Offshore Energy Harvesting, Storage and Power Generation System
Technology #14188

Applications

Current offshore wind energy systems experience difficulties when there is a lack of or too much stimulus. A submerged mechanical energy storage device for offshore wind turbines would help energy-harvesting companies and electric power generators focusing on offshore energy storage through intermittent time intervals.

Problem Addressed

Existing mooring technologies use heavy deadweight anchors on the sea floor; however, the anchors serve no other purpose other than mooring the structure. This invention replaces those heavy deadweight anchors with deadweight ballasted chambers in the form of a void near the sea floor from which water can be pumped out to provide energy storage. As a result, this technology repurposes the deadweight anchors. By adding a multi-purpose mooring system, this technology helps solve the wind and energy harvesting problem when the winds are calm. The resulting lack of input from the wind energy source to the grid can cause trouble if the wind energy source makes up more than a few percent of the total capacity of the grid. Therefore, this technology helps keep energy harvesting at a constant rate even through intermittent conditions.

Technology

This invention is a system for simultaneously anchoring floating offshore energy harvesting machines, such as wind turbines and wave energy machines. This system also stores excess harvested energy and generates continuous power to meet baseload demands. It consists of a subsea structure with a chamber anchored to the seafloor to resist mooring cable loads on the supporting floating structures. The chambers are constructed from precast concrete. The excess power during peak energy harvesting is transformed into potential energy by pumping water from the subsea structure to higher elevation. Power is generated during periods of low energy harvesting as water is allowed to flow back into the subsea structure.

Advantages

- Combines energy harvesting and energy storage mechanisms
- Can be used by any type of energy harvester

Categories For This Invention:

Energy
Energy Storage
Other (Energy Storage)
Intellectual Property:
Offshore energy harvesting, storage, and power generation system
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Publications:
Symbiotic Offshore Energy Harvesting and Storage Systems
Sustainable Energy Technologies and Assessments
2014

External Links:
In Profile: Alex Slocum
Youtube Video Demonstration
https://www.youtube.com/watch
Precision Engineering Research Group
http://pergatory.mit.edu/

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