



## **Performance and design optimization of a heaving point absorber for the exploitation of wave energy in the Italian Seas**

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The presentation aims to assess the potential for wave energy production in the Italian seas by the deployment of a heaving point absorbers, specifically optimized for mild climates. We model a single-body WEC, consisting of a cylindrical heaving buoy, attached to a linear electric generator placed on the seabed. The model includes both hydrodynamic and electromechanical forces.

Two different version of the device are modeled, a two-body device consisting in a floating buoy attached to a linear generator placed at the sea bed and a three-body device, which also includes a submerged sphere located halfway from the float and the generator, which increases the performance by going easily to resonance. For each version of the device, the model takes into account either the heave only or the heave and surge combined.

The devices have been tuned according to the Mediterranean Sea wave climate, taking particular attention to the floaters dimensioning and to the geometrical design of the PTO, which has been adapted to particular working conditions introduced by the surge mode.

The Annual Energy production is estimated, showing encouraging results and enlarge the perspective on wave energy production in the Italian and Mediterranean Seas.

In the last part of the work the feasibility of supplying electricity through energy produced by wave by the described device in array at a small Italian island will be presented.