FUTURE ENERGY MARKET DESIGNS: RESEARCH AND INNOVATION NEEDS

An event organised under the auspices of the

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

22-23 October 2018

Hosted by Project Management Jülich
Zimmerstraße 26-27

10969 Berlin

iea Energy Technology Network

Experts' Group on R&D Priority Setting and Evaluation

Future Energy Market Designs: Research and Innovation Needs

22 – 23 October 2018

Hosted by Project Management Jülich, Berlin, Germany

Rationale

Current energy market structures were designed to secure supply while at the same time they may create incentives to reduce overall costs of electricity production in an oligopolistic market. In the transition towards a low-carbon economy, global and local energy markets are undergoing profound changes.

The increase in renewable energy sources (RES) in the electricity grid has led to decentralized supply structures and a growing need for intelligent grids. The fluctuating character of RES requires further efforts to balance supply and demand in real-time with energy storage, demand-side management and managing electricity to/from other energy sectors such as transport, heating, or industries. There are also a growing number of small-scale actors entering the market including residential "prosumers" producing electricity with small-scale photovoltaics (PV), as well as intermediate-scale energy suppliers such as wind farms or biogas facilities.

These developments result in a more complex, dynamic and interdependent energy system and require constant adaptation of the laws and regulations to support worldwide climate goals. Enabling a smooth transition requires energy market (re-) design on the national level by governments and regulating bodies.

Research, development and demonstration (RD&D) can facilitate design of efficient and well-managed energy markets, understand the possible consequences of future energy market designs and to analyse the benefits - and challenges. For example, the interplay between a new energy technology and the energy network can be tested in large-scale or regional demonstration projects. Such showcase projects could provide a test bed for a number of technical, economical and regulatory challenges to integration of the technology, demonstrating model solutions which could then be deployed on a larger scale.

Aims

This workshop aims to address the following issues:

- **Understanding the challenges, obstacles and risks**
  - Can a clever energy market design ensure security of supply in a volatile energy system?
  - Which are the key challenges for future low-carbon energy markets?
  - Which (market) obstacles are expected on the path towards an energy system based on a greater share of RES?
  - Which market structures can accommodate the growing range of participants efficiently?
- **New technologies and future business models**
  - What are the potentials of new technologies and paradigms such as block chain?
  - Which business models facilitate new technologies and adaptable market design?
- **Best practice examples and lessons learned**
  - Are the showcase test beds applicable to other regions - or countries?
  - What is the role of the "prosumer" in a future energy system?
- **Current research and future research needs**
  - Which insights are possible through simulation and modelling?
  - Is it possible to develop blueprints (from laboratory to market) for 'smart' RES integration?
- **R&D policies and decision making**
  - Which R&D policy questions should be addressed now in order to lay the foundation for energy market (re-) design?
  - Which funding instruments are needed?

Target audience

In addition to EGRD members and national experts, we are seeking input from social scientists, behavioural economists, RD&D decision-makers, strategic planners and programme managers from industry, academia, think tanks, national laboratories, NGOs and government. Participation is by invitation only.

Expected outcomes

The workshop will result in a summary report that identifies challenges and opportunities of future energy market designs and present perspectives and best practice for R&D planners and strategists.

DAY 1 – Monday, 22 October

08:30 Registration

Welcome, introduction and setting the scene

1	09:00	**Opening remarks** *Johannes Kerner, Energy Research, German Federal Ministry of Economic Affairs and Energy*
2	09:05	**A new energy research programme for the German Energiewende** *Johannes Kerner, Energy Research, German Federal Ministry of Economic Affairs and Energy*
3	09:30	**Introduction to the EGRD** *Birte Holst Jorgenson, EGRD Chair*

Session 1: Challenges, obstacles and risks on the way to a low-carbon society

Moderator: Atsushi Kurosawa

4	09:45	**Tracking clean energy progress** *Carrie Pottinger, Programme Manager, Technology R&D Networks, IEA*
5	10:15	**Insights on planning for power system regulators** *Andreas Jahn, Senior Associate, The Regulatory Assistance Project*
	10:45	*Coffee break*
6	11:00	**Smart grid transitions – experiences from the International Smart Grid Action Network** *Dr. Werner Friedl, Thematic Coordinator, Integrated Energy Systems, Austrian Institute of Technology*
	11:30	**Discussion**
	12:00	*Buffet lunch*

