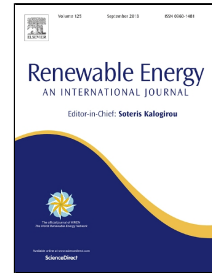


Accepted Manuscript

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José F. Gaspar, Miguel Calvário, Mojtaba Kamarlouei, C. Guedes Soares



PII: S0960-1481(18)30617-7
DOI: 10.1016/j.renene.2018.05.092
Reference: RENE 10144
To appear in: *Renewable Energy*
Received Date: 11 September 2017
Accepted Date: 27 May 2018

Please cite this article as: José F. Gaspar, Miguel Calvário, Mojtaba Kamarlouei, C. Guedes Soares, Design tradeoffs of an oil-hydraulic Power Take-Off for Wave Energy Converters, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.05.092

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Design tradeoffs of an oil-hydraulic Power Take-Off for Wave Energy Converters

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Abstract: This paper presents the main design tradeoffs that should be handled when developing oil-hydraulic Power Take-Off devices aiming at the maximization of energy extraction from waves with a point absorber wave energy converter. These tradeoffs were identified in a case study of a new Power Take-Off concept. The simulation results have shown that improvement of Power Take-Off harvested power is followed by a substantial increase on the power peaks that can be 10 to 30 times above the average power. This demands extreme operational conditions on the Power Take-Off components and an undesirable decrease of overall efficiency. The size of the system, in particular, of the main hydraulic pump, is also substantially increased. Thus, the addition of accumulators, to control the pump size, is recommendable, in particular for storage and release of reactive energy to the Power Take-Off oil-hydraulic cylinders.

Keywords: Wave Energy Converter; Power Take-Off; Oil-Hydraulics; Optimization; Genetic Algorithms; Neuro-Fuzzy.

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