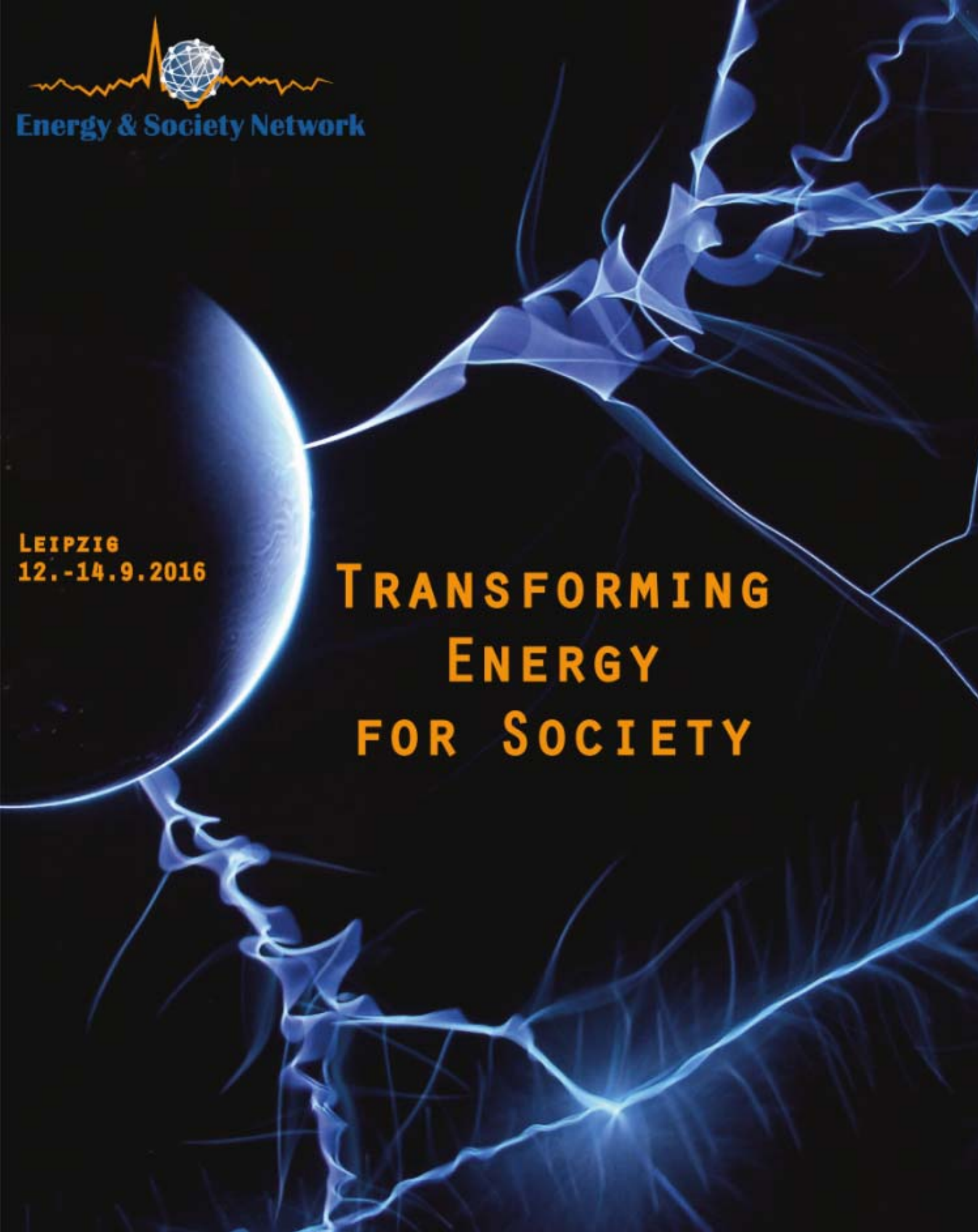
Energy & Society Network
Leipzig
12.-14.9.2016
Transforming
Energy
for Society

Energy & Society Network

TABLE OF CONTE

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EA EUROPEAN ACADEMY OF TECHNOLOGY AND INNOVATION ASSESSMENT

GENERAL INFORMATION

WELCOME TO THE CONFERENCE

3rd Energy and Society Conference
Transforming Energy for Society
ESA RN12 - Environment and Society Midterm conference
Leipzig, Germany, September, 12-14, 2016

The Energy & Society Conferences have been aiming at inspiring and providing networking opportunities for researchers interested in energy and society issues. Following the success of the two previous conferences, we will now be hosting the third conference in Leipzig. We hope this can be a great occasion for developing the sense of community that has been emerging from these meetings, as well as from the conferences of the European Sociological Association. In order to provide a lively forum for insightful debates, the conference will include other formats besides keynote presentations and sessions for oral presentations. Participants will be able to present and discuss their research in roundtables and in poster sessions. The conference will also offer a number of workshops proposed and organized by participants. Moreover, participants are invited to propose informal meetings, which will be announced during the conference. We hope that the social events will also contribute to make this a pleasant and friendly conference.

CONFERENCE THEME

While global oil and gas supplies are subject to geopolitics, the concrete form of a particular energy regime is often an issue of national politics. This has recently become clear within the context of climate change mitigation and energy security, with significant differences in national approaches. Some countries have opted for a renewed fossil fuel strategy pursuing unconventional exploitation of shale gas and oil, and new nuclear capacities. Other nations are by contrast pursuing renewable energy systems, seeking to dramatically reduce their dependence on fossil fuels and a third group, most notably China, is heavily investing in both energy regimes. Pathways of energy regimes have long term implications for the labour market, the landscape and built infrastructure, the parliamentarian spectrum and the relationship of regions to their central government. While renewable strategies call for increased cooperation between neighbouring countries, energy sector coupling and “smart” de-centralisation, fossil and nuclear pathways will reaffirm large scale industrial infrastructure, global fuel supply chains and centralised ownership.

Energy policies are foremost legitimised in a national context, but they also relate to the international discourse on climate change mitigation as well as practices on the local level. The consequences of increasingly diverging pathways thus have implications for single nations as well as for global politics. For example, in the European context, while some countries have opted for nuclear power and unconventional fossil fuels, others support a post-fossil road map. The

period of broad consensus that shaped energy policies in Europe for many years and formed the very basis of the early Union itself makes way for a new phase of contention.

These issues present important questions for social research, regarding discourses of risk, acceptance and legitimacy, investment and costs, (changing) practices of energy consumption and production, and evolutions in actor networks.

Taking this as a starting point, the conference explores the diversity of contemporary energy regimes and seeks to examine the emerging questions. We want to address the particular local and national contexts and also the big picture. What could be a seed for change when hopes in post-Kyoto politics are repeatedly disappointed? Do energy and climate politics need a restart to develop a new pathway for a desirable sustainable future?

SCIENTIFIC COMMITTEE

ABOUT THE ENERGY & SOCIETY NETWORK

The Energy and Society Network was created in 2010 by academics active in the European Sociological Association (ESA) Research Network 12 on Environment and Society and in the International Sociological Association (ISA) Research Committee 24 on Environment and Society.

The network aims at bringing together researchers interested in social aspects of energy issues to provide them a platform for information exchange, discussion and development of collaborations across countries, including on international collaborative research projects in this field. The group has also been aiming at strengthening a network of those interested in extending familiar approaches to environmental sociology by forging links with other social science fields such as science and technology studies, the sociology of risk, material culture, innovation studies etc. as well as the natural and engineering sciences.

During the 10th Conference of the European Sociological Association in Geneva the group decided to organize its first meeting in Lisbon, Portugal. Initially thought as a workshop, the event was very well received, and ended up gathering over 140 researchers from Europe and elsewhere. The first conference of the Energy and Society Network was hosted by the Institute of Social Sciences of the University of Lisbon between March 22nd and 24th, 2012, as a Midterm Conference of the ESA RN12, in collaboration with ISA RC24. The conference included the first general meeting of the network and all participants in the conference were invited to become members. Further information about this conference, including short bios of all speakers, some presentations and the conference sum up, can be found at http://www.energyandsociety.ics.ul.pt/. A selection of papers from the conference was published in a special issue of the journal Nature and Culture focused on “Energy cultures and practices”. More information can be found at http://journals.berghahnbooks.com/nc/.

In Lisbon it was decided that this conference would be the first of a series of meetings held every two years between the ESA conferences.

The second conference was held in Krakow, Poland, between June 4th and 6th, 2014. The Institute of Sociology of the Jagiellonian University was commissioned to host the conference, which was again supported by the Research Network 12 on Environment and Society of the European Sociological Association and by the Research Committee 24 on Environment and Society as their Midterm Conference. This second conference has drawn of an even larger number of abstracts submitted from around the world. More information can be found at http://www.energyandsociety.confer.uj.edu.pl/.

HOW TO BECOME A MEMBER

The network welcomes all researchers within the social sciences interested in becoming members. There are no membership fees.

Those interested in joining may send an email to Pia Laborgne, who is in charge of the communication through the network’s mailing list. All queries should be addressed to her.

CONFERENCE VENUE

The conference will be held at the modern conference centre Leipziger KUBUS, which is well connected to everywhere in the city.

Leipziger Kubus
Helmholtz Centre
for Environmental Research - UFZ
Permoserstrasse 15
04318 Leipzig
Germany

BY ROAD

On A14 motorway take exit marked "Leipzig-Ost" and heading for Stadtzentrum (City Centre)

BY RAIL

The Intercity Express from Berlin, Frankfurt, Munich and others stops at Leipzig. From Leipzig Central Station take No.3 tram heading for “Sommerfeld” or “Taucha”. After about 15 minutes alight at stop "Torgauer/ Permoserstraße", cross the street and take the street Permoserstraße in eastern direction. After about
200 metres you will find the main entrance of the UFZ.

BY PLANE

From Leipzig/Halle Airport, take the train (regional express) to the Leipzig Central Station (3,20 Euros one-way). From the Central Station, take No. 3 tram heading for “Sommerfeld” or "Taucha"

BY TAXI

A taxi from Leipzig Central Station to the UFZ will cost about EURO 10.

CONFERENCE PROGRAM OVERVIEW

MONDAY, 12 SEPTEMBER

9:00-10:00	Registration at the KUBUS
10:00-11:30	Welcome and Keynote
11:30-12:30	Poster Session
12:30-13:30	Lunch
13:30-15:00	Workshop Sessions 1
15:00-15:30	Coffee break
15:30-17:00	Parallel Sessions 1
17:00-18:30	Panel Discussion

TUESDAY, 13 SEPTEMBER

9:00-10:30	Parallel Sessions 2
11:00-12:30	Workshop Sessions 2
12:30-13:30	Lunch break
13:30-15:00	Parallel Sessions 3
15:00-16:30	Parallel Sessions 4
16:30-17:00	Coffee break
17:00-18:30	Parallel Sessions 5
18:30-19:30	Keynote
20:00	Conference Dinner at the City center

WEDNESDAY, 14 SEPTEMBER

9:00-10:00	Round Table
10:00-11:30	Parallel Sessions 6
11:30-12:00	Closing remarks
12:00-13:00	Lunch
13:00	Departure for excursions

MONDAY, 12 SEPTEMBER

10:00 – 11:30 WELCOME AND KEYNOTE

Can we adapt? An evolutionary lens on future energy-society relations

Debra Davidson

Debra Davidson is Professor of Environmental Sociology at the University of Alberta (Canada) and researches in the field of Renewable Resources. She is Director of the Resilient Urban Food Systems Network and member of the IPCC as well. Davidson is specialized in climate change impacts and adaptation, transitions in energy and food systems and natural resource politics and governance.

11:30 – 12:30 POSTER SESSION

Alena Bleicher	Chair
Mukesh Lakum / Thounaojam Somokanta	Local Niche Experimentation of Bus Rapid Transit System (BRTS) In Ahmedabad City of India
Adélaïde Amelot / Julie Lassalle / Annabelle Boutet-Diéye / Christine Chauvin	Smart-grid appropriation study: a socio-ergonomic approach
Steven Maerz	Identifying local hot-spots of fuel poverty: GIS-MCDA analysis to assess the vulnerability of urban neighbourhoods against fuel poverty
Diane Petillon	Energy in urban planning of sustainable cities. A sociological study on the urban energy planning project “RES TXL – Spatial Energy Simulation for Berlin Tegel”
Michael Jedelhauser	From individual activities to resilient institutions? The role of pioneers in the energy transition in the Allgäu region
Ana Horta / Mónica Truninger / Susana Fonseca / Nélia Nobre / Augusta Correia	No need for more information. Youngsters, smartphones and learning processes of energy use in everyday life
Isaac Nunoo	Energy Use and Poverty: Evidence from Ghana
Oliver Wagner	Preservation strategies of the German energy regime

Local Niche Experimentation of Bus Rapid Transit System (BRTS) in Ahmedabad City of India

Mukesh Lakum / Thounaojam Somokanta

This paper attempts to examine the local experimentation of niche actors involved in the BRTS project in the Ahmedabad city, and also explores the transnational linkages of the niche experimentation in terms of actors, knowledge, capital, institution and technology. Certain research questions are, why the geography of Ahmedabad has become significant space of urban sustainability thinking? Why BRTS in the city is successful? And how the transnational linkages shape the urban experimentation of BRTS in the city?

In a developing country like India, BRTS has become an alternative urban mobility, namely Ahmedabad city. It acts as a response to the climate change, air pollution and health in the city. Methodologically, our research applies qualitative case study method, with the objective of understanding the successful story of BRTS since its establishment in 2009, local initiatives of BRTS project under the funding of national actor, transnational linkages of the niche experimentation of the project and so on. Strategic Niche Management has been applied to analyse the niche experimentation of local actors involved in the project. It is supplemented by in-depth interviews and personal communication to the key officials. Our research has contributed to the field of geography of transitions in the context of urban mobility system in India.

Smart-grid appropriation study: a socio-ergonomic approach

Adélaïde Amelot / Julie Lassalle / Annabelle Boutet-Diéye / Christine Chauvin

The development of energy-saving behaviours is currently a key issue for improved power grid management and security. The smart-grid rollout serves these new needs, incorporating both smart meters that communicate consumption data to the supplier and information technologies conveying those data to the customers. Smart grids, as persuasive technology, should be the driving force of behavioural changes in energy saving. A smart-grid experimentation is currently taking place in Lorient (Brittany, France) as part of the SOLENN pilot project. Its purpose is to experiment with two families of smart grids in 975 households: technological smart grids and hybrids that provide information through technology and human support. An ongoing study investigates the SOLENN smart-grid appropriation process by taking a holistic perspective, either at individual, social, or societal level. The current study proposes an interdisciplinary approach based on theories from both ergonomic and sociological fields, namely instrumental theory (Rabardel, 1995), the appropriation approach developed by Proulx (2005), and the actor-network theory (Callon, 2006). This socio-ergonomic survey highlights the barriers and levers of the appropriation process and the development of energy-saving behaviours. The poster presents the first results of this study.

