

ENERGY ISLANDS

Developing Renewable Energy Hubs

Webinars organized under the auspices of the
IEA Experts' Group on R&D Priority-setting and Evaluation (EGRD)
Hosted by the Danish Ministry of Climate, Energy and Utilities

Tuesday 29 September 2020

10:00-11:15 (CEST)

13:00-14:25 (CEST)

Onshore, nearshore or offshore seems to be one of the central choices governments face when preparing for large scale wind energy in the transformation of the energy system. Each siting comes with its pros and cons. As of today, the Levelized Cost of Energy (LCoE) of onshore wind power is more cost competitive than offshore wind but are also subject to increasing public resistance. Moving nearshore does not address this challenge, but are associated with lower installation and operation and maintenance costs compared to offshore.

However, offshore wind energy has proven to be a prosperous venue. Moving wind energy generation offshore took off just a few decades ago with the first ever offshore farm in Danish Vindeby in 1991. Throughout the 2000s, offshore wind continued to expand in Northern Europe, primarily in the North Sea, which offers near ideal conditions for energy generation with strong winds, average wind speeds over 8 meters per second and relatively shallow water depths. The globally installed offshore wind capacity reached nearly 30 GW by June 2020. The UK remains the world's largest offshore wind sector, with a cumulative capacity of 10.4 GW followed by Germany with 7.7 GW and China with 6.4 GW.¹

With ambitious national targets for a combination of renewable energy and CO₂ emission cuts, countries face the challenge of how to effectively deploy and integrate large scale offshore wind energy in the energy system that can go beyond traditional flexibility measures and cross-border transmission lines. In 2019 a number of ambitious infrastructure projects coupling offshore wind energy to gas storage facilities and power-to-gas grids were presented. The international consortium partners of the North Sea Wind Power Hub (NSWPH) presented the prospects of wind power hubs in the North Sea, the so-called Hub-and-Spoke projects, combining wind power connection, coupling of energy markets through interconnection and smart integration in the onshore energy grid, including power-to-gas. Some of these projects are foreseen nearshore, others offshore, some plan with building an artificial island, combining the features of nearshore and offshore.

This series of webinars will focus on the rationale and advantages of these infrastructure projects, the technological, regulatory, environmental and economic challenges, the lessons learned so far and the unknowns to be addressed and solved. More specifically the webinars will provide insights in different renewable energy islands/hubs cases, the opportunities and challenges they pose for the transformation of the energy system and how they might be further facilitated.

¹ https://wfo-global.org/wp-content/uploads/2020/08/WFO_Global-Offshore-Wind-Report-HY1-2020.pdf

Webinar 1 will focus on renewable energy islands:

- What are the rationale and concept of different energy islands
- What are the main technological, regulatory, environmental and economic challenges of the island/hub?
- What are the recommendations to accelerate the roll-out of such islands/hubs?

Registration: <https://register.gotowebinar.com/register/6384353159121963280>

Webinar 2 will focus on technologies and system integration:



- What are the knowledge gaps and gains in power-to-gas tech. and their integration in the system
 - Prospects of different electrolysis technologies
 - Their competitors – blue hydrogen (based on natural gas), batteries etc.
 - Models for the power-to-gas infrastructure (e.g. landing zone, on-site, distributed)




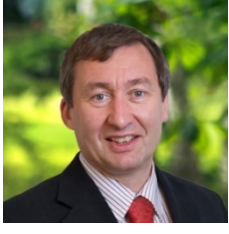

Registration: : <https://register.gotowebinar.com/register/8512851539846462731>

Webinar 1: Energy Islands	
10:00-10:10	Welcome by Dr. Birte Holst Jørgensen, Chair EGRD
10:10-10:25	The Danish energy islands by Janni Torp Kjærgaard, Deputy Director General, Danish Energy Agency
10:25-10:40	The IJVER Energy Island by Ernst van Zuijlen, Offshore Service Facilities
10:40-10:55	Perspectives on offshore wind and its integration in the energy system by Halvor Hoen Hersleth, Equinor - Renewable & Low carbon technology
10:55-11:15	Discussion Concluding remarks by Dr. Johannes Tambornino, Vice Chair EGRD

Webinar 2: Power-to-gas Technologies and System Integration	
13:00-13:10	Welcome by Dr. Birte Holst Jørgensen, Chair EGRD
13:10-13:25	NEDO's Power to Gas technology development activity by Eiji Ohira, Director General, Fuel Cell and Hydrogen Technology Group, Advanced Battery and Hydrogen Technology Department, New Energy and Industrial Technology Development Organization (NEDO)
13:25-13:40	Westküste100 - Complete sector coupling: Green hydrogen and decarbonisation on an industrial scale by Klemens Kaar, Oersted
13:40-13:55	Hydrogen Initiative Energy Model Region Austria Power & Gas by Martina Ammer Flagship Region WIVA P&G
13:55-14:10	Game changes for PtX and infrastructure by Tor Elmelund, Danish TSO Energinet
14:10-14:25	Discussion moderated by Dr. Herbert Greisberger, CEO, Energy and Environment Agency of Lower Austria Concluding remarks by Dr. Atsushi Kurosawa, Vice Chair EGRD

