



## Innovative Tools for Offshore Wind and DC Grids

### Deliverable 2.5 – Work Package 2

Tools for analyzing resonances, design and control interactions.

WP 2 Leader: DTU

Website: <https://innoDC.org>

## Introduction

Work Package 2 focuses on large offshore wind power plants. The main objectives are to develop tools for techno-economical comparison and optimization of the OWPP collector system, for the analysis of the stability of offshore AC grids. This document summarizes Work Package 2's work to achieve Deliverable 2.5.

## Deliverable 2.5

The topic is *Tools for analyzing resonances, design and control interactions*, set with a delivery format 'other'. The deliverable includes four video PowerPoint presentations on the research conducted on transmission concepts, DC wind power plants, control solutions for black-start from offshore wind power plants and stability analysis of offshore wind power plants:

- (1) Jovana Dakic, "Tools for analysis of novel concepts of transmission systems for offshore wind power plants" <https://youtu.be/FGn4bRldZ-o>. The video will be publicly available following publication of her paper "Optimal Design of an HVAC Transmission System for Offshore Wind Power Plants Including Mid-cable Reactive Power Compensation" in IEEE Power Delivery (under review).
- (2) Gayan Abeynayake, "A Multi-State Systems Markov Model for Reliability Evaluation of Offshore Wind Farms" <https://www.youtube.com/watch?v=Du8bcmZTZEo>. The video will be publicly available following publication of his paper of the same title in IEEE Transactions on Sustainable Energy (to be submitted September 2020).
- (3) Luis Orellana, "Algorithms on characterizing analytically resonance frequencies" <https://www.youtube.com/watch?v=nBeHV1ysp8g&t=2s>
- (4) Anubhav Jain, "Black-start and islanding capabilities of offshore wind power plants" [https://www.youtube.com/watch?v=jiwW\\_9CxV5o](https://www.youtube.com/watch?v=jiwW_9CxV5o). Details about the model implementation, control strategies used and simulation study results can be found in the following publications:

Title	Journal	Authors	Status	Link
Blackstart from HVDC offshore wind power plants: Hard vs Soft Energization	<a href="#">IET Renewable Power Generation</a>	Anubhav Jain, Oscar Saborío-Romano, Jayachandra N. Sakamuri, Nicolaos A. Cutululis	Under review	
Grid-forming control strategies for blackstart by offshore wind power plants	<a href="#">Wind Energy Science (Special Issue – Wind Energy Science Conference 2019)</a>	Anubhav Jain, Jayachandra N. Sakamuri, Nicolaos A. Cutululis	Accepted	<a href="https://doi.org/10.5194/wes-2020-34">https://doi.org/10.5194/wes-2020-34</a>

## Work package members

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