Identifying local hot-spots of fuel poverty: GIS-MCDA analysis to assess the vulnerability of urban neighbourhoods against fuel poverty

Steven Maerz

Fuel poverty, in particular from space heating, is a widely neglected issue in Germany, although studies estimate that up to 30 percent of all German households are fuel-poor depending on the used definition. Moreover, from a policy perspective there is a need for approaches to effectively identify fuel-poor homes and neighbourhoods at the local level and to avoid misallocation of limited local and national budgets. This is the starting point for this analysis. I performed a GIS-MCDA to identify neighbourhoods suffering most from fuel poverty. I used a AHP (Analytic Hierarchy Process) and asked a group of scientific experts to compare several impact factors of fuel poverty to assess the relative importance of each criteria. These relative weights are multiplied with local census data, energy consumption data from local utilities and social data collected from the city of Oberhausen and created an overall priority ranking of 170 statistical units (neighbourhoods) in Oberhausen with regard to their fuel poverty vulnerability. This analysis is to been seen as a decision support system, which supports local and national authorities to focus their efforts to those most in need. It also allows to evaluate existing policies in terms of their target-group outreach.

Energy in urban planning of sustainable cities. A sociological study on the urban energy planning project "RES TXL – Spatial Energy Simulation for Berlin Tegel"

Diane Petillon

With the opening of the new Berlin Brandenburg Airport, the current Berlin airport Tegel will be closed and redeveloped as an innovative hub for cutting-edge research and industry under the umbrella of "Berlin TXL – The Urban Tech Republic" (UTR). The concept combines various advanced urban technologies on energy, mobility, recycling, materials and water management, and ICT for a smarter and greener district.

The research institute EIFER, the energy provider EDF, the Institute of Urban Planning of TU Berlin and the energy consulting company Drees & Sommer started in 2014 a research collaboration with Berlin Tegel Projekt GmbH, the development agency commissioned by the city of Berlin for the management of the site. The goal was to develop a simulation prototype illustrating the interrelation between different energy technologies, land uses & planning decisions, in an iterative and collaborative process.

Energy is at the centre of this research collaboration, which seeks to connect urban and energy planning. However, energy topic is one element amongst many of smart districts, and is not the only aspect of urban technologies concept of UTR district. In the framework of a bachelor thesis of sociology, the following question is tackled: what are the international, national, local and social contexts which influenced

the involvement of the sub-cited partners in a research collaboration on operational urban planning project, and the focus on energy topic?

From individual activities to resilient institutions? The role of pioneers in the energy transition in the Allgäu region

Michael Jedelhauser

The current fossil fuel-based energy system needs to be transformed into a more or completely sustainable socio-technical system based on renewable energies. One key aspect is the interplay between local or regional energy pioneers and incumbent actors of existing energy regimes. Building on the Multi-Layer-Approach (Geels, 2011) and the resilience concept, this contribution aims at analyzing how individual activities of pioneers in niches use “windows of opportunity” to implement innovations and to what extent these activities result in resilient institutions.

We retrospectively analyzed the transition process of the energy system in the Allgäu (southern Germany) – a region characterized by early pioneer activities (1980s/90s) and relatively high expansion rates of renewables. We conducted a secondary data analysis and qualitative interviews with pioneers, incumbents and further actors involved in the system.

First results show that pioneers were part of several systemic units and dense personal networks, which they connected strategically to implement their innovations. This led to the creation of formal and informal institutions.

No need for more information. Youngsters, smartphones andlearning processes of energy use in everyday life

Ana Horta / Mónica Truninger / Susana Fonseca / Nélia Nobre / Augusta Correia

Smartphones are devices whose increasing functionality involves growing energy consumption. However, their power supply depends on limited capacity batteries. Intensive users may develop battery management skills in order to conserve power until they can charge it. Based on interviews and a survey conducted with adolescents, we found the formation of battery management practices in association with the use of smartphones. However, if in some cases these practices include energy efficiency measures, other actions do not save any energy (like using other devices instead of the phone to avoid draining its battery). Considering that many adolescents say that they never searched for information on how to make their battery life last longer, in this poster we extend previous work by examining their learning processes related to battery use. Drawing on the concepts of habitus (Bourdieu) and skill (Ingold), we explore why in many cases individuals do not search for information that would help them to improve the efficiency of their batteries, and try to understand how energy use is entangled in embodied dispositions for action.

Energy Use and Poverty: Evidence from Ghana

Isaac Nunoo

Energy is crucially important for all three pillars of sustainable development; social, economic, and environmental well-being. The standard of living of a given country can be directly related to the per capita energy consumption. Improving access to energy can be seen as a critical component for improving quality of life in developing countries, particularly among the poorest. Adequate energy services are integral to poverty alleviation and sustainable economic development. Contrariwise, a lack of access to energy contributes to poverty and deprivation and can contribute to the economic decline. Objectives of the study are to investigate willingness to pay for cleaner energy like electricity, gas and solar among the urban poor in the Ashanti Region of Ghana. The study was conducted in the Kumasi municipality in the Ashanti Region. A multistage sampling technique was employed to sample 300 household within the municipality. Selected respondents were interviewed using semi structured questionnaires and focus group discussions. The study results showed about 30% uses kerosene and dry cell batteries for various application in addition to charcoal. The respondents showed willingness to pay for cleaner energy like gas and electricity but claim it's expensive and usually not readily available for use.

Preservation strategies of the German energy regime

Oliver Wagner

We propose to examine the preservation strategies of the German energy regime following the transition approach developed by Geels. From a multi-level perspective it can be observed: Innovations take place in niches and have to overcome the obstacles and the persistence of the conventional fossil-nuclear energy regime. By means of an empirical analysis it can be concluded that – with regard to the local electricity grids – the established regime significantly delays the decentralisation process required for a transformation of the energy structures. Besides, it is shown that Stadtwerke (public utilities) are important key actors for the German Energiewende (energy transition) in their function as local energy distributors and meet a variety of requirements to promote a fundamental structural change. The trend towards remunicipalisation and the re-establishment of public utilities reveal the desire to further strengthen the scope of local politics. In this context we refer to policy goals and to promising strategies for changing the old regime elements.

13:30 – 15:00 WORKSHOP SESSIONS 1

Bernhard Gill / Anna Wolff	How do households adapt to changing energy environments?
Pia Laborgne / Ana Horta / Giorgio Osti	Role and (potential) contributions of social scientists in the field of energy
Thomas Blanchet / Conrad Kunze / Sören Becker	Community Energy in Cities and Regions: Varieties of citizen participation in renewable energy transitions
Benjamin Sovacool	Conceptualizing and Implementing Energy Justice

How do households adapt to changing energy environments?

Bernhard Gill / Anna Wolff

This workshop will focus on the reactions of households to changing energy environments, such as increasing energy prices, stricter refurbishments requirements, and installed retrofitting. With the invited presentations, we aim to shed light to these questions from different disciplinary and theoretical perspectives. On this basis, a broader discussion with the audience is planned; asking questions such as:

Do households “immediately” adapt to price signals, as classical economic perspectives suggest? Or are the reactions embedded in everyday “practices and habits” that change rather slow? Based on which norms and beliefs does energy consumption take place? What role do interaction effects between residents’ behavior and (new) heating equipment play, e.g. when a system characterized by a faster response time is replaced by a more inert heating system such as floor heating? How strong is the heating spill-over between flats in refurbished apartment houses and how much it is taken consciously into account?

The aim of the workshop is to discuss perspectives and approaches from different European countries.

Henrike Rau	Energy Retrofitting and Household Energy Consumption
Constantinos Balaras	Heating energy use in Hellenic residential buildings
Ray Galvin / Minna Sunnika-Blank	Prebound-Effect: The gap between performance and actual energy consumption
Ines Weber / Johannes Schubert / Michael Schneider	Heating price elasticity of demand: the importance of building type, household structures and their connectedness

Role and (potential) contributions of social scientists in the field of energy

Pia Laborgne / Ana Horta / Giorgio Osti

Traditionally, the field of energy was mostly seen as domain of engineers even though social scientist have been working on it for years, regarding topics like social acceptance, risk assessment and social movements.

In the context of discussions on energy transitions, a growing number of social scientists from different perspectives and disciplinary affiliations like environmental sociology, Science and Technology studies, history and political sciences, strengthen and widen up the contributions of social sciences.

In the workshop we will discuss the role and (potential) contributions from social scientists out of different perspectives inside our disciplines as well as out of perspectives from political, research institutional (like EU programmes) and practice stakeholders.

Short inputs on this will be provided, but the moderated discussions among all participants should be at the core of the workshop. In order to achieve this, a format similar to an open space/future workshop will be designed.

Community Energy in Cities and Regions: Varieties of citizen participation in renewable energy transitions

Thomas Blanchet / Conrad Kunze / Sören Becker

The transition to renewable energy systems resulted both in the development of new technologies and in the (re)emergence of new actors and forms of organizations in the energy sector. Among these actors, citizen groups have lately been acknowledged by science and politics as being able to play a crucial role in the energy transition process. That concerns financing, process, transparency and democratic debates around energy issues, facilitating the acceptance in the implementation of various energy projects. Nevertheless, the role of citizen grass root groups as institutional change agents (Garud et al., 2007; Rao et al., 2000) that is, as actors aiming to shape local energy politics, to influence existing public energy utilities or to intend setting up new publicly owned utilities, remains widely under researched. This workshop examines the role of this specific actor in the changing energy sector with case studies from France and Germany.

Conceptualizing and Implementing Energy Justice

Benjamin Sovacool

This workshop involves four papers. The first two will present various energy justice conceptual frameworks, which can serve as an important analytical tool for energy researchers striving to understand how values get built into energy systems or to resolve common energy

problems, as well as a useful decision-making tool that can assist energy planners and consumers in making more informed energy choices. The third paper sets out an analysis of the concept of 'energy justice' from the perspective of framing. Drawing on research with organizations in Philadelphia, Paris and Berlin, the paper explores the articulation and elaboration of an energy justice frame. The final paper offers an account of the core tenets of energy justice: distributional, recognition and procedural. Later it promotes the application of this three-pronged approach across the energy system, within the global context of energy production and consumption.

MONDAY, 12TH SEPTEMBER
15:30 – 17:00 PARALLEL SESSIONS 1

Session A 1
Local, regional national and international energy strategies, pathways and policies

Session B 1
Local, regional national and international energy strategies, pathways and policies

Session C 1
Theoretical approaches to energy transitions research

Session D 1
Energy, vulnerability and poverty

Session E 1
Dynamics and patterns of energy use practices

Session F 1
Communities, grass roots and self-organisation in energy transitions

SESSION A 1 LOCAL, REGIONAL NATIONAL AND INTERNATIONAL ENERGY STRATEGIES, PATHWAYS AND POLICIES	
Nona Schulte-Römer	Chair
Ekatarina Paramonova / Reinier Verhoog	Influence of political poweron the outcomes of the Swiss energy transition
Robin Curry	Mapping Ireland's Energy Pathways: Characterizing and Catalyzing Transition
Aleksandra Lis / Agata Stasik	Local communities and shale gas industry: hybrid forums in search of common world
Karin Edberg	Not one sustainability but many – the complexity of energy facility siting

Influence of political power on the outcomes of the Swiss energy transition

Ekatarina Paramonova / Reinier Verhoog

Switzerland plans to replace its nuclear energy (40% of its electricity supply) with a mix of renewables, energy efficiency, and other sources. The dynamics among the 700+ stakeholders involved in the electricity network affect which policies will be passed and their likelihood of achieving results.This study applies agent-based modeling grounded in political science game theory to understand how the realistic outcomes of the Swiss Energy Strategy 2050 policy change when one accounts for the power of the Swiss electricity market stakeholders. The stakeholders involved have distinct levels of capabilities, interest, and preferred policy positions on a policy continuum. They interact and decide whether to concede, depending on the utility gained from being close to their position or the overall 'average' position. Several codes using this approach have been benchmarked and the results compared to the outputs of commercial models to identify the best alternative. Data for the Swiss energy stakeholders was gathered as well. The results of the model with the Swiss energy stakeholder data indicate that the predicted policy outcome does not support the current measures of the Swiss Energy Strategy 2050, hence limiting its feasibility of implementation, but identifies "gatekeepers" who may influence this situation.

Mapping Ireland's Energy Pathways: Characterizing and Catalyzing Transition

Robin Curry

In 2015 Ireland has arguably begun to make its first bold steps in confronting the challenges of energy transition, with the objective of a "low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050" expressed in the 2015 Climate Action and Low Carbon Development Bill and the 2015 Energy Bill acknowledging that energy transformation relied on a new breed of 'energy citizens'. These represent the first formal articulation of Ireland's ambition to engage in a radical, long-term and far-reaching transition process, and raises a myriad of questions over how this can be operationalised, resourced and whether it can maintain political momentum. A range of perspectives on these issues is provided in the

growing body of literature on transition theories (Rotmans et al. 2001, Markard et al. 2012) and the inter-disciplinary EPA-funded CC Transitions project, based at Queen's University Belfast, represents an attempt to translate this into the context of Ireland's institutions and technological profile. By relating this to international research on sustainability transitions, which conceptualises transitions as multi-level, multi-phase and multi-actor processes, this paper will explore the opportunities of alternative pathways that could take Ireland towards a more progressing, inclusive and effective low carbon future. Drawing on a number of case studies it will highlight some of the capacities for transition required in Irish society: where these exist, how they are being built or enabled, and the barriers to wider social change.

Local communities and shale gas industry: hybrid forums in search of common world

Aleksandra Lis / Agata Stasik

The controversy concerning consequences of shale gas productions results in growing scholars' interests in its public perception. However, as methods as discourse analysis are dominant, there is a still need to understand how the public perception of 'fracking' is constructed in the specific local communities which are confronted with the perspective of shale gas drilling. Our goal is to understand reactions to the information about drilling for shale gas and the dynamics of conflict or cooperation between local communities' members and representatives of shale gas industry. To meet this goal, we conducted qualitative analysis of three public meetings organized in Poland. To understand the processes of gathering voices, issues and concerns around the shale gas on local arenas we adopted term 'hybrid forum' proposed by Callon et al. (2009). Basing on our data, we claim that members of local communities struggle not only with conflicting knowledge claims, but also shared or contested identities, interests, and inequalities; thus, successful meeting on shale gas development has to go beyond the narrow issue of 'physical safety'.

Not one sustainability but many – the complexity of energy facility siting

Karin Edberg

The current energy transition, evident in many European countries, entails changes not only on a policy level but also in the physical landscape. The extraction and transportation of "sustainable" energy requires new infrastructure, sited in an existing physical and cultural setting (Boholm & Löfstedt 2004; Shove & Walker 2004; Bridge et al 2013; Mels 2014). This article discusses how local actors legitimize their position towards new energy projects by analysing the construction of a natural gas pipeline and a proposed, but later rejected, wind power park in a specific geographical area. By using frame analysis, the article shows that the interviewed local actors frame the siting broader than as a sheer energy issue, based on their social practices (Snow et al 1986; Macnaghten & Urry 1998; Star 1999; Benford & Snow 2000). Rather, the understanding of the physical and social landscape and of how the place should be used, is significant. The specific is however merged with the general, as actors also refer to environmental issues and global politics as well as moral concerns. By claiming that actors use and combine different levels of

sustainability to frame and legitimize their position, the article presents an extended interpretation of sustainable energy production.

