

International Smart Grid Action Network (ISGAN) Annex 7 – Smart Grid Transitions

Webinar: A Nordic carbon-neutral energy system enabled by flexibility and storage

30 June, 12.45 – 14.30 (Central European Summer Time)

Key words: Smart grid, Energy storage, Flexibility, Enabling conditions, Nordic energy system

Invitation to an ISGAN Annex 7 webinar organized by The Danish Technological Institute and DTU Management, Technical University of Denmark.

Place: Microsoft TEAMS meeting (an invitation with link will be forwarded to registered participants)

Participation is free.

This webinar discusses the flexibility measures enabled by smart grids and sector coupling that can help countries and regions make the deep decarbonisation of their energy systems a reality.

Carbon-neutral electricity is the main challenge since it will be the primary future energy carrier for heating, transportation and other energy needs. Soon fossil fuel-based power plants will be substituted by renewables such as wind and solar. Thus, **new storage solutions - activated by the smart grids and enabled by linkages with the heat or mobility sectors - will become central flexibility assets.**

However, their direct participation to balancing **competes with other, centralised flexibility solutions** such as hydroelectric dams that are facilitated by existing market designs and the long-lasting international cooperation among the Nordic countries.

Recent studies have demonstrated that **decentralised and cross-sector storage is hindered by regulatory barriers and distorted price signals.** Implementing enabling frameworks would create room for new business models to develop that would capture the added value of new types of storage to complement current flexibility solutions in future decarbonised mixes.

The webinar will discuss some of the **opportunities and challenges of balancing energy and power** in a larger perspective and in some local perspectives in the Nordic countries. Short presentations will give inspiration on the subject before opening the panel debate with Nordic energy experts:

- Analysis of **new low-carbon scenarios for the Nordic-Baltic energy region** carried out as part of the Flex4RES project. Storage and flexibility services as a means of accelerating the green transition is part of this presentation.
Claire Bergaentzlé, Postdoc, and Simon Bolwig, Senior Researcher, DTU Management, Technical University of Denmark - DTU
- **Measures to reach a stable carbon-neutral electricity supply.** There is only 10 years to complete the full transition of the electric supply and this requires new measures. For stability and security of supply, some of the primary flexibility assets may be interconnectors, large scale storage, cross-sector storage, seasonal storage and more.
Anders Bavnhøj Hansen, Chief Engineer at Energinet. Energinet is Denmark's TSO, i.e. the enterprise responsible for the operation of the transmission grid and the electricity system.
- **Electric storage to help balance energy and power** from the sub-second level to a day-to-day scale. Electric equipment and storage can help provide both balancing flexibility and grid services to the future electric grid. Based on years of R&D focus on flexibility and efficiency supplemented with dedicated lab testing at the Danish Technological Institute DTI.
Kjeld Nørregaard, Senior Project Manager at the Danish Technological Institute - DTI.

A panel debate will wrap up the webinar focusing on Denmark and the Nordic-Baltic energy region and possibilities for decarbonizing their energy systems. Themes for the debate:

- Will increased power transmission and international smart energy/grid cooperation bring sufficient flexibility? Or will a mix of local and national storage solutions be needed?
- The Corona crisis closed many national borders to people – could a future energy crisis cause closing of energy borders? Could this give rise to reconsider the heavy reliance on international trade in electricity as a flexibility mechanism and favor local storage and generation?
- What should be the prioritized next steps? Are there barriers and technology that needs upgrading to match the climate goals?

The webinar is organized by the IEA International Smart Grid Action Network (ISGAN) Annex 7 – Smart Grid Transitions, with support from EUPD – a programme under the Danish Energy Agency.

A Nordic carbon-neutral energy system enabled by flexibility and storage

12:45 – 13:00	Webinar link is open for verification of connection and registration
13.00 – 13.05	Welcome Simon Bolwig , DTU, leader of the Danish ISGAN Annex 7 project
13.05 – 13.15	Storage in a carbon-neutral Nordic energy system: Pathways to 2050 Simon Bolwig Technical University of Denmark - DTU Claire Bergaentzlé Technical University of Denmark - DTU
13.15 – 13.20	Q&A
13.20 – 13.30	Measures to reach a stable carbon neutral electricity supply Anders Bavnhøj Hansen Chief Engineer at Energinet
13.30 – 13.35	Q&A
13.35 – 13.45	Electric Storage to help balance Energy and Power. Kjeld Nørregaard Danish Technological Institute - DTI
13.45 – 13.50	Q&A
13.50 – 14.30	Panel debate theme: Can interconnectors and international smart energy/grid cooperation bring sufficient flexibility in a carbon-neutral Nordic-Baltic energy system, or will local and national energy storage solutions be needed, and in what mix? Should reliance on cross-border trade and cooperation be reconsidered in the light of recent events? What kind of flexibility-enabling infrastructures will local populations accept? Moderator: Poul Erik Morthorst DTU and Danish Council on Climate Change - The perspective of the Danish Council on Climate Change (short introduction) Panel participants: Klaus Skytte CEO Nordic Energy Research - The perspective of Nordic-Baltic energy cooperation (short introduction) Anders Bavnhøj Hansen Chief Engineer at Energinet Simon Bolwig Technical University of Denmark Claire Bergaentzlé Technical University of Denmark Kjeld Nørregaard Danish Technological Institute

Bios of Speakers and Panellists

Simon Bolwig



Simon Bolwig, is Senior Researcher at UNEP DTU Partnership, DTU Management, Technical University of Denmark. He holds a Ph.D. in Geography from University of Copenhagen. He carries out research on sustainable energy and energy efficiency, among other topics. He was participant in the recent Flex4RES project on the role of flexibility in pathways to a carbon-neutral energy system in the Nordic and Baltic countries, in which he carried out research on transition pathways and the role of social acceptance of energy technologies, combining techno-economic and socio-technical perspectives.

Claire Bergaentzlé



Claire Bergaentzlé is a researcher at the Energy Economics and Regulation group at Denmark Technical University (DTU). She holds a PhD in Energy Economics and a master degree in Energy Economics and Law. Her research interests include the regulation and organization of network industries and enabling frameworks and business models for smart energy sector coupling and for decentralized flexibility resources.

Kjeld Nørregaard



Kjeld Nørregaard is senior Project Manager in Transport and Electric Systems Center at Danish Technological Institute – DTI.

Anders Bavnhøj Hansen



Anders Bavnhøj Hansen is Chief Engineer at Energinet, the Danish TSO. He is expert of power systems and energy policy applied to renewable energy deployment.

Klaus Skytte



Klaus Skytte is CEO at Nordic Energy Research. He holds a PhD in economics from the University of Copenhagen and has worked in fields related to energy, climate and the environment since 1996 – both in the Nordic region and internationally. Klaus comes from a position as Head of Energy Economics and Regulation at the Technical University of Denmark (DTU). He has been a member of the The Energy Board of Appeal in Denmark, and has served as Denmark's national expert in the international ISGAN collaboration on Smart Grids. Klaus also served on the board and chaired a program under the European Energy Research Alliance ERRA.

Poul Erik Morthorst



Poul Erik Morthorst is professor in Energy Economics and Head of the Systems Analysis division at DTU Management Engineering. He has participated in more than 75 national and international projects, being project leader of a significant part of these projects. Specialisation and experience within economic and technical assessment of renewable energy technologies, especially wind power and photovoltaics.