



Flex4RES



Smart Grid Transitions - System Solutions and Consumer Behaviour in Buildings



ISGAN Smart Grid Seminar, hosted by DTU Management Engineering
23. August 2017, 09.30 - 16:00.

VENUE

DTU - Technical University of Denmark
Produktionstorvet (Building) 421, Auditorium 73, 2800 Kongens Lyngby

CONTENT AND PURPOSE

The seminar will focus on central aspects of the transition to a smart electricity grid and flexible energy system, targeting two main themes:

- Experiences from real-world demonstration projects (morning)
- Consumer behaviour in relation to the energy consumption of buildings (afternoon)

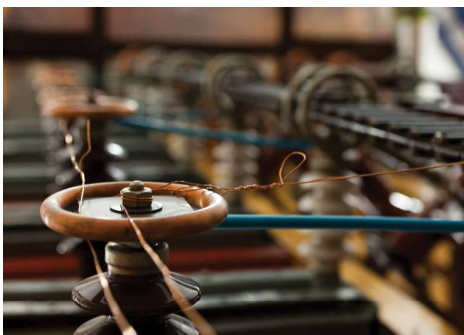
Experts from research, civil society and industry are invited to address these themes in two main research blocks, separated by a site visit to PowerLabDK, hosted by the DTU Centre for Electric Power and Energy. This will provide the seminar participants with a chance to get a unique preview of the future, flexible energy system.

A pamphlet on Smart Grid Transitions will be distributed for seminar participants to take home. It reviews recent Danish and International research and discusses current issues for the smart grid transition, with a focus on the role of consumers, among other topics, in an easy-to-read format.

The seminar is organised in collaboration with the CITIES and Flex4Res projects, and marks the conclusion of the project Participation in IEA-ISGAN Annex 7 Smart Grid Transitions (ISGAN). The ISGAN project enables and strengthens Danish participation in IEA-ISGAN Annex 7 and disseminates knowledge on smart grids to Danish stakeholders. ISGAN project partners are DTU Management Engineering, Danish Technological Institute, The Danish Ecological Council, and The Danish Intelligent Energy Alliance. EUDP (Energiteknologisk Udviklings- og Demonstrationsprogram) supports the project.

REGISTRATION

Participation is free of charge, but tickets are limited and will be given on a 'First come first serve basis', so please register using the following link <http://www.conferencemanager.dk/ISGAN2017>. The deadline for registration is Sunday 20th August. The seminar programme and background is found below. Questions can be directed at postdoc Rikke Brinkø at rikkb@dtu.dk



PROGRAMME

Time	Task	Themes	Presenter
9.30-10.00	Coffee and registration		
10.00-10.15	Welcome and introduction	Overall theme: smart grids transitions. Presentation of pamphlet	Simon Bolwig/Klaus Skytte
10.15-12.10	Block 1	System solutions	Chair: Helle Juhler-Verdoner, The Danish Intelligent Energy Alliance
	10.15-10.55	KEYNOTE: The role of Smart Grids in transition pathways towards Sustainable Energy Systems	Klaus Kubeczko, Austrian Institute of Technology, IEA-ISGAN Annex 7 Operating Agent
	10.55-11.20	Experiences from dream and smart grid open projects	Kjeld Nørregård, Danish Technological Institute
	11.20-11.45	Methodologies for implementing future intelligent and integrated energy systems; Experiences from the CITIES and the EU SmartNet projects	Henrik Madsen, DTU Compute
	11.45-12.10	Experiences from the EcoGrid EU project Bornholm - the future electricity system and market	TBC
12.10-12.45	Lunch and poster session		
12.45-13.45	Block 2	Site-visit at PowerLabDK, Center for Electric Power and Energy, DTU Lyngby Campus. Control center for smart grid demo projects	Frida Frost, DTU Electrical engineering
13.45-14.00	Break - coffee		
14.00-15.45	Block 3	Consumer behaviour and buildings	Chair: Per Sieverts Nielsen, DTU Management engineering
	14.00-14.25	How do consumers react to demand shift incentives and what are the energy system effects? Results from the INCAP project	Niels Framroze Møller, DTU Management Engineering
	14.25-14.50	Adapting the electricity market for the smart prosumer, market models for aggregators	Helle Juhler-Verdoner, The Danish Intelligent Energy Alliance
	14.50-15.15	Consumer empowerment in the EU Clean Energy (Winter) package	Søren Dyck-Madsen, The Danish Ecological Council
	15.15-15.40	Smart Refrigeration Plants as beneficial Energy Conversion	Torben Funder-Kristensen, Head of Public and Industry Affairs, Danfoss
15.40-16.00	Finish and goodbye	Comments, questions and recommendations regarding smart grid transition	Moderator: Per Sieverts Nielsen, DTU Management engineering