SESSION B 1 LOCAL, REGIONAL NATIONAL AND INTERNATIONAL ENERGY STRATEGIES, PATHWAYS AND POLICIES	
Giorgio Osti	Chair
Paula Kivimaa / Hanna-Liisa Kangas	Connecting policy mixes to low energy transitions in buildings: A perspective of stakeholders from the consumer energy services niche
Sari Janhunen / Satu Paetaeri / Maija Hujala / Anssi Tarkiainen / Kristiina Korjonen-Kuusipuro	Exploring Behavioral Intentions Related to Wind Power Landscapes: Particular Focus on Emotions
Sriraj Gokarakonda / Shritu Shrestha / Kilian Topp, Vaibhav Rathi / Rohan Jain / Pratibha Ruth Caleb	Energy Efficient and Green Buildings: The Key to Decoupling in the Construction and Building Sector in India – policy recommendations from a joint Indo-German study
Bettina Blümling	The soft power of biogas

Connecting policy mixes to low energy transitions in buildings: A perspective of stakeholders from the consumer energy services niche

Paula Kivimaa / Hanna-Liisa Kangas

The built environment is one of the largest contributors to energy use worldwide and reducing energy use in buildings is slow. Thus, low energy transition in buildings is an enormous challenge. In Finland, energy efficiency has traditionally received less focus in climate policy than renewable energy. Since 2007, however, energy efficiency policies addressing buildings have gained force on both strategy and instrument levels largely following the EU Building Energy Efficiency Directive and the 80% emission reduction goal for by 2050. Sixteen new policy instruments have been added during 2007-2014 in addition to revisions made in the building code

Given the importance of public policy for sustainability transitions, we analyse the potential of the Finnish policy mix in promoting disruptive change for low energy transition in buildings. We explore to what extent recent policy developments could be described as having destabilised the regime. Instead of top-down analysis, we investigate the existing policy mix from a stakeholder perspective drawing on 23 interviews, because perceived impacts of policies may differ from their intended outcomes. The findings show a diverging view regarding the disruptive influence of the existing policy mix. The paper will discuss these findings in relation to the literature on energy transitions.

Exploring Behavioral Intentions Related to Wind Power Landscapes: Particular Focus on Emotions

Sari Janhunen / Satu Paetaeri / Maija Hujala / Anssi Tarkiainen / Kristiina Korjonen-Kuusipuro

Visual impacts are one of the major concerns when assessing the siting of wind power. Previous studies have focused mainly on physical attributes and on respondents' characteristics in specific wind energy cases. For the present, there is quite a few number of researches relating to wind power emotions.

This study explores behavioral intentions related to wind power landscapes in Finland. Particular focus is on emotions and their interactions with wind power attitudes in general and associated in specific landscapes. Hypotheses explaining impacts of emotions directly and indirectly via the attitudes were proposed. The research model was tested with experimental setting based on photographs in two empirical studies. The first data was collected among university students and the second one among customers of electricity company.

Findings indicate the interesting role of emotions in wind power cases. Both the general and landscape specific attitudes may have impacts on emotions which in turn have effects on behavioral intentions. Theoretical and practical implications relating to the role of emotions in the prediction of intentions in wind power projects are also discussed.

Energy Efficient and Green Buildings: The Key to Decoupling in the Construction and Building Sector in India – policy recommendations from a joint Indo-German study

Sriraj Gokarakonda / Shritu Shrestha / Kilian Topp, Vaibhav Rathi / Rohan Jain / Pratibha Ruth Caleb

Economic growth and rapid rate of urbanisation in India has led to growing demand for resources and energy. This will increase stresses on limited natural resources and create irreparable environmental impact. The Indo-German Expert Group on Green and Inclusive Economy therefore, advocates for the importance of decoupling growth from resource and energy consumption. Construction and buildings have been identified as a key sector in transformation towards a green economy in India. In this context a joint study has been conducted by the Wuppertal Institute and Development Alternatives to highlight the need and to identify the potential for decoupling resource and energy use in the building and construction sector under different scenarios. A theoretical potential analysis study has been carried out using qualitative decomposition analysis to identify the influence of various factors and the effect of technological interventions on resource and impact decoupling. Barriers and drivers within the existing policy framework and adaptable good practice international experiences that drive decoupling in the Indian context have been analysed. Subsequently, recommendations for policy initiatives have been made targeting the civil society, companies and political and financial decision makers at the regional, state and central level.

The soft power of biogas

Bettina Blümling

China is known internationally for its investment and dependency on oil imports, for its quest for uranium to supply its expanding nuclear power industry, or for the country's large-scale and competitive development of renewable energy. Less is known about its history of developing decentralized biogas infrastructure for the production of energy in rural areas. After 60 years of development, biogas recently has become part of China's South-South cooperation. Not only national, but also subnational actors engage in the distribution of this low-tech, but well developed technology. Research has so far not looked into these energy-related foreign relations of China. Based on document analysis, this presentation will review and try to characterize "the soft power of biogas" by analysing related actors, narratives, projects and their geographical distribution. The main objective is to find out in how far the "the soft power of biogas" has to be seen as a complementary strategy within China's general quest for energy, or as an independent strategy of its own to motivate an alternative pathway of decentralized bioenergy development in the Global South. As such, this presentation also discusses whether the Beijing Consensus (as understood by Stefan Halper) applies to China's foreign biogas policy.

SESSION C 1

THEORETICAL APPROACHES TO ENERGY TRANSITIONS RESEARCH

Pia Laborgne	Chair
Martin David *Magdalena Wallkamm* *Alena Bleicher*	Exploring holistic governance-modes of the rare earth-energy nexus
Alfredo Agustoni	Energy systems and Energy transitions beyond the Pleistocene: a theoretical framework
Martin Boucher	Sustainability Transition Theories and Decentralized Energy: Developing a Socio-technical Strategy
Ludger Gailing	Institutions, Materiality, Power and Space (IMPS): Presenting and discussing an analytical framework for conceptualizing energy transitions

Exploring holistic governance-modes of the rare earth-energy nexus

Martin David / Magdalena Wallkamm / Alena Bleicher

Renewable energy technologies suffer dependencies from rare earth elements which have been repeatedly subject to market shortages. This endangers the further global spreading of renewable energy

technologies. Two distinct types of dependencies are addressed in literature in regard to this rare earth-energy nexus:
1. Dependencies from environmentally-unfriendly mining practice,
2. Dependencies from Chinese mineral markets.

Both dependency-types highlight different spatial and geo-political dimensions and require diverse modes of governance, which are not sufficiently developed so far it seems: literature focusses either on environmental burdens caused by mining mostly with technical efficiency strategies, or on market-and price-dependencies. This obscures that both dependency-types are in relational nature to each other and that governance strategies address the rare earth-energy nexus rather lopsidedly, underscoring either the one or the other type of dependency, instead of issuing both. The presentation reveals the societal bonds of both positions and contrasts those to current governance options. Based on these facts more globally-holistic governance approaches to manage the rare earth-energy nexus are explored and further conceptualized.

Energy systems and Energy transitions beyond the Pleistocene: a theoretical framework

Alfredo Agustoni

In this paper, we try to propose and discuss some theoretical frameworks for an historical and sociological reflection about the relations between energy, power and society. All living systems (including social and urban systems) are meant to be as Energy converters, whose metabolism produces entropy. Several approaches, from Ostwald's one (proudly criticized by Max Weber) to Lotka's and Odum's, tried to frame biological evolution in general, and in particular human development, within the thermodynamic theory. Despite considering human development as part of the natural processes network, this kind of approach seems to focus on Humanity as a single biotic community, contending spaces to other ones, ignoring power relations within human societies themselves, again in the framework of the networks of life. To better analyse this former issue, some key ideas and concepts have been recovered, such as Mumford's idea of a "Mega-Engine" and Schumpeter's concept of technological clusters, further developed by some of his scholars (Georgescu-Roegen, McNeill, Freeman and Perez). The analysis of the "steam city" and that of the "motor city" clusters may be useful in order to better explain this point of view., within the framework of the energy transitions that has involved the capitalist development.

Sustainability Transition Theories and Decentralized Energy: Developing a Socio-technical Strategy

Martin Boucher

A transition to decentralized energy is not simply an engineering or scientific endeavor. It is as much a social transformation as it will be a technological challenge. Social, economic and environmental considerations will be critical, and a literature on "sustainability transitions" exists in which these considerations are linked to the technological challenges. The most prominent of these sustainability

transition theories are transition management theory, technological innovation systems, strategic niche management, and multi-level perspective on socio-technical transitions. I will present these theories in the context of decentralized energy in the Province of Saskatchewan, Canada. Saskatchewan's electricity sector is currently entering a unique transitional period that presents opportunities for new governance and technological innovations. A critical review of sustainability transition theories in the context of decentralized energy can provide insights into understanding the implications of a shift towards decentralized energy. Decentralized energy describes a strategy that includes various generation, distribution, and conservation technologies that work in tandem. It combines the use of micro-grid and storage technologies with a portfolio of electricity generation technologies such as co-generation, biomass power, small-scale wind, photovoltaic power, geothermal, and biogas. Demand-side management technologies and provisions such as energy efficiency and conservation are also central.

Institutions, Materiality, Power and Space (IMPS): Presenting and discussing an analytical framework for conceptualizing energy transitions

Ludger Gailing

Institutions, materiality, power and space are four core issues of social science research on energy transitions which are under-theorized in (energy) transitions research generally. The paper presents the principal conceptual results of a three year research project on different ways of theorizing energy transitions. The project aimed, firstly, at showing how institutions, materiality and power are conceptualized in various literatures with respect to their spatial dimensions and, secondly, at discussing the impacts of power, materiality and institutions on local and regional energy systems in transition. The paper maps out ways of researching the institutional change-materiality-power-space (IMPS) nexus in future: Firstly, important messages emerging from each of the four core issues will be conveyed; secondly, ways of looking across these four core issues and combining the conceptual approaches at the IMPS nexus will be presented; thirdly, the methodological opportunities and limitations of using the IMPS framework will be discussed at the example of energy transitions at the local and the regional level.

SESSION D 1 ENERGY, VULNERABILITY AND POVERTY	
André Schaffrin	Chair
Katrin Grossmann	Energy poverty in an intersectional perspective: on multiple deprivation, discriminatory systems and the effects of policies.
Sergio Tirado Herrero	From subordination to resistance and solidarity: transformative citizen action and energy vulnerability in Barcelona
Ute Dubois	Sharing knowledge and developing expertise in a context of professional fragmentation: the French network of energy poverty actors.
Benjamin Sovacool	Energy Poverty and Best Practices for the Promotion of Distribued Renewable Energy

Energy poverty in an intersectional perspective: on multiple deprivation, discriminatory systems and the effects of policies

Katrin Grossmann

Most definitions of energy poverty cling to the triangle of low incomes, high energy prizes, and low energetic quality of dwellings. This coincides with a search for the best quantitative indicators to detect energy poverty among households and to measure the extent and dynamics of the problem, using income and (potential) energy costs as the main predictors. From a point of view of social structuration theory, this is a rather simple understanding of a complex situation of deprivation. The presentation explores to what extent the intersectionality approach to social status and oppression or deprivation can stimulate a more complex understanding of how households fall into energy deprivation. The main claim of this landscape of social theory is that intersecting characteristics of people facing systems of discrimination turn them into disadvantages, which do not just add up but deepen at their intersections. In addition, it explores how policies work along the lines of such discriminatory systems. Using the example of the housing market, I will shed light onto how this is interesting for energy deprivation research and conceptual work.

From subordination to resistance and solidarity: transformative citizen action and energy vulnerability in Barcelona

Sergio Tirado Herrero

The substantial increase in energy poverty levels occurred in Spain since 2008 has run in parallel to a rapid surge in unemployment rates and electricity prices, resulting in thousands of households facing the risk of disconnection from basic utility services because of late payment or non-payment of bills. As a reaction to this perceived injustice, citizen-led initiatives such as the Alianza contra la Pobreza Energética are supporting vulnerable households in the metropolitan area of Barcelona – especially those in risk of disconnection from the electricity, natural gas and water networks. At the same time, they

raise awareness, give voice to vulnerable households, and provide a platform for citizens to become politically engaged around issues of domestic energy affordability and the transition to a fair and sustainable energy system. The paper studies the potential of such responses to transform individually experienced conditions of vulnerability into networks of citizen solidarity and resistance. By engaging with this community of mutual support, it is argued that affected households become more empowered to influence the conditions under which energy poverty arises, thus reclaiming their agency and confronting their status of isolated, vulnerable individuals subordinated to conditions set by more powerful state and corporate actors.

Sharing knowledge and developing expertise in a context of professional fragmentation: the French network of energy poverty actors

Ute Dubois

Energy poverty has emerged in the French policy debate during the last decade. Whereas the topic has received increased attention at the national level since 2010, the implementation of measures to fight energy poverty remains a local issue because energy poverty interventions require being in direct relation with the affected households. Often, energy poverty is only one topic among many others for the professionals dealing with it. And in each local structure, only few people are in charge of energy poverty. Therefore developing an expertise in a constantly evolving political context is a difficult task. However, expertise and knowledge regarding policies and methods are necessary to address the difficulties of people in the most appropriate way. This paper analyses the use of an Internet discussion group, the RAPPEL network, by professionals from different fields (social, habitat and energy) who seek information on methods and policies. This network can be analysed as a community of practice (Wenger, 1998). The goal of the present paper is to analyse the trajectory of the topics discussed, based on a discourse analysis of the conversations between members of this discussion group.

Energy Poverty and Best Practices for the Promotion of Distributed Renewable Energy

Benjamin Sovacool

This presentation demonstrates how small-scale renewable energy technologies such as solar panels, cookstoves, biogas digesters, microhydro units, and wind turbines are helping planners eradicate energy poverty and reduce greenhouse gas emissions. Through an in-depth exploration of case studies in Bangladesh, China, India, Laos, Indonesia, Malaysia, Mongolia, Nepal, Papua New Guinea, and Sri Lanka, the presentation highlights the applicability of different approaches to the promotion of renewable energy in developing countries. It also illuminates how household and commercial innovations occur (or fail to occur) within particular energy governance regimes. It lastly, and uniquely, explores successful case studies alongside failures or “worst practice” examples that are often just as revealing as those that met their targets. Based on these successes and failures, the presentation presents salient lessons for policymakers

and practitioners wishing to expand energy access and raise standards of living in some of the world's poorest communities.

SESSION E 1 DYNAMICS AND PATTERNS OF ENERGY USE PRACTICES	
Magdalena Wallkamm	Chair
Pia Otte	Solar membrane fruit drying for Mozambicanfarmers – A needs assessment
Thomas Roberts / Kavin Narasimhan / Nigel Gilbert	Understanding the dynamics of energy intensive domestic social practices
Gareth Thomas	Energy biographies, psychosocial research and sustainable living

Solar membrane fruit drying for Mozambican farmers – A needs assessment

Pia Otte

Undernourishment in developing countries is often attributed to a lack of methods for food preservation. In Mozambique, large amounts of fruit that ripen in a very short period are not consumed in due time and thus rot. Solar drying presents a solution that can limit food losses by preventing rotting. This paper is based on an interdisciplinary research project that aims to develop a technological solution that combines solar collectors with newly developed breathable membrane bags for drying and preserving fruits. Earlier research highlights the failure in the implementation of energy technologies due to a tunnel vision in engineering that did not account for social and cultural aspects. This paper applies Rogers' Innovation Decision Process to identify farmers' needs for solar fruit drying that will determine the shaping of the technology. Farmers in Mozambique were asked about their conventional fruit drying techniques and needs for food perseveration through a variety of participatory methodsbetween 07th and 21st of April 2016. This paper's preliminary findings will assist engineers in the successful development of the combined solar membrane drying technology.

