

A new system optimises electric transmission from offshore wind farms

June 11 2018



Wind turbine. Credit: UC3M

Scientists from Universidad Carlos III de Madrid (UC3M) have designed a new control system for wind turbines in offshore wind farms that allows power transmission to the coast in a more flexible and cheaper way than current solutions.

This innovation allows the use of a diode rectifier station in the offshore platform of a high voltage direct current (HVDC) link. In this way, the [wind](#) turbine's alternating current (AC) can be easily converted into direct current (DC) for HVDC transmission.

The researchers have developed a distributed control system to synchronise and regulate the electrical voltage and frequency of the [wind turbines](#) of the [offshore wind farm](#). This allows the transmission of energy to the general network through an HVDC link with a diode rectifier station. "It is less complicated, cheaper and more flexible than other current solutions," explains co-author Santiago Arnaltes Gómez, head of the UC3M Power Control Group.

This new system synchronises the wind turbines without using any additional element, since it uses the wind turbines' capacity to contribute to voltage and frequency control. One of key factors is the use of diode rectifier stations, which reduce the cost of the offshore rectifier platform by up to 30 percent, according to some studies. "What we have managed to do is to provide the technical feasibility necessary in order to use this kind of rectifier, since at the moment, wind turbines still cannot work with them," explains co-author José Luis Rodríguez Amenedo, from UC3M's Department of Electrical Engineering.

The researchers have developed three patents in relation to this system, which they have validated by means of simulations, small-scale laboratory prototypes and proofs of concept. The next step is its commercialisation and industrialisation. "Our main clients would be large electricity companies that have the capacity to make these diode rectifier stations," said Amenedo.

Globally, the integration of offshore wind farms into mainland electrical systems is currently being put forward as a way of reducing fossil fuel consumption and greenhouse gas emissions. Due to the fact that a

significant proportion of the large offshore wind farms planned are located far from the coast, a connection using HVDC links (in direct current) is technically and economically more suitable than a HVAC transmission [system](#) (in alternating current).

Provided by Carlos III University of Madrid

Citation: A new system optimises electric transmission from offshore wind farms (2018, June 11) retrieved 10 April 2024 from <https://phys.org/news/2018-06-optimises-electric-transmission-offshore-farms.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--