BACKGROUND

Smart grid technology has now been under development for more than a decade. It is a highly complex technology and involves the full electricity system including energy production, network, distribution and consumption, and implies not only technical changes but also changes in market designs, role distributions, interaction patterns and practices. Creation of the necessary flexibility and buffering capacity for the electricity system at the consumption side, is crucial for smart grids to play a key role in the transition towards clean energy systems and integration of more variable, renewable energy sources; making this a key problem to solve.

Differences in energy systems, market structures, renewables' potentials, energy needs, etc. mean that smart grid technology is developing differently from country to country. Still, most countries have in the first years of smart grid development emphasised grid coordinating and stabilizing technologies, integration technologies

for renewables, and technologies for control, monitoring and data exchange in the grid. This has often included development of technical or techno-economic models for the grid actors and of smart metering technology, supported e.g. by the European Union's policy for smart meter deployment. As a result, electricity consumption and consumers seem to have been considered primarily from a 'grid perspective', i.e. as a demand side factor that should be managed in order to create the needed flexibility for the grid. Opportunities for demand side management have been analysed mainly in principle, e.g., in techno-economic models, rather than in practice.

In recent years, broader demonstration projects of smart grid technology and interplay between different parts of the grid have been carried out, and an increasing number of such projects include energy consumers and energy consumption in real life contexts. Many projects though, are still primarily focused on technical measuring and monitoring, while fewer have analysed technology-consumer behaviour interaction, consumer benefits, and motivations and barriers for consumption change in practice.

The flexibility created or demonstrated through these projects has so far been too small to enable integration of large shares of wind and other variable renewables in the energy systems. Recent research and demo projects indicate that it is a bigger challenge than expected to create the consumption flexibility needed for substantial renewable energy integration. The results so far seem to show that economic incentives alone are not sufficient; it will take a combined effort of several initiatives, such as for example automation and benefits, for the needed changes in consumption patterns to be realised. In this regard, it is striking that the flexibility gains have been small even in countries where most energy consumers have had smart meters for several years, such as in Italy, Finland, Sweden, and in part Denmark.

Another key trend is the increasing role of additional, major energy-consuming and energy-producing components at the consumer end - solar cells, heat pumps, geothermal energy, electric cars, energy efficient/low-energy buildings etc. These changes in the energy system are expected to be substantial and pervasive. In this light, also larger changes in consumers' behaviour and understandings of energy systems should occur, with some decentralization to be expected and prosumer aspects seeming to need more attention.

So far, only few countries have tried to move to a full market deployment of smart grid technology, with dynamic pricing schemes that encourage flexibility in the consumption. Yet in the coming years many countries plan to develop their market forming institutionalizations with respect to consumers and smart grids in such a direction, moving from experimental demonstration projects to market deployment at large scale. Denmark is one of these countries.

THE IEA-ISGAN ANNEX 7

The objective of Annex 7 in the International Energy Agency's (IEA) International Smart Grid Action Network (ISGAN) is to investigate smart grid transition processes in society and institutional including market changes associated with these. Using a transition framework, the Annex intends to gather information and knowledge from a cross-disciplinary field of social sciences, e.g. innovation studies, political sciences, energy economics, institutional economics, and sociology. The Annex is supporting and complementing technology oriented smart grid activities and can make important added value for policy makers, strategic planners, and other stakeholders in the smart grid field. The Operating Agent for Annex 7 is Austrian Institute of Technology.

Additional information about the different projects involved in this seminar, either via organising collaboration or via presentations during the seminar can be found here;

<http://smart-cities-centre.org/>

<http://www.nordicenergy.org/flagship/flex4res/>, <http://www.sys.man.dtu.dk/research/eer/research-projects/flex-4res>

<http://www.sys.man.dtu.dk/Research/EER/Research-projects/INCAP>