Understanding the dynamics of energy intensive domestic social practices

Thomas Roberts / Kavin Narasimhan / Nigel Gilbert

Understanding the dynamics of domestic energy demand remains a major barrier to successful demand reduction. While governments around the world launch new demand reduction strategies based on outdated rational choice principles, domestic energy demand continues to rise. Alternative approaches, such as social practice theory, have challenged these assumptions but due to a lack of data and the perceived complexity of these approaches they have had little impact on policy making (Shove 2012).

In this paper we use an Agent Based Model (ABM), called Households and Social Practices in Energy Consumption Scenarios (HOPES), to

demonstrate the dynamics of households performing energy intensive practices (heating, laundry, visual entertainment, electronic communication). HOPES simulates these practices on an hourly and daily basis and evaluates the resulting energy consumption. The model is calibrated with data collected from both walking interviews around people's homes and energy monitoring equipment. The model also demonstrates how practices adapt at a societal level over longer time periods. The understanding gained by examining the dynamics of domestic practices and their energy use patterns on both short and long timescales allows us to explore the possibility of motivating short-term changes that can influence more permanent lifestyle changes.

Energy biographies, psychosocial research and sustainable living

Gareth Thomas

Controversies exist concerning how to bring about change in contemporary ways of living to address intractable climate and related risk issues. The energy biographies research project (www.energybiographies.org) has addressed this issue as part of its inquiries into the often highly embedded nature of routine, everyday energy practices that underpin patterns of energy demand, and how to open up reflective spaces for thinking about possibilities for change. Drawing on recently published work on how subjects experience and construct waste and wastefulness, the presentation will focus on the team's efforts to conduct methodologically innovative research involving a combination of narrative, and qualitative longitudinal data collection and analysis methods, and which offer rich research resources for the interpretation and analysis of empirical data. Our argument is that patterns of practices in and of themselves cannot be viewed as responsible for the continuance of unsustainability. Rather, there is a need to go deeper and broader in thinking about how people become participants in energy-using practices. A psychosocial perspective can offer more complex views of the embodied and affective relationships that texture subjects experiences of other elements, shape their interpretations and performances of particular practices, and opens up possibilities for understanding the dynamics of change in energy usage in and through time.

SESSION F 1 **COMMUNITIES, GRASS ROOTS AND SELF-ORGANISATION IN ENERGY TRANSITIONS**	
Aleksandra Wagner	Chair
Natalia Magnani	Italian renewable energy cooperatives between localism and social movement
Dick Magnusson	Municipalities as drivers and obstacles for Swedish grassroots for renewable energy production
Emily Creamer	Can the social impacts of community energy be measured? Results from a collaborative inquiry in Scotland

Italian renewable energy cooperatives between localism and social movement

Natalia Magnani

My presentation analyses the role of grassroots initiatives on renewable energies, with particular attention to the case of cooperatives. The international literature emphasizes the weakness of such initiatives in southern Europe as compared to Northern European countries. However, there is a lack of empirical research in this area as well as in-depth explanations for the lagging behind of Southern European countries.

In my presentation on the basis of case-study research centered on semi-structured interviews with civil society actors, I will analyze the main cooperative initiatives emerging in Italy in regard to the production, consumption, and recently the provision, of renewable energy. Moreover, taking the literature on renewable energy cooperatives in Northern Europe as a key reference point (e.g. Huybrechts and Mertens, 2014), I will explore differences and similarities of the Italian situation. In particular, I will highlight the tension between the existence of a spatially bounded model of community renewable energy development (Magnani and Osti, 2016), which seems to work well in small localities of Northern Italy, and the emergence of a wider national interest-based social movement (Diani, 1992). I will also highlight how attempts to scale up civil society's action involve in a significant way new forms of re-intermediation (Moss, 2009) between consumers and producers.

Municipalities as drivers and obstacles for Swedish grassroots for renewable energy production

Dick Magnusson

The literature concerning grassroots innovations (GIs) (cf. Seyfang & Smith, 2007) has grown in recent years, focusing on various forms of citizen initiatives for sustainable practices, spanning from organic gardening cooperatives to cooperatives for small-scale energy production. Research on GIs in a Swedish context has to a large extent been lacking, especially concerning energy production which is at focus in this paper. The argument is that the institutional context of historically strong municipalities is a major explanation for the lack of focus on GIs. The sustainable transition has to a large extent been implemented by the municipalities through their companies, from switching fuel in district heating companies to sustainable waste management. However, GIs do exist and using a web-based analysis have identified more than 200 cases and this paper focus on analyzing their characteristics and activities, as well as the institutional context in which they have emerged. The analysis shows a wide range of origin, goals and activities, and this is analyzed in relation to the institutional historical context.

Can the social impacts of community energy be measured? Results from a collaborative inquiry in Scotland

Emily Creamer

Community-owned renewable energy (CRE) initiatives are commonly expected to deliver a range of social benefits to the local community, including: skills and knowledge development; confidence and capacity building; increased community cohesion (e.g. Bere et al, 2015; Callaghan and Williams, 2014; DECC, 2014; Scottish Government, 2015; Slee, 2015). Yet, the evidence on which these pro-social assumptions of CRE are based is highly fragmentary and largely anecdotal. There is a stark absence of empirical research which has rigorously investigated the social impacts of CRE initiatives. There are various reasons for the weakness of the current evidence base, including: i) a lack of consistency in the definition of these social impacts across academic, policy, and practitioner literatures, ii) a lack of consensus on how to measure these phenomena in a way that could allow comparison between different CRE initiatives. This paper presents the results of a research project which sought to address these gaps by bringing together public, private, and third sector stakeholders in Scotland to co-design a framework to assess the social impacts of CRE.

17:00 – 18:30 PANEL DISCUSSION

Current Energy Policy in Germany

Conrad Kunze / Alena Bleicher

We cordially invite all conference participants to the panel discussion reflecting current developments in German energy policy. Germany's so-called *Energiewende* aims to restructure its energy sector in direction from nuclear and fossil fuels to renewable sources of energy. The challenges faced in such a transformative shift are numerous. Among these is the issue of transporting wind energy generated in the north to more southern areas of the country and the development of novel storage technologies. Furthermore, any hopes that the shift from a fossil and nuclear based energy system to a more renewable based system will make the German economy stronger have often been questioned.

Florian Schaefer / Stefan Taschner / Harry Lehmann	The Paris Climate Treaty and the future of coal in energy production in Germany The German Energy Transition and opportunities for novel forms of democratic participation of the sector. The question of infrastructure – a challenge for the emergence of a renewable energy system.

TUESDAY, 13 SEPTEMBER
9:00 – 10:30 PARALLEL SESSIONS 2

Session A 2
Local, regional national and international energy strategies, pathways and policies

Session B 2
Local, regional national and international energy strategies, pathways and policies

Session C 2
Theoretical approaches to energy transitions research

Session D 2
Energy, vulnerability and poverty

Session E 2
Dynamics and patterns of energy use practices

Session F 2
Communities, grass roots and self-organisation in energy transitions

SESSION A 2 LOCAL, REGIONAL NATIONAL AND INTERNATIONAL ENERGY STRATEGIES, PATHWAYS AND POLICIES	
Aleksandra Wagner	Chair
Roberto Cantoni	The 'new Norway' hoax: rise and fall of Poland's energy autonomy dream
Maria Świątkiewicz-Mośny	Do we (Poland) want to catch up Denmark? Wind energy in Polish media.
Krzysztof Niedzialkowski / Marcin Fronia	Destabilizing the coal Goliath? Institutional change concerning renewable energy production as a potential factor eroding existing energy regime in Poland
Jonas Urbanavičius	Legal challenges in implementing Paris Agreement in Lithuania

The 'new Norway' hoax: rise and fall of Poland's energy autonomy dream

Roberto Cantoni

In 2011, a report by the US Energy Information Administration attributed to Poland Europe's largest reserves of shale gas. While these estimates were later greatly downsized, the report initiated a 'shale gas frenzy' in Poland. Numerous gas companies ventures into shale gas exploration, prompted by the Polish administration, and over the background of a predominant political discourse: energy security. Such narrative focused on the need for Poland to acquire energy autonomy from Russia and on the image of Poland as a new energy titan, a 'new Norway'. However in the last two years macroeconomic conditions and difficult geology prompted foreign companies to leave Poland. On a parallel with such changes in the Polish gas map, the narrative centring on shale gas gradually disappeared from both the media and the political arena. In my talk I analyse possible explanations for the magnification of the security argument in the face of uncertain data about local geology through a discourse analysis (M. Hajer, The Politics of Environmental Discourse, 1995) of a series of interviews carried out locally with leaders of governmental scientific institutions, oil companies, think tanks, and NGOs.

Do we (Poland) want to catch up Denmark? Wind energy in Polish media.

Maria Świątkiewicz-Mośny

Denmark is the world leader in wind energy. More than 40% of Denmark's energy supply comes from wind power and the plan is to reach 50 per cent by 2020. In Poland the numbers are definitely different Only about 3% energy comes from wind (Lacal-Arantegui, Serrano-Gonazlez, 2015). Notwithstanding the Poles admire Denmark for its environmental friendly attitude Poland is even not ready for that race. Polish media treat renewable energy source not very seriously. Rather as a kind of hobby than serious alternative for mine industry (which dominate in Poland). Wind energy issues are dominated by economical perspective. (Świątkiewicz-Mośny, 2016) And even media present wind plants as an important factor of economic development citizens protest against almost every new investment (Świątkiewicz-Mośny, 2016). In presented paper, basing on research conducted in

polish papers and following the idea of Clarke (2009) situational analysis, I will try to defined the main source of barrier and identify the main actors who are against the idea of wind energy.

Destabilizing the coal Goliath? Institutional change concerning renewable energy production as a potential factor eroding existing energy regime in Poland

Krzysztof Niedziałkowski / Marcin Fronia

This paper presents the preliminary insights of a work-in-progress concerning Polish renewable energy policy. We looked at the process accompanying passing of the Renewable Energy Act in the Polish Parliament in early 2015. Renewable energy industry had been advocating introduction of a stable and comprehensive system of renewable energy production for years, however with little success. The proposal of the long awaited draft proved not satisfactory for environmental lobby especially with regard to the support for small scale individual producers (prosumers). Surprisingly, during the proceedings, the minority proposal of feed-in-tariffs for prosumers, was accepted despite governmental objections and discontent of utilities. The socio-political struggle behind this legal change can be interpreted as a step towards low-carbon transition supporting diffusion of renewables in a highly unfavourable context. We analysed parliamentary proceedings and media content to reconstruct the process, identify main actors involved and reconstruct their discourses. On that basis, guided by Geels' (2014) distinctions of power in relation to debates on transitions, we looked at four forms of power and resistance of fossil fuel regime and identified the ways in which actors supporting niche development were able to challenge them.

Legal challenges in implementing Paris Agreement in Lithuania

Jonas Urbanavičius

Paris Agreement is widely perceived as a major step in global climate change policy. However, new agreement does not set binding targets leaving for national governments to make a decision on national implementing measures.European Union, claiming its global leadership in this policy area has already adopted binding targets on renewable energy and greenhouse gas emmissions to be met by its Member States by 2030, although these targets are believed to be insufficient in order to achieve ambitious Paris goals. Paris Agreement from the EU law point of view is the mixed agreement; it has impacts on national law of EU Member States both directly as an instrument of international law, and through the EU law. Thus, any national implementing measures must also take into account EU legislation. Such double obligations might pose political and legal dilemmas. Author analyses the Lithuanian legislation currently in force in the area of climate change, as well as other related legal regulation, identifying areas that pose most challenges in fulfilling Paris obligations. Analysis is a part of the wider interdisciplinary research on strengthening social support for climate change policy measures on national and regional levels.

SESSION B 2 LOCAL, REGIONAL NATIONAL AND INTERNATIONAL ENERGY STRATEGIES, PATHWAYS AND POLICIES	
Xaquin Perez	Chair
Felix Jawinski	Labor in the Nuclear Industry: The Case of Japan and the Dark Side of 'A Bright Life'
Daniel Kremers / Emi Ichiyanagi / Conrad Kunze	Local Citizen Energy in rural Japan: Case Study on the village Yusuhara
Noriaki Yamashita	Troubles and corresponding policies in utility-scale solar PV project development in Japan
Yasushi Maruyama	External benefit of Renewable Energy Projects: As a Tool to Boost Social Acceptance in Japan

Labor in the Nuclear Industry: The Case of Japan and the Dark Side of 'A Bright Life'

Felix Jawinski

The key element for producing a 'bright life' (akarui seikatsu) in Post-war Japan was energy and its production. The working and living conditions of dispatched workers (haken rōdōsha), contract service workers (ukeoi rōdōsha), day laborers (hiyatoi) and many other forms of employment, which continue to exist beside the hegemonic and supposed almighty salaryman, have been recognized by social research on Japan in the past in a general way. Connecting these things to the labor market of the nuclear energy sector is nevertheless not common (yet). In my presentation, I would therefore like to focus on laborers working in the nuclear industry in Japan, to show the 'dark side' of the modernization process in Post-war Japan. The questions are: How is the labor market within this industry structured and what are the obstacles they experience every day.

Local Citizen Energy in rural Japan: Case Study on the village Yusuhara

Daniel Kremers / Emi Ichiyanagi / Conrad Kunze

The transition to renewable energy in Japan partially resembles European pathways with citizens´ bottom up initiatives that set up production capacities, financing schemes and consumption cooperatives, known as community energy or energy democracy (Angel 2015; Smith et al. 2015, Kunze/Becker 2014). In Japan, on the one hand small photovoltaic accounts for the large majority in numbers of installations, but on the other hand only for a very small proportion of the national production capacity (Raupach-Sumiya/Tezuka 2016). Despite not always favourable legal conditions, some grass roots initiatives continue to work, and attract public attention as a Japanese version of energy democracy. The specifics of the country are presented, in comparison to Europe, with a case study of the village Yusuhara and its successful renewable energy investment fund, drawing on interviews realised by the researchers in spring 2016.

Troubles and corresponding policies in utility-scale solar PV project development in Japan

Noriaki Yamashita

Since the enforcement of FIT in 2012, as utility-scale solar PV projects increase in Japan, troubles with local inhabitants or local governments are more frequently reported. The main causes of these troubles are landscape preservation, disaster prevention, protection of the living environment, getting consensus with inhabitants, and the lack of a national policy. Especially, local inhabitants in scenic mountainous communities worry about landscape changes, flood damages, and landslides by large-scale PV projects. In order to deal with these problems, local governments are adopting four types of policy measures: specifying restrictions on areas for solar PV projects, enacting environmental assessment prefectural bylaws, establishing municipal bylaws to protect local inhabitants' interests, and conducting administrative guidances to minimize negative impacts of solar PV projects. For example, the government of Nagano prefecture installed comprehensive policy measures in cooperation with municipal governments. Their goals are not only to resolve previous difficulties, but also to push for desirable renewable energy projects for local inhabitants. Local governments should have discussions with local inhabitants to determine what types of renewable projects are preferable and which policies are needed to achieve their goals.

External benefit of Renewable Energy Projects: As a Tool to Boost Social Acceptance in Japan

Yasushi Maruyama

The aim of this research is to describe the changes in social acceptance of renewable energy after Fukushima event in japan, and to show the possible scenario to make them more sustainable, both socially and environmentally in local society. Social acceptance for renewable energy has jumped up since 2011 in Japan. The number of projects and installed capacity has also been increasing. At the same time, however, there are social conflicts triggered by environmental issues. Based on interview survey for stakeholders and media analyses, this research will point out structural problem which brings conflicting reaction of stakeholders. Case studies show that the problem is not a risk itself, but also distribution of risk and benefit. Therefore, financial participation models have become popular to solve acceptance issue. There are also a few practices which bring external benefit into local society by networking rural and urban citizens. One remarkable case is a project of consumer cooperative in Tokyo, who tries to build up fair partnership with the region and handle their agricultural products. They develop more external benefit, by which distributional issue can easily be solved.

