

11 November 2020

14:00 – 16:30 (CET)

# OFFSHORE ENERGY HUBS

Joint webinar organized by CIGRE NGN Netherlands and NGN Denmark

## CIGRE Next Generation Network

CIGRE NGN NL and CIGRE NGN DK would like to invite you to a webinar on offshore energy hubs. Join the discussion on recent research results and system operation experiences related to the rapid transformation and challenges imposed on electricity networks and markets by increased amounts of offshore wind energy.

**Date and Time:** 11 November 2020, 14:00 – 16:30 (CET)

**Platform:** Microsoft Teams

**Registration:** Link in the description

### Agenda:

14:00 – 14:15 Opening and Introductions of NGN DK and NGN NL

14:15 – 14:45 Energy Hubs to Integrate Renewable Energy in Europe  
by Łukasz Hubert Kocewiak (Ørsted)

14:45 – 15:15 System integration of hybrid offshore energy hubs  
by Laurids Dall (Energinet)

15:15 – 15:45 Energy Hubs in PROMOTioN project  
by Maksym Semenyuk (DNV-GL)

15:45 – 16:15 The role of P2G conversion in the stabilization of electrical power systems  
by José Luis Rueda Torres (TU Delft)

16:15 – 16:30 Final remarks & Closing of the Webinar

Join Us

CIGRE NGN NL: <https://www.cigre.nl/becoming-a-young-cigre-member/>

CIGRE NGN DK: <https://www.cigre.dk/new-generation-network.html>



## Topic I: Energy Hubs to Integrate Renewable Energy in Europe

As the number and size of commissioned offshore wind power plants is increasing there is a need to provide comprehensive transmission solutions to deliver renewable energy to consumers. Development of offshore transmission assets by means of offshore energy hubs can address those challenges and establish a path towards 100% renewable-based future power systems.

### Łukasz Hubert Kocewiak



Dr. Łukasz H. Kocewiak holds BSc & MSc degrees in electrical engineering from Warsaw University and PhD degree from Aalborg University. Currently he is working in Ørsted as R&D manager and lead power system engineer on development of electrical infrastructure in large offshore wind power plants. The main direction of his research is within harmonics and nonlinear dynamics in power electronics and power systems especially focused on wind power generation units. He is the author/co-author of more than 100 publications and member of various working groups/activities within Cigré, IEEE, IEC.

## Topic II: System integration of hybrid offshore energy hubs

The prospect of harvesting and integrating several GW of offshore wind power will push the boundaries of power system control and stability. The scale of wind power plants and offshore transmission systems calls for careful attention to system wide stability and securing healthy voltage and frequency for all consumers and producers. This presentation will address some of the challenges which must be solved when integrating large offshore hybrid assets into the power system.

### Laurids Dall



Laurids Dall is a Power System Engineer with the Danish transmission system operator, Energinet, where he is involved in modelling and stability analysis of the power system with a special focus on grid-connection of renewable energy sources. He holds a MSc in Electrical Power Systems and High Voltage Engineering from Aalborg University, and is a member of Cigré WG C4.56 which is about utilization of EMT analysis for large-scale system stability analysis.

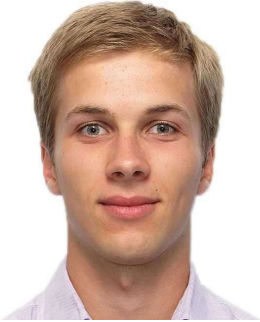
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## Topic III: Energy Hubs in PROMOTioN project

Within PROMOTioN energy hubs are considered as a potential way to develop a meshed offshore grid that allows to evacuate up to 200 GW of offshore wind and provide opportunities for the interconnection of North Sea countries. The approach based on large energy hubs scores best across the analyzed network designs under a range of cost-benefit analysis KPIs. Furthermore, a particular case of an offshore hub at the natural hub of Bornholm in Denmark has been explored not only from the grid planning perspective but also looking at the technology selection, market integration and regulatory aspects.

### Maksym Semenyuk



Maksym Semenyuk is a consultant in the Energy Markets & Technology team of DNV GL. His primary expertise is in (offshore) transmission infrastructure deployment, cost-benefit analysis of energy projects, power purchase agreements and energy system modelling. Maksym has coordinated and contributed to multiple projects of European and British offshore grid development. Within the PROMOTioN project, Maksym has coordinated feasibility studies on the development of an offshore energy hub on the natural island of Bornholm in Denmark. Maksym holds a master's degree in Sustainable Energy Technology from the Technical University of Delft.

## Topic IV: The role of P2G conversion in the stabilization of electrical power systems

This presentation overviews the outcomes of the Activity 2 of the TSO2020 project. First, a generic model of PEM (proton exchange membrane) electrolyzers will be introduced, showing the validation of the 1 MW electrolysis plant based on field measurements. Next a larger scale application (e.g. 300 MW) will be discussed by considering a future scenario for year 2030 in the North of the Netherlands. Finally, the effect of the addition of special schemes for fast active power-frequency support by large size electrolyzers will be illustrated based on real-time digital simulations and power-hardware-in-the-loop tests.

### José Luis Rueda Torres



Dr.ir. Jose Rueda is currently an Associate Professor leading the research team on Stability, Control, and Optimization, within the IEPG Section, Department of ESE, Delft University of Technology, The Netherlands. His research interests include power system stability and control, operational planning & reliability, and probabilistic and AI methods. Currently, he is member of the Technical Committee on Power and Energy Systems of IFAC (International Federation of Automatic Control), Chairman of the IEEE PES WG on Modern Heuristic Optimization, Secretary of the IEEE PES Intelligent Systems Subcommittee, and Secretary of CIGRE JWG C4/C2.58/IEEE Evaluation of Voltage Stability Assessment Methodologies in Transmission Systems.

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