About speakers and moderators

	<p>Dr. Birte Holst Jørgensen, Technical University of Denmark, is Chair of the IEA EGRD. She is an experienced researcher and practitioner in the field of new energy technologies and systems, where she has specialized in energy R&D strategies and technology policies at the national, European and international levels. She is responsible for scientific advice at DTU Wind Energy, o.a. the technical assistance to the Danish Energy Agency's Global cooperation programme within offshore wind. She is also Principal Coordinator in sustainable energy at the Sino-Danish Centre for Research and Education. Birte holds a PhD in Political Science (University of Copenhagen) and a MSc in Business Economics (Copenhagen Business School).</p>
	<p>Janni Torp Kjærgaard is Deputy Director General of the Danish Energy Agency. She oversees Centre for Renewable Energy, Centre for Renewable Energy Administration and Centre for Telecommunication. Moreover, Janni is responsible for legal services. Previously, Janni Torp Kjærgaard served as Head of Department at the Danish Transport, Construction and Housing Authority, being responsible for road safety, construction, and transport markets. Janni Torp Kjærgaard also has extensive experience from two other previous appointments as Head of Development at the Capital Region of Denmark and Head of Department at the Danish Enterprise and Construction Authority. She holds a master's degree in law from the University of Copenhagen and a master's degree in public administration from Copenhagen Business School.</p>
	<p>Ernst van Zuijlen has a PhD in Physics (University of Utrecht) and has since 1985 been active in wind energy, first in a wind cooperative; later as consultant and as project developer for wind at sea (Amalia, Belwind, Sheringham Shoal, Godewind, a.o.t.). From 2010 until 2018, he was initiator and coordinator of R&D programmes in offshore wind in the Netherlands (FLOW, TKI-offshore wind and GROW). He is former (vice) president of Newin, Pawex and NWEA (Netherlands Wind Energy Association). Since 2014 owner of WindWerk and now also director of Hydrautrans and Offshore Service Facilities.</p>
	<p>Halvor Hoen Hersleth is Operations Manager of the Hywind Tampen Floating Wind Farm Project – Equinor. He is an experienced within renewable energy and offshore wind is particular, both floating and conventional, from project execution to operations, from engineering to management, and highly enthusiastic to boot. He has a MSc in Electrical and Electronics Engineering from Norwegian University of Science and Technology (NTNU).</p>
	<p>Dr. Johannes Tambornino is Vice Chair of EGRD . He is the head of the Energy Strategies and Systems Analysis Unit at Project Management Jülich, where he is responsible for the R&D programme on energy systems analysis funded by the German Ministry of Economic Affairs and Energy. He is leading a group that covers a broad range of topics along the energy innovation chain and currently serves as the German representative in the IEA Experts' Group on R&D Priority Setting and Innovation. He holds a PhD in Mathematical Physics and has actively pursued research in quantum gravity and cosmology at different laboratories in Canada, France and Germany before changing fields and devoting his time to energy-related issues.</p>
	<p>Eiji Ohira is the Director General of the New Energy and Industrial Technology Development Organization (NEDO)'s Fuel Cell and Hydrogen Group within the Advanced Battery and Hydrogen Technology Department. In this capacity, he is responsible the overall strategy, execution and coordination of NEDO's research, development and demonstration project on fuel cell and hydrogen. He has also coordinated fuel cell and hydrogen activities with international stakeholders, through International Energy Agency's Technology Collaboration Program (IEA TCP: Advanced Fuel Cell & Hydrogen), and International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE). He joined the NEDO in 1992, just after graduation from the Tokyo University of Science. He served as a visiting scholar at the Massachusetts Institute of Technology in 1997-1998.</p>