SESSION C 2 THEORETICAL APPROACHES TO ENERGY TRANSITIONS RESEARCH	
Pia Laborgne	Chair
André Schaffrin	Energy Epistemics as Drivers of a Local Energy Transition: How to Solve the Zero-Sum Game of Land-Use and Renewable Energy?
Andrea Amri-Henkel	Presenting a discourse analytic approach to research the political debate about the energy transition in respect of sustainability – according to the concept of "Vorsorgendes Wirtschaften"
Mirko Suhari	Transdisciplinarity and the Transformation of Energy Cultures – Following the Energy Transition through Sustainability Science
Catherine Butler	Governing Transitions in Energy Demand

Energy Epistemics as Drivers of a Local Energy Transition: How to Solve the Zero-Sum Game of Land-Use and Renewable Energy?

André Schaffrin

Over the last decades the governing of energy transition has witnessed significant changes with an increasing focus on the local rather the national level. The majority of research is on best-practices, and the role of social sciences is rather one of an outside observer to provide objective descriptions of local processes. However, as local energy transition becomes a mainstream solution for local problems, increasingly complex and contested challenges emerge and block localized developments towards sustainable communities. These challenges are routed in social conflicts over different forms of land-use such as nature conservation, agriculture, etc. This paper discusses the potential role of social science (among other disciplines) to launch a process of cooperation between scientists and local practitioners. Using the concept of an innovation group, we contribute a transdisciplinary and participative instrument to provide conflict resolution within the planning process of local energy transition in the county of Ahrweiler in Germany. The innovation group tries to elaborate a jointly developed and commonly accepted concept of sustainable land use in the county. On that basis, the project aims to develop a general model of an epistemic, participatory, and scenario-based decision making process to meet major challenges of sustainable land-use and energy supply.

Presenting a discourse analytic approach to research the political debate about the energy transition in respect of sustainability – according to the concept of "Vorsorgendes Wirtschaften"

Andrea Amri-Henkel

In its main expertise of 2011 the WBGU demands a "social contract for a Great Transformation" and defines energy as a central transformation field (WBGU 2011). As dominant discursive approaches

and narratives can foster or block transformation (WBGU 2011), discourses play a central role for the scope of transformation. If the energy transition is to correlate with a societal transformation towards sustainability as a whole, the debates about it have to focus sustainability, too. The presented doctoral research study analyses the formal political discourse about the energy transition in respect to sustainability. Thereby, sustainability corresponds to the German concept of "Vorsorgendes Wirtschaften" (pre-caring economy). As discursive approaches and narratives are transported significantly by political elites, the discourse of politicians in the German Bundestag since the introduction of the German Renewable Energy Law (Erneuerbare Energien Gesetz) was chosen as research object. A document analysis as well as qualitative expert interviews are conducted. In the session the research project is presented focussing on underlying discourse theoretical considerations and research methods. First results will be shown.

Transdisciplinarity and the Transformation of Energy Cultures – Following the Energy Transition through Sustainability Science

Mirko Suhari

The interest of this paper refers to the co-production (Jasanoff 2004) of emerging practices of transdisciplinary energy research and the sustainable transformation of energy cultures in Germany. Particularly the announcement of the German Energiewende but also discourses of sustainable development have triggered discussions whether scientific institutions and practices would be able to respond to the great challenge of transforming energy cultures to sustainability. Although the fundamental importance of science is widely acknowledged, the entanglement of science/technology and social order is a problem in its own right and questions about how position, relationship, and relevance of science in society are a prominent element of current debates. The paper draws the attention to current negotiations of science-society relations in the field of sustainable energy research in Germany, particularly in the realm of the state-driven research program FONA (Research for Sustainability). It focuses on current controversies around intensified participation of non-academic actors with regard to setting research agendas as well as to the collaborative production of socially robust and transformative knowledge. Within these negotiations, the paper argues, the energy transition unfolds itself as a transdisciplinary knowledge object (Knorr-Cetina 2001).

Governing Transitions in Energy Demand

Catherine Butler

In recent years, energy demand has been highlighted as problematic both in terms of the need to achieve reductions for low carbon transitions, and issues of affordability and access. Academic research and theory has highlighted the ways that government policies, strategies, and processes across wide-ranging areas of policy, from health to work and the economy, shape everyday practices with significant implications for energy demand. This work brings focus on the role the state plays in shaping energy demand far beyond what might traditionally be characterised as 'energy' policy. The project on

which this paper is based contributes to advancing understanding of the relevance of other policy domains for energy demand – taking UK welfare and employment policy as its focus. The paper will use qualitative interview data with actors involved in policy-making and/or policy implementation, to present an analysis of welfare and employment policy offering insights into the state's role in shaping and ultimately reconfiguring energy demand to meet challenges in this area. The analysis applies practice theory and theories of governmentality to interrogate the empirical data and highlight some of the key challenges related to creating a politics of transition.

SESSION D 2 **ENERGY, VULNERABILITY AND POVERTY**	
Matthias Gross	Chair
Adem Atmaca	Life cycle assessment of residential buildings constructed in urban and rural areas in South East of Turkey
Carmit Lubanov	Public opinion polls and design of climate and energy policy in Israel
Marja Ylönen	Regulation of safety in Energy Industry – Comparison between Finnish nuclear industry and Norwegian Petroleum industry

Life cycle assessment of residential buildings constructed in urban and rural areas in South East of Turkey

Adem Atmaca

Today, buildings are responsible for more than 40% of global energy used, and as much as 33% of global greenhouse gas emissions, both in developed and developing countries. In this paper life cycle energy analysis of residential buildings has been studied. The study which includes the literature review, methodology, formulations developed, the data used for such a comprehensive and detailed analysis and the application of this methodology to an actual residential building constructed in Gaziantep, Turkey. The proposed model focused on building construction, operation and demolition phases to estimate energy use per square meter over a 50 year lifespan. The analysis showed that primary energy use of BT1 and BT2 falls in the range of 384–558 kWh/m2 which is fairly higher compared to the other EU countries. It is found that the operating phase is dominant in residential buildings and contributes 76% of the primary energy requirements. The embodied energy of the buildings accounts for 24% of the overall life-cycle energy consumption. The results show that, because of the differences in building structures, living standards and air conditioning habits, life cycle energy intensity in rural residential buildings are 31% lower than that of in urban residential buildings.

Public opinion polls and design of climate and energy policy in Israel

Carmit Lubanov

The media discourse on the future of climate change is being conducted in Israel almost without the involvement of the scientific community. On the political level, part of budgetary cuts made by the government in 2015, the GHG mitigation program was suspended. Consequently, at the current rate, Israel would not meet its mitigation targets, whereas the impacts of climate change have direct implications on Israel, including advancement of the desert line and internationalized the energy market. To examine Israelis' quality of knowledge on climate change and their evaluation of government climate policy, AEJI conducted opinion poll in 2015. The survey questions were based on survey conducted in 2003[1] and compared to global surveys. The findings, cross referenced with participants' income and education, portraying that substantial percentage of high income earners believe that the impacts of 'global warming' have already began to influence. They also attest that they understand the terms fairly well, more than lower income, although in fact that had not expressed a higher level of knowledge than the general population. The full data will be presented at the conference.

Regulation of safety in Energy Industry – Comparison between Finnish nuclear industry and Norwegian Petroleum industry

Marja Ylönen

The objective of this study is to provide understanding of characteristics of Finnish nuclear industry and Norwegian petroleum industry in terms of safety regulation. Both industrial branches belong to high risk industries, and they also face similar challenges, such as ageing of infrastructure, decommissioning, complex projects with long supply chains as well as increasing automation and related safety and security concerns. In addition, the current economic depression may have implications on safety. Both industrial branches have adopted the principle of continuous improvement of safety. Yet, there are differences in the way safety is approached and regulation implemented. The data consist of interviews with inspectors from the Norwegian Petroleum Safety Authority and the Radiation and Nuclear Safety Authority from Finland, documents, such as safety requirements and reports. Method of analysis is content analysis. Conceptual frame consists of governance and regulation theories. The study shows differences in the safety regulation as regards understanding of safety, risk, and inclusiveness vs. exclusiveness of stakeholder involvement in safety issues, and institutional arrangements as regards safety.

SESSION E 2 DYNAMICS AND PATTERNS OF ENERGY USE PRACTICES	
Martin David	Chair
Marco Sonnberger / Michael M. Zwick	Energy efficiency and sufficiency strategies in private households
Giorgio Osti	Energy Accumulators Wanted! The hard search for people installing batteries in their home
Immanuel Stiess / Michael Kunkis / Corinna Fischer	Power efficiency classes for households: Transforming the energy system by sustainable everyday practices

Energy efficiency and sufficiency strategies in private households

Marco Sonnberger / Michael M. Zwick

Based on qualitative interviews, we investigate the drivers of diverging levels of energy consumption in private households. In order to select specific households, we could draw upon directly measured energy consumption data that had been collected in the context of the project "SEE – city with energy efficiency Stuttgart", funded by the German Federal Ministry of Education and Research. With 31 particularly heterogeneous households we carried out qualitative interviews focusing on their energy use and underlying rationales. We present seven prototypical households, which differ not only with respect to their living conditions and energy consumption level, but also refer to different subjective considerations regarding energy related decisions and practices. We discuss explanations for diverging energy consumption levels that are based on certain configurations of behavior patterns and motives, living conditions and resources as well as societal context conditions. Our results suggest that households – if at all – pursue strategies to mitigate their energy consumption that can be roughly divided into efficiency and sufficiency strategies. However, the promising combination of efficiency and sufficiency strategies seems to be unlikely to occur.

Energy Accumulators Wanted! The hard search for people installing batteries in their home

Giorgio Osti

The search presented in the abstract is focused on believes, attitudes and practices of people potentially ready to install an energy accumulation system (EAS) in their home. Intermittent energy sources, like that coming from PV panels, can be developed at their best if coupled with an accumulation system (chemical based battery, generally, but there are other technologies). Such installation is possible also at single house level. The technologies are marketable, even if quite expensive. Thus, the convenience occurs when household power cost is very high or in presence of incentives. An action-research has been planned for discovering and following a certain number of potential EAS adopters. The Participatory Action Research method allows to interact in different phases with the subjects, to learn progressively as they develop the idea of

accumulation and possibly decide to adopt. The hypothesis is they start a game with the environment. Then, not a rational choice due to an economic return, but an affair (romantic liaison) started for the pleasure of interact and win a race with other people, the environment, the destiny. Eugen Fink thoughts on games are used for framing the approach. The field research is at the beginning.

Power efficiency classes for households: Transforming the energy system by sustainable everyday practices

Immanuel Stieß / Michael Kunkis / Corinna Fischer

Ambitious climate goals cannot be achieved through technological innovations alone. Moreover, a significant change of everyday practices and consumption patterns is necessary. In our contribution, we will present insights from the research project 'Power efficiency classes for households'. The main objective was to develop an integrated approach supporting households to more easily estimate their total power consumption and better implement specific goals for saving power. The basic idea of the power efficiency classes is to provide households a simple comparative feedback tool on their total power consumption. Within a six-month-lasting field test this approach, including an on-site energy advice, was implemented in 100 households. The focus was set on mainstream energy users with an average or high level of energy consumption. The empirical findings suggest that the classification system is helping households to better assess their own level of power consumption and fits well to the needs of the target group. They findings also demonstrate that changes in energy consumption practices result from an interplay of motivational, situational and structural factors. We will finally discuss some implications on how the approach can be further used for scaling up sustainable consumption practices in relation to sustainable energy use.

SESSION F 2 **COMMUNITIES, GRASS ROOTS AND SELF-ORGANISATION IN ENERGY TRANSITIONS**	
Nona Schulte-Römer	Chair
Diana Süsser / Martin Döring	How to explore community-based energy transition? Benefits of a mixed methods and complexity approach applied on the German North Sea Coast
Alister Forman	Energy and Equity Revisited? The Role of Community Energy in Enacting Energy Justice: Evidence from a Welsh Case Study
Bregje van Veelen	Community energy in Scotland: a bottom-up transition?

How to explore community-based energy transition? Benefits of a mixed methods and complexity approach applied on the German North Sea Coast

Diana Süsser / Martin Döring

Community energy emerged into an important concept of local energy transition based on renewable energy technologies. This poses one

major question: How could one sufficiently study the social side of this development of a low-carbon energy transition? To empirically investigate community renewables, a mixed methods methodology was applied. This allows us to analyse different facets of community renewables and its interaction with the social system under consideration to get an in-depth understanding of the multifaceted and complex nature of community-based energy transition. To deal with the system complexity, we decided explore the place, local agents and their interactions. Five different qualitative and quantitative research methods have conceptually been combined. Of central importance were the grounded conduction of interviews and the combination of a standardised household survey feeding into an agent-based model. In this paper, we discuss why and how different methods complement each other and present obstacles, challenges and benefits encountered during the research process. Our application of a mixed methods approach reveals the benefits of an exploratory research design and of using diverse methods for focusing on emerging and dynamic themes. In particular, the methods are suitable to reveal and study different developmental layers contributing to community renewables.

Energy and Equity Revisited? The Role of Community Energy in Enacting Energy Justice: Evidence from a Welsh Case Study

Alister Forman

Questions of equity in the context of energy are gaining increasing prominence. Such interests beckon distinct imaginaries with respect to energy futures; leading to mounting calls for greater energy justice and for energy systems with social justice at their heart.

In Wales, the increased diffusion of community energy suggests one pathway through which such futures are being contested and enacted. Such projects represent profound societal interventions to transform energy systems in their image; heralding more local and distributed energy futures which are inherently and more holistically just. Despite community energy becoming increasingly ubiquitous, whether such projects contribute towards a more socially just energy system is ultimately more ambiguous in practice.

This paper presents a scalar approach to energy justice and considers the ways in which community energy represents a move towards a form of ‘energetic governance’; offering a critical understanding of the extent to which energy justice is or need be a feature of community energy. In practice, communities are motivated by a diversity of factors, whilst history of space and place play a significant role in constituting claims for justice reaching far beyond the realm of energy; seeking, both literally and metaphorically, a radical (re)- distribution of power.

Community energy in Scotland: a bottom-up transition?

Bregje van Veelen

Community-led renewable energy initiatives have received an increasing amount of attention in recent years. Presented as an alternative to large scale, privately-owned energy installations,

community energy has become associated with a range of positive assumptions about both the process and outcomes of these projects, e.g. them being fairer, more democratic, or equitable than other forms of energy production.

In this paper I will position community-owned energy as part of a broader trend of (primarily rural) community development policies and practices in Scotland. Although generally viewed as a 'bottom-up' or 'grassroots' movement, I will argue that centrally-led policies and preferences in Scotland have been strongly influential in shaping the socio-technological configuration of the community energy sector. These policies and preferences are underpinned by the assumption that community energy, and in particular specific forms of community

energy, not only provide socio-economic benefits, but do so in a fair and equitable manner. However, the normative assumptions underpinning the suggested range benefits of endogenous community development in general, and community energy specifically, has often inhibited a more critical discussion of how differences in power and capacity between groups and between groups and institutions will be addressed.