Session 2: New technologies and future business models

Moderator: Carrie Pottinger

7	13:30	**VPP and P2P power transaction using blockchain technology** *Mr. Fumiaki Ishida, General Manager, Energy Use Technology Laboratory, Kansai Electric Power Company*
8	14:00	**P2P energy trading using blockchain** *David Shipworth, University College London, DSM TCP Chair*
	14:30	*Coffee break*
9	15:00	**Demand response tools and new business models for energy cooperatives** *Armin Wolf, FLEXCoop*
10	15:30	**Innovation for Cool Earth Forum (ICEF) Fintech innovations** *Dr. Georg Erdmann, former Head of Energy Systems, Berlin Institute of Technology*
	16:00	**Discussion**
	16:30	**End day 1**
	16:30	**Site visit (for further details see last page)**
	19:30	**Self-paid group dinner (details to follow)**

DAY 2 – Tuesday, 23 October

Session 3: Energy transition: showcase regions

Moderator: Birte Holst-Jorgensen

11 09:00 **Smart energy showcases - digital agenda for the energy transition (SINTEG)**
Dr. Markus Graebig, Project Leader, WindNODE Project

12 09:30 **Towards a renewable energy system**
Dr. Susanne Supper, Cluster Manager, Green Energy Lab, Energy and Environment Agency of Lower Austria

10:00 *Coffee break*

13 10:30 **Experimenting with law and governance for decentralized electricity systems: adjusting regulation to reality?**
Imke Lammers, Department of Governance and Technology for Sustainability (CSTM), University of Twente, and Lea Diestelmeier, Department of European and Economic Law, Groningen Centre of Energy Law, University of Groningen

14 11:00 **Living lab for new energy technology: Bornholm, Denmark**
Prof. Jacob Ostergaard, Electrical Engineering, Danish Technical University

11:30 **Discussion**

12:00 *Buffet lunch*

Session 4: Energy market design: towards R&D policies and decision making

Moderator: Herbert Greisberger

15 13:00 **Solar PV prosumage: pros, cons, and system perspectives**
Dr. Alexander Zerrahn, German Institute for Economic Research

16 13:30 **Market design and regulation during the transition to low-carbon power systems: policy recommendations**
Stefan Lorenczik, Electricity Analyst, International Energy Agency

14:00 *Coffee break*

17 14:30 **R&D policies to transform and decarbonise the energy system and markets: Singapore**
Ho Hiang Kwee, National Climate Change Secretariat, Strategy Group, Prime Minister's Office

18 15:00 **Scaleable technologies, business models, societal challenges – and energy R&I**
Hans-Günther Schwarz, Strategic Programme Coordinator, Austrian Federal Ministry of Transport, Innovation and Technology

Final discussion and wrap up

Moderator: Johannes Tambornino

19 16:00 **Discussion: Workshop summary and R&D recommendations**

17:00 **End of workshop**

DAY 3 – Wednesday, 24 October Members' meeting 9h-12h00 (by invitation only)