	<p>Klemens Kaar is a Project Development Manager for Renewable Hydrogen at Ørsted, a global leader within clean energy. He manages Ørsted’s contribution to the Reallabor Westküste 100 in Schleswig Holstein and other hydrogen development projects.</p> <p>Klemens holds a MBA in Entrepreneurship & Innovation and has a Master’s degree (Dipl.-Ing.) in Environmental Process Engineering. He is a PMI-certified Project Management Professional and a Chartered Engineer at the Institute of Chemical Engineers in the UK.</p> <p>Prior to Ørsted, Klemens worked in Process Engineering, Project Manager and Consultant roles for industrial energy and infrastructure projects within global companies such as VA Tech Wabag, Siemens, Bechtel and KBR. Before his current role, Klemens was the Risk Manager for Ørsted’s first zero-subsidy 900MW offshore wind project ‘Borkum Riffgrund 3’, as well as “GodeWind 3 & 4”, and the multi-GW scale “Bay State Wind” project in the USA.</p>
	<p>Martina Ammer is project manager and network coordinator in the association WIVA P&G - Hydrogen Initiative Model Region Austria Power & Gas. This association which was founded primarily to manage the research initiative called WIVA P&G. Ms. Ammer has more than 10 years of experience in the field of innovation support for energy and environmental technologies, both in the related funding processes and in the relevant implementation support for SMEs. She graduated from the University of Applied Sciences Wiener Neustadt.</p>
	<p>Tor Elmelund is an engineer and energy analyst in the Gas System Innovation department at Energinet, the Danish electricity and gas TSO. His area of expertise is Power-to-X and integrated renewable energy systems, with a focus on ensuring that renewable energy sources can be integrated efficiently with little discarded electricity, by creating synergies across energy sectors, while ensuring security of supply of affordable energy and cost savings of energy infrastructure. Tor holds a MSc Eng degree in Physics and Nanotechnology, specialised in Energy and Sustainability (Technical University of Denmark), with research experience in the field of emerging energy systems and third generation photovoltaics.</p>
	<p>Dr. Herbert Greisberger is the Managing Director of the Lower Austrian Energy and Environment Agency (OGUT), where his projects focus on energy and innovation with a special focus on sustainable buildings and renewables. Dr. Greisberger is also Scientific Manager of the Austrian Futurelab focusing on long-term developments and their consequences for society. He was formerly the Senior Scientist on R&D, innovation and energy technologies for the Austrian Energy Agency and the Austrian Society for Environment and Technology. He is also a Lecturer at the Institute for Research and Education focusing on energy economy and energy management. Dr. Greisberger holds a PhD (University of Stuttgart) and studied economics (Universities of Graz and Vienna).</p>
	<p>Dr. Atsushi Kurosawa is Vice Chair of IEA EGRD. He is Director of the Global Environmental Programme, Research and Development Division, Institute of Applied Energy (IAE). His research focuses on integrated assessments of global climate change and energy R&D strategy through the integrated assessment model GRAPE and TIMES Japan model. He has held visiting and fellowship positions at many universities and institutes, including Stanford University, Research Institute of Innovative Technology for the Earth, Kyushu University, Japan Science and Technology Agency, New Energy and Industrial Technology Development Organization, and University of Tokyo. He holds a PhD in Electrical Engineering (University of Tokyo), a MSc in Nuclear Engineering (Tokyo Institute of Technology) and a BSc in Nuclear Engineering (Nagoya University).</p>

International Energy Agency (IEA)

The IEA is an autonomous agency established in November 1974. Its mandate is two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply and to advise member countries on sound energy policy. The IEA carries out a comprehensive programme of energy co-operation among 30 advanced economies. The Agency aims to:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations, and other stakeholders.

Since the 1980s, the IEA has continued to build good working relationships with countries beyond its membership, in particular major energy consuming, producing and transit countries. Co-operation with partner countries cover a wide range of activities, from joint workshops to in-depth surveys of specific energy sectors or data exchange. Combined, the IEA co-operates with more than 69 countries worldwide.

IEA Energy Technology Network

The IEA Energy Technology Network is an ever-expanding, co-operative group of more than 6,000 experts that support and encourage global technology collaboration. At the head of this vast network is the Committee on Energy Research and Technology (CERT).

Committee on Energy Research and Technology

Comprised of senior experts from IEA member governments, the CERT considers effective energy technology and policies to improve energy security, encourage environmental protection and maintain economic growth. Under the guidance of the IEA Governing Board, the CERT oversees the technology forecasting, analyses and the research, development, demonstration and deployment strategies of the IEA Secretariat, notably through its flagship publication, *Energy Technology Perspectives*, and the series of energy technology roadmaps. The CERT also provides guidance to its working parties and experts' groups to examine topics that address current energy technology, or technology policy, issues.

Experts' Group on R&D Priority-Setting and Evaluation (EGRD)

The EGRD examines analytical approaches to energy technologies, policies, and RD&D on targeted, timely topics. The results and recommendations support the CERT, feed into IEA analysis, and enable a broad perspective of energy technology issues. Recent topics analysed include Energy Communities (2020), Green Fuels (2019), System Resiliency and Flexibility (2019), and Future Energy Market Design (2018). Workshop summaries are available here: <https://userstcp.org/iea-egrd>