11:00 – 12:30 WORKSHOP SESSIONS 2

Jason Chilvers / Helen Pallett / Noel Longhurst	Energy and society in 'whole systems' perspective: Towards relational and co-productionist approaches
Lars Holstenkamp / Joerg Radtke	Community Energy: Current research and challenges ahead of a worldwide phenomenon
Felix Jawinski / Florentine Koppenborg / Christopher Hecker / Emi Ichiyanagi	Energy in Japan: 3 case studies

Energy and society in 'whole systems' perspective: Towards relational and co-productionist approaches

Jason Chilvers / Helen Pallett / Noel Longhurst

The task of achieving wholesale transformation to more sustainable low carbon energy systems promises to be a defining challenge of our age. In addressing this energy research and policy has struggled to get to grips with the societal dimensions of energy transitions particularly when it comes to questions of 'whole system' transformations. Systemic approaches to energy transitions - whether based on technical modelling or multi-level perspectives - tend to be technologically-centred and leave out questions of power, politics and

dynamics of societal engagement with energy. 'The social', democracy and 'the public' are most often invoked as fixed pre-given categories that that are somehow separate from energy, and studied in ways which attend to specific parts of the system. A more sophisticated understanding of social relations with energy is offered by relational approaches like practice theory or actor-network theory, which account for the hybridity, emergence, politics and mutual co-production of energy-related technosciences and society. Yet, while they have made important breakthroughs relational approaches have mainly consisted of situated accounts of societal relations with energy. This is beginning to change with the advent of more systemic approaches in relational theories, whether in terms of systems of practice, deliberative systems, or constitutional co-productionist work in STS. In this workshop we open up discussion over the prospects, possibilities and implications of thinking about energy systems and system change in more relational and co-productionist terms.

PART 1: Three paper presentations (15mins + 5 mins discussion for each paper)

Noel Longhurst / Jason Chilvers	Ecologising transitions: a relational co-productionist approach to energy system change'

In this paper we present a relational co-productionist approach to understanding and intervening in socio-technical system change and explore it in the case of energy transitions. Multi-level perspectives on socio-technical system change have been subject to recent critiques, not least over their limited attention to power, politics, actor dynamics, and performativity. In response we set out a more fully relational and co-productionist ontology of socio-technical change, grounded in science and technology studies (STS) and cognate disciplines. Our relational co-productionist approach sees systems as assemblages composed of multiple jostling sociomaterial collectives that all co-produce - comprise, produce and are shaped by - meanings, knowings, doings, and forms of organizing. System change occurs through relations between (i) diverse, emergent and 'decentred' collectives (ii) spaces of coherence (where collectives become part of wider stabilised zones of similarity or arenas of difference), and (iii) 'centred' constitutional stabilities in terms of durable complexes of socio-material arrangements. Our approach opens up new paths for reflexive and responsible governance of system change, namely: understanding situated collectives; mapping collective diversities; catalyzing new anticipatory collectives; and distributed reflexive governance. We illustrate our framework using examples from the energy system transition context in which the approach was developed.

Jason Chilvers / Helen Pallett / Tom Hargreaves	Rethinking energy participation as relational, co-produced and systemic: a new conceptual framework'

This talk develops a framework for understanding energy participation not only as relational and co-produced, but also at a systemic level. In contrast to more realist approaches to energy participation which take for granted the nature of the public and of public participation itself, our

framework accounts for the emergence of energy publics, their diversity, and the complex 'ecologies of participation' which shape and are shaped by them. Responding to the systemic turn across several different domains of work around public participation, from deliberative democracy to social practice theory, we develop our own systemic framework which is compatible with our relational and co-productionist approach. In contrast to the very situated focus of most relational and co-productionist studies, we draw on constitutional co-productionist work in STS to theorise the energy system as constitution and understand its co-productive relationship with practices of public and societal engagement with energy. The possible implications of our framework for studying and governing energy transitions and society are highlighted.

Helen Pallett / Jason Chilvers / Tom Hargreaves	Opening up energy participation: a systematic mapping of diverse public engagements in the UK energy system 2010-2015

This talk will report on findings from a systematic review of diverse instances of public participation related to the UK energy system 2010-2015 in the academic and grey literatures. The mapping reveals interesting patterns as to the who (publics), how (procedural formats), what (energy technologies & issues) and where (parts of the energy system) of energy participation in the UK, which go far beyond the conventionally assumed forms and sites of public participation around energy. Furthermore, this mapping also illustrates the broader processes at play – from the particular practices of engagement performed in research and governance, to different energy-related 'issue-spaces' and 'arenas of development' – shaping the energy system as constitution. The talk will explore in an empirical manner how to represent and understand 'whole system' energy participation and the varied societal dimensions of energy transitions it reflects. Moreover it will illustrate what this kind of approach can reveal about the UK energy system as constitution, specific collective practices of public participation and the relationships between the two.

PART 2: Two discussants provide immediate responses (5 minutes each)

PART 3: Wider workshop discussion (20 minutes)

Community Energy: Current research and challenges ahead of a worldwide phenomenon

Lars Holstenkamp / Jörg Radtke

Community energy is a worldwide phenomenon (Holstenkamp & Radtke, forthc.; Walker et al., 2008). While it has been an element of rural electrification in different places across the globe (e.g. USA, Argentina, India), it is re-emerging as a central element of early energy transitions from a centralized, fossil-fuel based system towards the use of renewable energies in some countries. It has attracted attention from various disciplines. Defenders say it enhances social acceptance of new technologies, even though it seems to be neither a necessary nor a sufficient condition. Moreover, research has shown that while it may be part of a self-regulatory process and enhance political

legitimacy, similar patterns as in relation to participation in other sectors can be found: mainly well-educated, medium-to-high income people engage in community energy projects. Yet, there is a considerable heterogeneity observed within the community energy sector within and across different countries. Moreover, changes in regulations put pressure on existing community energy companies to develop new business models (Müller et al., 2015).

Taking up these phenomena the workshop provides room for presenting results from current research on community energy and for discussing challenges ahead. Moreover, it is intended as a place for inter- and transdisciplinary exchange.

Energy in Japan: 3 case studies

Felix Jawinski / Florentine Koppenborg / Christopher Hecker / Emi Ichiyanagi

This workshop deals with energy related issues in Japan and aims to illuminate these issues by considering different points of view. First, Florentine Koppenborg will take a look at political implications of the nuclear accident at the Fukushima Daiichi NPP in the form of changes in the field of nuclear regulation. Connected to this is the presentation by Christopher Hecker, who elaborates on how energy policies are implemented in Germany and Japan from a comparative perspective. The third presentation by Emi Ichiyanagi will compare how the media in Germany but also in Japan covered the nuclear accident as well as which policy changes they championed in response. Accordingly, the panel includes the following three presentations:

Florentine Koppenborg	Reforming nuclear regulation after 3/11: An inconspicuous transformation
Christopher Hecker	Top down energy policies, and bottom up approaches. A country comparison between Germany and Japan focusing on the field of nuclear & renewable energy
Emi Ichiyanagi	Comparative analysis of media coverage about energy policy after Fukushima in Germany and Japan

TUESDAY, 13TH SEPTEMBER

13:30 – 15:00 PARALLEL SESSIONS 3

Session B 3
Spatial and geo-political dimensions of energy transition pathways

Session C 3
Theoretical approaches to energy transitions research

Session E 3
Dynamics and patterns of energy use practices

Session F 3
Communities, grass roots and self-organisation in energy transitions

SESSION B 3 SPATIAL AND GEO-POLITICAL DIMENSIONS OF ENERGY TRANSITION PATHWAYS	
Giorgio Osti	Chair
Clare Hanmer	Networks of heat: an actor-network approach to historical heating pathways
Celine Bout	All things considered? – A review of long term energy planning models applied in Ireland, UK and Denmark
Norbert Kohlheb	Possible energy transition pathways in Hungary
Thounaojam Somokanta / Mukesh Lakum	Transitions in Risk Society: Regional Case of Gujarat Solar Park

Networks of heat: an actor-network approach to historical heating pathways

Clare Hanmer

Based on case studies of historical transitions in heating technologies, techniques from Actor Network Theory are used to demonstrate how particular heating technologies become established when different aspects of the heating system network come into alignment, forming stable configurations which resist changes to new types of heating. Applying the method of actor-network analysis highlights how the physical infrastructure of heating is interwoven with, and shaped by, social networks involving individual consumers, companies and governments. The presentation examines how gas central heating has become so dominant in the UK (where it is used by 83% of households), tracing this back to technology developments in the 1950s and the conversion to North Sea gas between 1967 and 1976. The British experience is compared with the transition in Denmark (where the majority of homes are connected to district heating) and this case study is used to illustrate how a country's traditions and institutions can affect heating system choices. The importance of organisations that take a co-ordinating role during transitions, aligning the interests of different actors in the heating network, is discussed.

All things considered? – A review of long term energy planning models applied in Ireland, UK and Denmark

Celine Bout

This paper examines the quantitative energy scenario modelling undertaken since 2009 for the three European countries with the highest amounts of wind energy full-load hours: Denmark, Ireland and UK. All three countries have witnessed significant development of their wind sectors over the past three decades. The countries' energy sectors and industries have been vastly modified, their policies continuously adapted, and their populations have become unevenly accustomed to wind farms in the landscape, not without protest. This paper aims to get a deeper understanding of the types of data considered by the energy models used in the three countries, in their

efforts to create energy road-maps, and thus highlighted by scenario papers and policies. This research is achieved through the systematic review of 410 papers dealing with the subject, which led to 15 articles and three NREAPs. Covering Denmark, Ireland and UK creates a comparative output of the type of data inclusion and assumptions made. Considering that energy data are inevitably tied to population behaviours and political orders, this research contributes to a critical reflection on quantitative energy scenario work, and the usual models' ability to represent future energy paths, if socio-institutional dynamics remain mostly ignored by the process.

Possible energy transition pathways in Hungary

Norbert Kohlheb

Energy democracy offers the possibility to create a decentralised energy system that supports social development since local energy production provides, beside self-sufficiency, independence and income diversification. Additionally, renewable energy deployment (RED) implemented in a democratic framework establishes a positive feed-back loop for sustainable resource management in local societies and increases energy consciousness. In Hungary RED seldom happens along a thoroughly prepared participatory energy strategy, rather randomly appearing subsidy schemes and single interests influence investment decisions. This is mainly because the common public does not consider energy production as their own field of action and the right of decision is rarely delegated to stakeholders participating in a common planning process. Consequently, decentralised municipal and household level renewable energy deployments are neglected. Additionally, the formerly state-owned and fossil fuel based energy companies, representing the central energy production scheme, also turned to renewable resources just like in many Western countries. The dominance of these kinds of renewable energy deployments demonstrates the possibility of a centralised renewable energy system with all its pros and cons. Both the weaknesses of the participatory decentralised RED and the growing relevance of the centralised alternative endanger the emergence of energy democracy in this country.

Transition Experiments in Risk Society: Lesson from Gujarat Solar Park

Thounaojam Somokanta / Mukesh Lakum

This paper begins with research question, how significant the theory of risk society in the field of sustainability transitions in order to understand the geography of Gujarat Solar Park? Multi-Scalar MLP has been adopted to explore the regional transition experiments in the case of Gujarat solar park. Our research addresses the establishment of a new sets of socio-technical configurations in the form of networks, learning, social practices, experimentation, visions and expectations of the niche actors and institutions in the park. It argues that transition towards sustainability at the regional scale is an essential step for achieving sustainable low carbon society. Ulrich Beck's term environmental bads and side effects (such as climate change, air pollution and green house emissions etc.) have been challenged in the

age of reflexive modernization of risk society by transition thinkers and practitioners at the local settings.

SESSION C 3 THEORETICAL APPROACHES TO ENERGY TRANSITIONS RESEARCH	
Martin David	Chair
Felix Ekardt	Defending Environmental Economic Instruments against the Economists and their Opponents: Strengthening a Major Tool of Transformation to Sustainability
Xaquin Perez-Sindin Lopez	"Coal [from Indonesia] is our life": understanding local resistance to energy transition
Nadjma Ahamada / Jean Daniélou	Energy efficiency: People or Place?

Defending Environmental Economic Instruments against the Economists and their Opponents: Strengthening a Major Tool of Transformation to Sustainability

Felix Ekardt

Friends and critics of economic instruments for environmental policy presuppose a connection between these instruments and neo-classical economics. This presentation aims at showing that economic instruments might also (or especially) be the most promising policy approach for transformation towards sustainability, if basic assumptions of (neoclassical) economic are not regarded as convincing. This concerns four aspects in particular, based on a governance, ethical, and legal analysis. (1) There is no necessary connection between economic instruments and highly contentious economic evaluation respectively cost-benefit analysis. (2) Economic instruments are not necessarily based upon a homo oeconomicus anthropology. (3) Friends and critics presuppose that economic instruments just stimulate technical innovation and thus make environmental protection and economic growth compatible. It is however to be doubted whether environmental protection will be successful if it is solely based on technical solutions. If this is not the case, the necessity for sufficiency contributions in environmental policy might prevent continuous economic growth. But economic instruments can also trigger sufficiency, and they can do it in an economically efficient way. (4) Economic instruments are discussed as solutions for isolated environmental problems; but they are capable of addressing different environmental problems at the same time.

"Coal [from Indonesia] is our life": understanding local resistance to energy transition.

Xaquin Perez-Sindin Lopez

In the 1950's a book regarded as a classic Coal Is Our Life, focused a study on a pit town in West Yorkshire, the folk, their aspirations their lives. The danger and insecurity in the coalfield as well as the high dependence of the community upon one single workplace led authors

to talk about the existence of a great social cohesion or *Gemeinschaft*. Hence, coal was not only a source of employment but the guarantee of community survival. This paper returns to this classic book to reflect on sociological obstacles of energy transition by mean a discursive and ethnographic analysis of the largest coal-fired power plant´s adjacent community in Spain. Despite the closure of the opencast mine in 2007, power plant remained active and fuelled by coal imports from emerging economies such as Indonesia. Analysis shows how coal is still seen not only as a guarantee of community survival but also an important identity element, particularly among pseudo-miners, that is, the truckers responsible for transporting the coal from the nearest port. Results suggest that the implementation of energy transition strategies is also subjected to the influence power of certain local and regional forces on the central government.

Energy efficiency: People or Place?

Nadjma Ahamada / Jean Daniélou

The expression “People versus Place debate” refers originally to urban sociology (Kain, 1968, Donzelot, 2003) and more precisely to the analysis of two kinds of public policies that are dealing with social housing, poverty and unemployment in urban areas. When the “people-based” approach relies on the very idea of empowerment, the “place-based” approach is rather based on the idea that the material degradation of urban areas is detrimental to the people that are living in such areas. Here, we propose to consider the fact that this opposition between “place” and “people” could also be used to understand how the energy transition’s issue is structured at the household level. We will first confront the realm of behavioral approaches (how to achieve energy efficiency thanks to virtuous practices?) to building’s techniques (thermal insulation for example), two approaches that are trying to achieve the same goal (energy efficiency in households). The objective of our communication will be to determine to what extent those two different means (virtuous practices thermal insulation) could be additional or not.

SESSION E 3 **DYNAMICS AND PATTERNS OF ENERGY USE PRACTICES**	
Francoise Bartiaux	Chair
Veronica Galassi / Reinhard Madlener	Higher energy savings or thermal comfort? – New insights on the rebound effect in retrofitted residential buildings
Mikael Hildén / Anna Lemström / Paula Kivimaa / Miimu Airaksinen	Energy Efficiency in Buildings in the City of Helsinki – A Long Run Sustainability Transition
Janine Morley	How do changing IT and media practices at home matter for energy demand?