MEETING VENUE

From Berlin-Tegel Airport

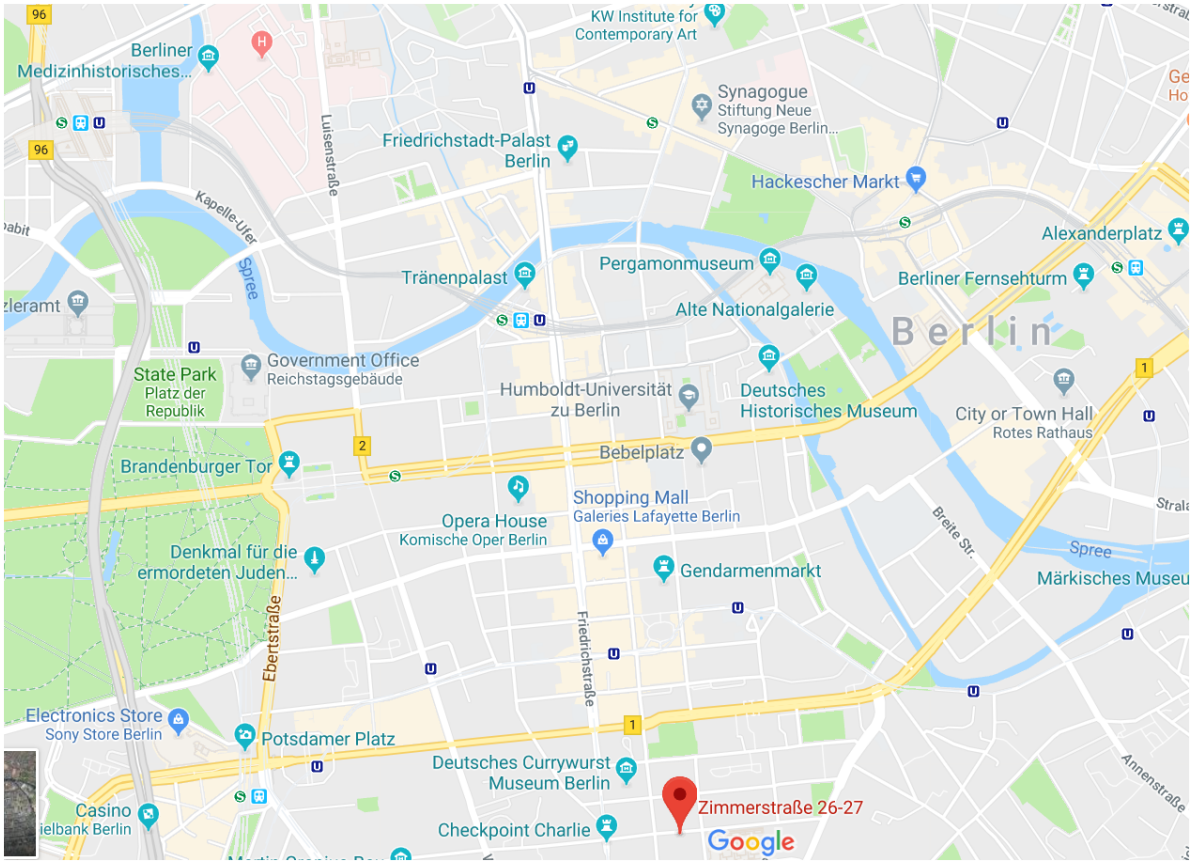
Take the 128 bus line towards underground station U Osloer Strasse to Kurt-Schumacher-Platz. Get off here and take the underground (U 6) towards Alt-Mariendorf to the city centre (Stadtmitte station). Get off here and take the exit in the direction of Alt-Mariendorf. Walk along Friedrichstrasse until you reach Zimmerstrasse. Turn left onto Zimmerstrasse and continue until Charlotten Carree.

From Berlin Schönefeld Airport

Take the suburban train or regional train towards Berlin to Friedrichstraße train station. Get off here and take the underground (U 6) towards Alt-Mariendorf to the city centre (Stadtmitte station). Get off here and take the exit in the direction of Alt-Mariendorf. Walk along Friedrichstrasse until you reach Zimmerstrasse. Turn left onto Zimmerstrasse and continue until Charlotten Carree.

From Berlin Central Train Station

Take the suburban train (S-Bahn) towards Friedrichstrasse train station. Get off here and take the underground (U 6) towards Alt-Mariendorf to the city centre (Stadtmitte station). Get off here and take the exit in the direction of Alt-Mariendorf. Walk along Friedrichstraße until you reach Zimmerstrasse. Turn left onto Zimmerstrasse and continue until Charlotten Carree.



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ACTIVITIES

22 October 2018

SITE VISIT	
EUREF campus in Berlin Schöneberg *A 5.5-hectare smart urban district, a symbol of the energy revolution in Germany, serves as a home base for companies working in the fields of energy, sustainability and mobility. Ecologically and economically sustainable solutions have transformed the offices and science campus - which by 2014 had already met the German government's climate objectives for 2050 - into a unique European centre for innovative forward-looking projects.* *For more information see https://reason-why.berlin/euref-campus/.*	
16:30	Leave meeting location for the EUREF campus via public transport (details to follow).
17:30	Choose one (separate groups): A) Combined power-to-x (heating/cooling) facility (part of the WINDNODE project) B) Campus guided tour including a few energy efficiency projects

SELF-PAID GROUP DINNER	
Name, location and access information to be provided later.	
19:30	Dinner begins
22:00	Dinner ends

Presentations will be available on the IEA website following the event at
https://www.iea.org/workshops/future-energy-market-designs-research-and-innovation-needs.html

For further information on EGRD activities, see *http://www.iea.org/about/structure/cert/egrd/*

Light bulb image: © Natalie_Mis, istockphoto