

What is a wave energy converter (WEC)?

Provided by the Springer Nature SharedIt content-sharing initiative A wave energy converter (WEC) utilizing the inertial gyroscope coupled with a hydraulic power take-off (PTO) unit for energy transformation and application is investigated. The structure design of various components of WEC are introduced.

What is a wave-driven compressed air energy storage system?

This paper proposes a novel wave-driven compressed air energy storage (W-CAES) system. This system integrates a WEC based on a hydraulic PTO component and a liquid-piston-based compressed air energy storage system to convert wave energy and store it directly as compressed air.

How does wave condition affect energy storage power?

Energy storage power was almost proportional to the hydraulic cylinder area, with an upper limit being imposed by the wave condition. Nevertheless, the maximum storage pressure had an inverse relationship with the hydraulic cylinder area, which decreased energy density under the same wave condition.

What is the energy storage power of a W-CAES system?

It was seen that the energy storage power of the proposed W-CAES system with the same geometry dimensions was larger than that of the 10 kW combined with the heaving buoy prototype in the literature when wave energy was  $< 15$  kW.

Is a W-CAES system better than a traditional wave energy converter?

Case studies demonstrated that the proposed W-CAES system had a better performance than the traditional wave energy converter system reported in the literature. The energy storage power was improved by  $> 30\%$  for the same wave condition based on the isothermal compression process.

What is an oscillating inertial WEC?

There are some oscillating inertial WECs, such as SEAREV 12 and WIIT 13, which use eccentric masses to create oscillation that activates the PTO system. The PEWEC 14 is another typical oscillating inertial structure that includes a pendulum mechanism, which activates the PTO through a gearbox.

To overcome the intermittent nature of waves and the resultant high intra-wave variability in PTO power output, a suitable large-scale energy storage system is essential for ...

Abstract - In the first part of the paper is presented the state of the art regarding the Flywheel Energy Storage Systems (FESS) and the inertial energy storage system based on the flywheel ...

The results are evaluated both via simulations and experimental tests. The results from the hybrid energy

storage solution showed the possibility of increasing frequency quality by using a slow ...

In this study, the design of wave energy pumped-storage power generation system is explained in detail. The working condition of the device under different sea conditions is ...

In order to enhance the power generation efficiency and reliability of wave energy converters (WECs), an enclosed inertial WEC with a magnetic nonlinear stiffness mechanism ...

In this study, we analyzed the power output from WEC-Sim simulations for six sea states in Wave Energy Prize to compute the peak power and power time history to estimate the required ...

An inertial wave and floating body technology, applied in ocean energy power generation, engine components, machines/engines, etc., can solve the problems of inability to meet the power ...

This kinetic-energy-based fast reserve is ensured despite wind speed variations - a disoptimisation of the power coefficient through the modification of the rotor speed set point or ...

Levelized Cost of Energy natural resources power generation generators of the system is calculated hour by hour for each month of one year, considering the new schedule of ...

The study is performed using real yearly wave power profiles relating to three different sites located along the European coasts. The Simultaneous Perturbation Stochastic Approximation ...

Abstract and Figures A new type of generator, a transgenerator, is introduced, which integrates the wind turbine and flywheel into one system, aiming to make flywheel ...