Higher energy savings or thermal comfort? New insights on the rebound effect in retrofitted residential buildings

Veronica Galassi / Reinhard Madlener

Energy retrofits of residential dwellings, cet. par., result in higher room temperatures.

This physical effect partially explains the increase in energy demand which often follows the implementation of refurbishments – a phenomenon known as technical “rebound effect”(Sorrell and Dimitropoulos, 2008). Irrespective of whether individuals enjoy higher temperatures or not, they will most likely change their interaction with the building to adapt to the new comfort situation in a way that also depends on previous habits (Maréchal, 2010).Despite the relevance of such behavioral impact for explaining rebound, there seems to be a severe lack of empirical studies addressing it. By means of a Discrete Choice Experiment conducted among some 3,000 tenants and owner-occupiers in Germany, we investigate preferences for behavioral changes to adjust thermal comfort in retrofitted buildings. Our focus is on whether and how respondents trade off part of the energy savings against higher comfort levels. Our model also accounts for the type of control over the room temperature, adjustment time, presence of obstacles in proximity of windows, thermostats or radiator valves, and clothing. By quantitatively measuring the impact of each factor in the decision making process we contribute to the ongoing rebound debate in the energy economics and social psychology literature alike.

Energy Efficiency in Buildings in the City of Helsinki – A Long Run Sustainability Transition

Mikael Hildén / Anna Lemström / Paula Kivimaa / Miimu Airaksinen

Policies call for a rapid transition towards near zero-energy buildings. The demands for such radical change have been voiced repeatedly and are also part of EU policy. There are great expectations on this transition in housing, but it brings to the fore both opportunities and stumbling blocks of sustainability transitions. The most obvious stumbling blocks are related to the long time needed spans because of path-dependencies and the slow dynamics of housing infrastructure. Therefore one cannot only rely on the emergence of new buildings, but one should also pay attention to the existing building stock. The opportunities lie in measures that achieve better new houses and improved existing houses. Using empirical date from the City of Helsinki we show that the achievements to date in energy efficiency are the result of a combination of external chocks (energy crises), technological development (building technology and R&D investments) and policy forcing (building regulations). The legitimacy of the transition has increased with respect to new buildings, but significant spill-over effects can be seen in the existing building stock. This effect should be recognised in the design of new policy measures for building.

How do changing IT and media practices at home matter for energy demand?

Janine Morley

The energy used by information and media technologies has grown over recent decades, both within households and across the infrastructures that support internet-connected devices. This paper reports on research with UK households that interrogates the basis of these changes in the everyday practices wherein information technologies are appropriated and embedded. By generating detailed accounts of everyday activities through diaries, interviews and electricity monitoring, and by combining this with existing secondary data, primarily from consumer and time-use surveys, this research aims to build insight into how such practices are changing. Timing, location, sequences and combinations with other activities, including those of other household members, are key. But so too are the historical trajectories and wider sets of relations, particularly commercial and government, within which practices 'at home' take shape. This paper critically reflects on the understandings of change generated (e.g. by zooming in and zooming out, (Nicolini, 2009)); and, in turn, the relevance of these insights for an 'energy agenda', specifically for improving understanding of energy trajectories (past and future) and how these might be shaped to reduce demand.

SESSION F 3

COMMUNITIES, GRASS ROOTS AND SELF-ORGANISATION IN ENERGY TRANSITIONS

André Schaffrin	Chair
Lukas Kala	Voluntary Simplifiers: Sources of Inspiration for Sustainable Energy Future?
Henk-Jan Kooij / Marieke Oteman	The role of Grassroots Initiatives in the Dutch renewable energy transition
Rebecca Ford / Malcolm McCulloch	Prosumer Collectives and Transitions to a Fractal Like Grid
May Lacey-Barnacle	Energy justice claims in the civic energy sector: the case ofcommunity-owned solar projects in Bristol city

Voluntary Simplifiers: Sources of Inspiration for Sustainable Energy Future?

Lukáš Kala

It is generally accepted that consumerist lifestyles is one of the major contributor to the energy crisis and the climate change. Therefore, any transition to a sustainable society will require people to move to energetically and materially simpler lifestyles. While in recent decades sociological studies have explored pro-environmental practices and more sustainable lifestyles, the resilience of such lifestyles and their reproduction has been under-researched. The present study fills a gap

researching reproduction of environmentally friendly lifestyle. The paper is based on data from the third wave of the unique longitudinal qualitative research (1992, 2002, 2015) on households and individuals living in voluntary modesty (Librová 1999; 2008). Questions have been raised about the existence of a group with a character analogous to that original sample of 1992 in contemporary Czech society? Adopting the technique of in-depth interviews and observation in households, we focus specifically on aspects of everyday consumption practices (incl. energy consumption). The sources of their inspiration were investigated. The transmission of pro-environmental values was examined. Preliminary results support the assumption that voluntary simplifiers could represent new pathway for a desirable sustainable future.

The role of Grassroots Initiatives in the Dutch renewable energy transition

Henk-Jan Kooij / Marieke Oteman

Central steering of society has been replaced by governance, giving way to bottom-up initiatives from society, especially in the field of renewable energy (RE). In some instances these grassroots are able to influence the mainstream, while others don't. The question is what the role of grassroots is, and can be in the energy transition and how grassroots are influenced by their institutional environment. To study the role of grassroots in the Dutch RE sector, a research project commenced with a focus upon the role of Grassroots Initiatives (GIs). These GIs are diverse and vary from cooperatives, citizen groups, businesses to local governments. As 'bottom' up initiatives, they have an important potential, yet much of it remains untapped due to regulatory, economic and political constraints. To overcome this, GIs connect among each other to exchange knowledge, marshal public support and forge political alliances. The current paper presents an overview of the Dutch grassroots initiatives in relation to the institutional environment. We carried out an web-based analysis of Dutch GIs, and supplemented the analysis with qualitative methods. We find a rich variety among the 400+ initiatives in our database, and we explain their emergence and heterogeneity through local, regional and national institutions.

Prosumer Collectives and Transitions to a Fractal Like Grid

Rebecca Ford / Malcolm McCulloch

The decreasing cost of edge technologies such as solar generation and battery storage, and improvements in ICT and energy management technologies, are enabling consumers to interact with energy systems in entirely new ways. Changing market dynamics, policy settings, and grassroots innovations are creating a shift of power, driving toward a pathway where customers are able to engage more dynamically with a smarter grid. Drawing from both a meta-review of international literature and interviews with early adopters of edge technologies in the UK and New Zealand, this work uses the Energy Cultures Framework (Stephenson et al., 2010; 2015) to explore how prosumer are developing and interacting at different scales, across household, communities, and regional, in different contexts. We identify the actors involved, the drivers, barriers and enablers of transition, new expectations and norms around energy, and the policy,

infrastructure and business model changes that have supported transition and emerged from it. Such an understanding of how change is emerging from community and grassroots innovation can help support enquiry into the broader implications on existing infrastructure, incumbent industry, and local and national energy strategies, pathways and policies.

'Energy justice claims in the civic energy sector: the case of community-owned solar projects in Bristol city'

May Lacey-Barnacle

Energy justice claims within distributed generation transition pathways, such as the Thousand Flowers pathway, broadly focus on two key factors; the geographical siting of generation technologies close to or within areas of high socio-economic deprivation; and the mechanisms of distribution around the environmental, social and economic benefits offered by these projects. Stemming from the growth of the UK's civic energy sector, these claims invariably draw upon the 'triumvirate of tenets' in energy justice theory – procedural, distributive and recognition justice – to highlight the complex social tensions at the heart of the growing deployment of environmental goods in a time of austerity.

Bristol's community energy sector centres on the diffusion of solar PV, with a small diversity of community-oriented legal structures employed, actor's values and aspirations are shown to determine the nature of energy justice claims and in turn, shape different legal models around the particularities of those claims. In addition, networks and intermediary organisations prove to be influential in shaping energy justice in Bristol, contributing towards highlighting the social impacts of different community models and mediating diverging local energy justice claims. Drawing on qualitative research data, this paper provides new evidence of the multifaceted justice implications of decentralised energy transitions.

TUESDAY, 13TH SEPTEMBER

15:00 – 16:30 PARALLEL SESSIONS 4

Session A 4
Local, regional national and international energy strategies, pathways and policies

Session C 5
Smart meters, smart appliances, smart grids, smart everything?

Session D 4
Public participation, democracy and justice in 'old' and 'new' provisioning

Session E 4
Dynamics and patterns of energy use practices

Session F 4
Communities, grass roots and self-organisation in energy transitions

SESSION A 4 LOCAL, REGIONAL NATIONAL AND INTERNATIONAL ENERGY STRATEGIES, PATHWAYS AND POLICIES	
André Schaffrin	Chair
Gerhard Fuchs	The Bio-Village Movement in Germany – agrarian backwardness or future oriented re-organization of the energy system
Karin Schakib-Ekbatan / A. Wagner	User satisfaction in focus – Implementation of survey results in the German Assessment System for Sustainable Office Buildings
Andrea Bues	Contested pathways for wind energy development: Comparing policies and opposition in Canada and Germany
Matthias Sebastian Klaes	Energy policy and the politics of non-knowledge – the case of hydraulic fracturing in Germany

The Bio-Village Movement in Germany – agrarian backwardness or future oriented re-organization of the energy system

Gerhard Fuchs

Germany is in the process of transforming its system of electricity generation and distribution. Available research has shown (e.g. Geels et al. 2016) that the process of transformation was advanced by a variety of civil society actors, keen on dismantling an old centralized, undemocratic, environmentally unsound and unhealthy system, and replacing it by a new one, closer to the people, decentralized and using renewable energies. One type of transformative activities is linked to the bio-village movement, which is to be found in mainly agricultural areas and which is especially relying on bio-mass as a transition technology. The presentation will put these activities in the context of the German electricity transition and analyze actors involved in this movement, their driving motivations and strategies. The empirical basis of the presentation will be on the one hand a structural analysis of the 28 bio-communities in the southwestern state of Baden-Wuerttemberg and an in-depth analysis of two cases, which feature different transition dynamics. Theoretically the presentation is informed by recent thinking in relational sociology (Fligstein/McAdam 2012; White 2009; Martin 2012; Padgett/Powell 2012), which emphasizes the importance of looking at the genesis of (new) structures – like new structures for the generation and supply of electricity.

User satisfaction in focus – Implementation of survey results in the German Assessment System for Sustainable Office Buildings

Karin Schakib-Ekbatan / A. Wagner

Offices should be of high functionality to provide a long-term supportive environment. Against the background of sustainable construction and energy efficiency users' well-being plays an important role in the planning and evaluation of office buildings in political initiatives. As a result of political and societal goals the German Federal Building Ministry launched the ‚Assessment System for Sustainable Office Buildings'. User satisfaction analyses are integrated as a proactive

component. A questionnaire was developed based on theoretical concepts and findings from environmental psychology. Based on data gathered from 45 office buildings (*N*= 1.098) the questionnaire was validated by factor analysis and reliability testing revealing good values. An overall building index was developed which includes energy-relevant (e. g. room temperature, lighting) as well as socially relevant aspects (e. g. privacy). The index value held from a survey is integrated in the points system of the assessment. While it is a reasonable and important step to include the users' everyday experiences at the workplace in the assessment some limitations are to be considered regarding numerical values respectively an index. Against the background of ‚real experiments' implications of the index regarding the link between energy and societal issues will be illustrated based on building examples.

Contested pathways for wind energy development: Comparing policies and opposition in Canada and Germany

Andrea Bues

Responding to the global imperative to cut back on greenhouse gas emissions to combat climate change, many jurisdictions around the world seek new pathways and policies for their energy sector. Wind energy is arguably the most promising, albeit the most contested renewable energy technology in this regard. While the literature on disputed energy strategies has mainly focused on the origins of anti-wind sentiments following single-case study approaches, this paper takes a fresh approach by putting disputes over wind turbines into a perspective of ideas, power and politics. The paper compares discourses and institutions in disputes over wind turbines in two beacon jurisdictions for wind energy development in North America and Europe: The Canadian Province of Ontario and the German federal state of Brandenburg. The paper applies the theoretical lens of discursive institutionalism (Schmidt 2008) and the concept of depoliticisation (Flinders/Buller 2006; Hay 2007) to underscore the political and institutional embeddedness of disputes over specific energy strategies, pathways and policies.

Energy policy and the politics of non-knowledge – the case of hydraulic fracturing in Germany

Matthias Sebastian Klaes

The exploitation of shale gas and oil by hydraulic fracturing, or fracking, is one of the most controversial topics in current energy debates. Conflicts on fracking are strongly influenced by uncertainties and non-knowledge, as there is no scientific evidence that provides certainty through established knowledge about possible benefits or risks of this technology. From a Sociology of Ignorance perspective (Peter Wehling), the question here is how missing knowledge and non-knowledge are becoming a topic of debate and how actors involved in the conflict use them as a political resource. Drawing on the Sociology of Knowledge Approach to Discourse (Reiner Keller) and on the Sociology of Critical Capacity (Luc Boltanski), I suggest an analytical framework to examine the modes of knowledge production and the practices of evaluating knowledge claims about fracking under the current conditions of uncertainty and non-knowledge. Subsequently, I

will apply this approach to case-studies from Germany that illustrate different facets of the politics of non-knowledge in the field of fracking since 2010. Finally, I intend to provide a contribution towards understanding current conflicts on environmental and technological policy surrounding the energy turn in Germany.

SESSION C 5 SMART METERS, SMART APPLIANCES, SMART GRIDS, SMART EVERYTHING?	
Ana Horta	Chair
Alexander Wentland	Disruptable technology: cybersecurity in the transformation of energy infrastructures
Wilfried Konrad / Dirk Scheer / Esther Hoffmann / Eugen Pissarskoi	Societal perspectives on smart grids: experts' and consumers' views on the digitalization of the energy system
Nona Schulte-Römer	Is that smart? Opening 'black boxes' in urban public lighting
Sabine Hielscher / Paula Kivimaa	The UK smart meter rollout: Dynamics of expectations

Disruptable technology: cybersecurity in the transformation of energy infrastructures

Alexander Wentland

The electrical grid is arguably the most critical infrastructure in modern societies. With the recent shift towards renewable energy and ICT-enhanced distribution systems, this infrastructure has become vulnerable to a new host of threats carried out from the digital world. Malicious cyberattacks can severely disrupt or damage large technical systems, as the computer worm "Stuxnet" demonstrated by wrecking Iranian uranium enrichment facilities in 2010. Individual households have become more open to attacks as well, as appliances are about to turn into communicating agents in the "internet of things." The academic discussion on energy and society has mostly neglected this downside of today's ongoing transition towards sustainable technologies. In my talk, I draw upon analytical tools from STS and security studies to conceptualize the changing relationship between materiality and power, technology and politics, and the unintended consequences of innovation. In particular, I want to focus on the technical and legal strategies companies and regulators have deployed to counter potential threats. I also examine the broader sociotechnical imaginaries linked to security and vulnerability. The goal is to explore the infrastructural underbelly of energy transitions and propose fruitful questions for further empirical research.

