation
  - Installation
  - Testing



**KymanOS<sup>®</sup> is an offshore Wave energy converter** that consists of a cylindrical floater fixed to a tail tube opened at the bottom to the sea water and at the top to an air chamber connected to the atmosphere through an air turbine.

It is designed to adapt the behaviour to the wave climate, optimizing its efficiency.

The oscillatory characteristic of the flow requires the installation of a self-rectifying air turbine adapted to the high pressures



**PHASE 1** – Mathematical modeling of hydrodynamic behaviour (IST) – **COMPLETED**

**PHASE 2** – Concept Validation (IST)– wave tank tests under regular and irregular waves:

a) Tests of a **1/150 scale model** - **COMPLETED**

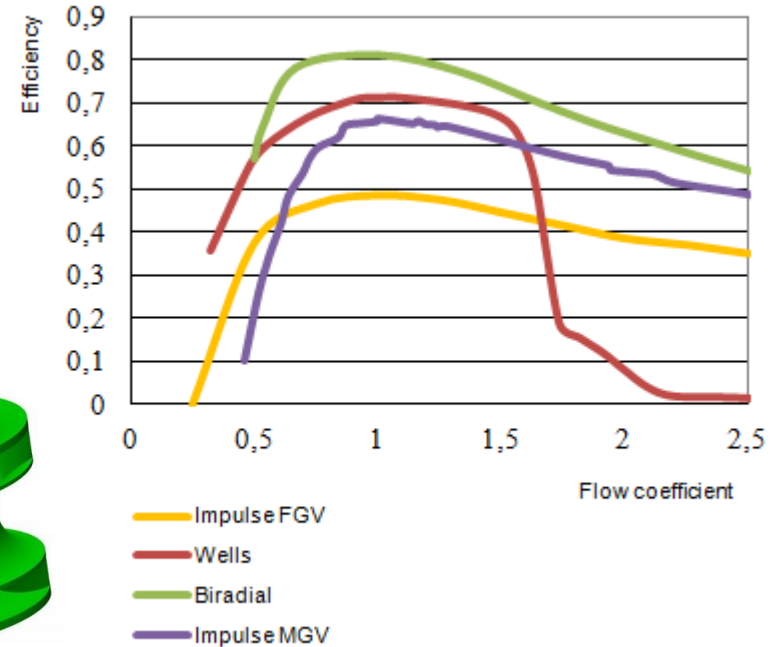
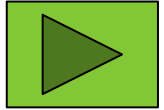
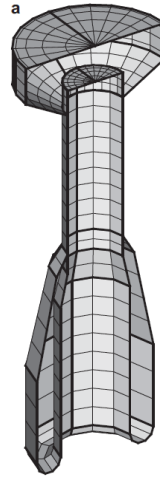
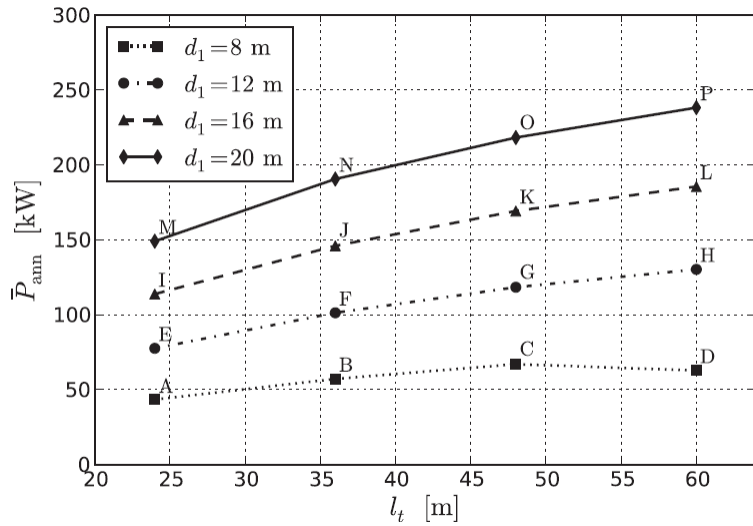
b) **1/35 scale model** testing - **COMPLETED**

c) **1/16 scale model** testing - **COMPLETED**

**PHASE 3** – Exploration model – full test at sea in real operating conditions at 1:4 scale. Model results confirmation. Possible with small air turbine. Validation of Business Case and definition of O&M model.

**PHASE 4** - 1:1 scale Prototype – Live test in open sea conditions. Confirmation of Business case and Life Cycle Cost. Definition of the Pre-Commercial phase setup

**PHASE 5** – Multi unit setup – Live operation in open sea conditions with full grid connection . Confirmation of O&M model and cost reduction through serialisation.





***Thank You***