Societal perspectives on smart grids: experts' and consumers' views on the digitalization of the energy system

Wilfried Konrad / Dirk Scheer / Esther Hoffman / Eugen Pissarskoi

Growing shares of renewable energies in electricity portfolios require new approaches for matching energy supply and demand. Making power grids smart by smart meters, demand side management, variable rate tariffs etc. is considered key to meet the challenges triggered by the rise of renewable energy. Transforming the energy system into a smart grid has long time been discussed in the sense of technical solutions for technical problems. In recent years, social science energy research has created awareness into the genuine socio-technical nature of smart grids (Skjølsvold et al. 2015; Verbong et al. 2013). In fact, the digitalization of the energy system transforms technical, economic, and societal structures, roles, business models, and processes in future power networks. We asked energy experts within a Group Delphi exercise as well as 30 consumers within three focus groups on their evaluations, expectations, and preferences of smart grids. We find that although experts and consumers recognize the underlying rationale of smart grids, they perceive important risks regarding data protection, data security, autonomy and social inequality and doubt that smart grids considerably contribute to a more efficient energy system. Acceptance and success of digital energy systems hence strongly depend on the way these risks are addressed.

Is that smart? Opening 'black boxes' in urban public lighting

Nona Schulte-Römer

City lights have always been closely intertwined with energy and society, as prominently described by historians like Thomas P. Hughes, Chris Otter and David Nye. Their accounts also draw attention to the standardisation and 'black boxing' of energy measuring techniques, maintenance services and gas or electric networks in the context of the electrification. In this presentation I will outline how the current digitalisation and transformation from electric lighting to 'smart' electronic lighting systems is calling for a reopening of these 'black boxes'.

Energy savings are a key argument for 'smart', digitally programmed lighting systems. Customised lighting solutions, adaptive light control and dimming schedules help to reduce light levels and thus the energy consumption of cities. But the new lighting technologies also challenge well-established relationships between urban light users and energy providers as they make it necessary to renegotiate the ways in which energy and energy infrastructures are used for illuminating cities – on a local, national as well as transnational scale.

In my presentation I will explore the on-going transition towards digital lighting systems and ask: what makes them smart? Based on ethnographic research, I will give examples of clever and unwise uses of energy-saving lighting technology and highlight the need for opening 'black boxes' in urban public lighting in the context of energy and society.

The UK smart meter rollout: Dynamics of expectations

Sabine Hielscher / Paula Kivimaa

Smart meters have taken a prominent role in the UK government's domestic energy demand reduction discourse over the past decade. Over the last few years, a substantial regulatory, policy and organisational apparatus has been established, setting in motion the rollout of 53 million residential and non-domestic gas and electricity meters by 2020. Given that a range of expectations and visions by multiple actors (such as policymakers, companies and NGOs) exist around the rollout and have implications on the legitimacy of policies, the early identification of alternative expectations and their possible deflations over time may be crucial to achieve associated consumer benefits.

Drawing on a discourse analysis (Hajer 1998) based on an examination of around 200 documents produced by multiple actors engaged in smart meters and participant observations at three smart meter events, the paper examines the dynamics of expectations associated with the UK smart meter rollout within the period of 2006-2015. In doing so, the paper aims to contribute to the literature on the sociology of expectations, by exploring how and why expectations have changed over time and negotiations associated with the smart metering rollout.

SESSION D 4

PUBLIC PARTICIPATION, DEMOCRACY AND JUSTICE IN 'OLD' AND 'NEW' ENERGY PROVISIONING

Aleksandra Wagner	Chair
Nele Lienhoop	Local preferences for distributional and procedural justice in wind energy projects: Insights from Choice Experiment
Jana Bovet / Nele Lienhoop	Does economic participation in wind power plants increase acceptance? Remarks regarding a law providing citizens and communities with increased participation in the development of wind energy
David Bidwell	Ocean Meanings and Support for Offshore Wind Farms in the United States
Fulvio Biddau / Paolo Cottone	Community involvement, public deliberation and environmental governance. Insights from Social Psychology

Local preferences for distributional and procedural justice in wind energy projects: Insights from Choice Experiment

Nele Lienhoop

While the general acceptance of wind energy generation is very high in Germany, there is considerable disapproval among people faced with local wind energy projects. The German Energy transition will

inevitably lead to a significant increase in wind energy projects in rural areas thus affecting an increasing number of local residents. Current planning- and decision procedures often lead to undesirable opposition. In order to raise acceptance, there is need to reform the design of the current wind energy policy, which involves very restricted participatory elements and influence of local residents (procedural injustice) and a disproportional amount of costs faced by the communities (distributional injustice). We conducted focus groups and a choice experiment to identify the importance and local preferences for policy features. Preliminary results suggest that procedural aspects are highly desired and that distributional justice, i.e. purchase options for shares, is less likely to raise acceptance among the local public.

Does economic participation in wind power plants increase acceptance? Remarks regarding a law providing citizens and communities with increased participation in the development of wind energy

Jana Bovet / Nele Lienhoop

The German population's acceptance of wind energy is high. At the same time it can be seen that there is often opposition to these projects when implementing wind power plants locally. Besides the general attempts to improve the quality of participation in the wind planning process, economic participation in wind power plants is discussed as a particularly important aspect in order to increase local acceptance. In Mecklenburg-Vorpommern – a German Bundesland (federal state) –, in April 2016 a law will pass the legislative process which foresees the obligatory participation of citizens and communities to onshore wind turbines. In developing such a law Mecklenburg-Vorpommern builds new policies, as there is presently no comparable regulatory requirement for such participation in Germany. In Denmark however, the idea of legally imposed economic participation has already been implemented and practiced since 2009.

In our talk we will analysis the law in Mecklenburg-Vorpommern and comment on its legitimacy by looking at the compatibility with the constitution and making a legal comparison with the Danish regulation

Ocean Meanings and Support for Offshore Wind Farms in the United States

David Bidwell

Construction of the first offshore wind farm in the United States began in 2015. Private companies and federal agencies hope this 30-MW project, located off the state of Rhode Island's Block Island, will lead to much larger wind farms being developed off the Atlantic coast of the United States. Widespread deployment of offshore wind energy, however, depends heavily on public acceptance of the technology. Although an extensive literature has developed around public acceptance of offshore wind and other ocean-based renewable energy technologies, little research has focused on how perceptions of the human-ocean relationship influence public attitudes toward specific projects. This presentation will highlight results from a survey of Block Island visitors and residents conducted during the summers of 2015 and 2016. Preliminary results indicate that ascribing importance to

existence values (i.e., valuing the ocean as a home for wildlife, a place of human culture, and as a source of knowledge) is associated with lower levels of project support and expectations that the project will have negative impacts on marine resources and the local community. Lessons for public participation in planning of future offshore energy projects will be discussed.

Community involvement, public deliberation and environmental governance – Insights from Social Psychology

Fulvio Biddau / Paolo Cottone

Public involvement has become a fundamental feature of the climate change policy agenda, emphasizing the need for participatory and deliberative mechanisms bringing together experts, policy-makers and community stakeholders in environmental management.

The research interest in this field has grown over the years with a prevailing political approach. Nevertheless, in order to find effective strategies for the design, management and evaluation of participatory processes, the psychosocial aspects of public/stakeholder participation -remaining often on the background- deserve further attention (Devine-Wright, 2011).

The contribution describes an ongoing project aimed to investigate the role of socio-psychological aspects of public participation -such as framing, identity processes and social representations- in shaping interaction and communication between actors within the deliberative processes.

The project will investigate different case studies of public deliberation through a multi-method perspective, and different levels of analysis -social, situational and individual (Doise, 1989)-, referring to different theoretical perspectives linked together: psychosocial literature on participatory processes and deliberative democracy, the social representations' approach, the discursive and environmental psychology.

Besides presenting the project, we explore what contribution the socio-psychological research can offer for a better understanding of public participation in sustainability policies.

SESSION E 4 DYNAMICS AND PATTERNS OF ENERGY USE PRACTICES	
Martin David	Chair
Francoise Bartiaux / Lionel Simon	Gender roles: a useful concept to help understand the dynamics of energy retrofits?
Rosie Day / Emmet Fox / Russell Hitchings / Sue Venn	Energy demand and the changing expectations and practices of leisure mobility in retirement
Dan Tamir	Something New under the Fog of War: The First World War and the Debut of Oil on the Global Stage

Gender roles: a useful concept to help understand the dynamics of energy retrofits?

Françoise Bartiaux / Lionel Simon

This contribution is intended to explore the potentialities of the gender roles' concept to uncover some aspects of energy retrofits and/or to better understand the dynamics of energy retrofits. In particular, this contribution will test whether an interpretation of results previously obtained by one of the authors with data from the years 2004-2009 still seems valid or needs to be modified: the fact that relatively few couples were considering energy retrofits for their house was interpreted as a consequence of too conflicting genders roles associated with energy retrofits and therefore situating them in a "no man's land".

In addition, we discuss whether and how social practice theories (Schatzki, 1998; Reckwitz, 2002; Warde, 2005, Gram-Hanssen, 2010), and in particular, the versions used for studying energy retrofits (among others: Bartiaux et al., 2014, etc.) can or cannot accommodate more classical concepts in sociology such as gender roles, and domestic power (Engels, 1845, Bourdieu, 1972).

The empirical material is primarily made of in-depth interviews that will be realised in the spring of 2016 with spouses of various social origins, each spouse of a same couple being interviewed separately. The area of study is Wallonia, the Southern and French-speaking Region of Belgium.

Energy demand and the changing expectations and practices of leisure mobility in retirement

Rosie Day / Emmet Fox / Russell Hitchings / Sue Venn

Although historically older people have tended to travel less than younger counterparts, various sources indicate that in recent years travel among older cohorts has been increasing faster than other age groups, with clear implications for associated energy demand. In this paper we are interested in the ways in which the expectations and practice of leisure travel in retirement seem to be evolving as new generations retire. We draw on a qualitative study of three cohorts of older people in the UK – one soon to retire, one recently retired, and one older cohort retired for some time. We discuss and compare their approach to arranging and undertaking leisure travel and consider the extent to which there is a generational distinctiveness, rooted in the socio-cultural and material contexts in which their practices develop. We also consider the impact of physical ageing and how the demands of travelling on older bodies are managed. Finally we consider what this might indicate for prospects for future demand for leisure travel, and associated energy demand, among retirees.

Something New under the Fog of War: The First World War and the Debut of Oil on the Global Stage

Dan Tamir, Ben Gurion University of the Negev

Humans, like all other animals, need external energy sources; human societies, accordingly, may be seen as a mean for distributing energy. Humanity's history may therefore be divided to eras, according to the prevailing energy regimes of each: the old regime was based on annually renewable energy cycles; the new regime is based on combusting fossil fuels. The new regime can be divided into sub-eras: of coal, of petroleum and of gas.

Energy is needed for all human activities, and the waging of war is no exception. This paper argues that the First World War marked a historical moment in which petroleum became the resource of the 20th century, replacing coal as the basis of industrial societies. After a short account of energy's importance for historical analysis, the article examines the quantitative and qualitative meaning of petroleum's introduction to the art of war, concluding with an assessment of the significance of that energetic moment to our perception and understanding of the 20th century – the century of oil.

SESSION F 4 COMMUNITIES, GRASS ROOTS AND SELF-ORGANISATION IN ENERGY TRANSITIONS	
Pia Laborgne	Chair
Marfuga Iskandarova/ Audley Genus	Institutional entrepreneurship and community renewable energy in England
Anna Godleman	Uncovering multiple narratives of local energy generation: a study of community energy in the UK, Germany and Denmark
Andrea Capaccioli / Matteo Bonifacio / Giacomo Poderi / Maurizio Marchese / Vincenzo D'Andrea	Organizing community in energy transition: an empirical experience

Institutional entrepreneurship and community renewable energy in England

Marfuga Iskandarova / Audley Genus

In the UK, the potential of community renewable energy generation has only been partially realised. To generate a deeper understanding of this, the paper reports on a study of community renewable energy initiatives in England, for which the researchers conducted interviews with 29 respondents from community groups or support organisations. Data were collected and analysed employing qualitative methods to generate a context-specific understanding of the phenomena under

scrutiny. A discourse-institutional perspective was adopted to investigate processes of institutional entrepreneurship and the intervention strategies employed in different kinds of initiative. The paper concludes that a discourse-institutional approach helps to identify structural and relational features of community renewable energy projects, and understand better the creation and legitimisation of new organisational forms and energy generation/consumption practices. The study contributes a fresh perspective on the challenges and growth of community renewable energy, while providing empirical evidence with which to interrogate prevailing arguments about the sources and nature of institutional entrepreneurship.

Uncovering multiple narratives of local energy generation; a study of community energy in the UK, Germany and Denmark

Anna Godlemann

The community energy movement has blossomed throughout Europe as an active, local response to the prevalent metanarratives of climate change, resource scarcity, fossil fuel dependency and the rise of low carbon technology. The movement has the ability to influence the transition towards sustainable production and consumption of energy from a grassroots level. This paper presents early findings from a narrative research inquiry, drawing on qualitative interview data and document analysis to present multiple stories of the community energy movement. The findings weave global metanarratives with local narratives; discussing how personal stories are intertwined with the influence of global events and discourse. It unravels the influence of national political narratives on the movement and provides a comparison between the UK, Germany and Denmark. The paper also argues the unique role of local actors in energy transitions; highlighting common threads in their stories, particularly their determination and resilience. Finally, it discusses how narratives connect to one another; the influence of aligning narratives at different levels and; the effects of a misalignment such as clashes of political discourse with local concerns.

Organizing community in energy transition: an empirical experience

Andrea Capaccioli / Matteo Bonifacio / Giacomo Poderi / Maurizio Marchese / Vincenzo D'Andrea

The aim of this contribution is to explore how communities self-organizing dynamics can foster social innovation in energy transition, by drawing on the experience of CIVIS, an EU/FP7 funded project. Recent works have been studying how these dynamics could improve performance in business and social settings in various work related domains. From a technological perspective, particular attention has been given on how new ICT developments, in particular the web, have provided new opportunities for communities to form and interact also on-line, giving birth to virtual communities. On the other hand, no attention has been given to the role of communities in exploiting values of other types of emerging technological network, namely, the distributed renewable energy network. In this network, people and groups, also through the use of ICTs, can autonomously produce and

consume energy on the base of a common identity and interests, becoming collective prosumers. This perspective recalls the individual level, while neglecting the role of collective forms of aggregation and their self-organizing dynamics. Differently, the main innovation and technological advance of CIVIS is to bring, by means of ICT, the social dimension of knowledge within the overall picture of the current energy transitions challenges.

TUESDAY, 13TH SEPTEMBER

17:00 – 18:30 PARALLEL SESSIONS 5

Session A 5
Local, regional national and international energy strategies, pathways and policies

Session B 5
Economics of energy transitions: Green/Blue economy, degrowth, divestment, and other concepts

Session C 4
Theoretical approaches to energy transitions research

Session D 5
Public participation, democracy and justice in 'old' and 'new' provisioning

Session E 5
Methodological approaches to energy research

Session F 5
Smart meters, smart appliances, smart grids, Smart everything?

SESSION A 5 LOCAL, REGIONAL NATIONAL AND INTERNATIONAL ENERGY STRATEGIES, PATHWAYS AND POLICIES	
Pia Laborgne	Chair
Stephan Bosch / Joachim Rathmann	Spatial compatibility of renewable energies
Patricia Graf / Kristine Kern	Länder-Cities dynamics in the energy transition
Heike Jacobsen / Patricia Graf	Radical Institutional change and organizational innovations in the transformation of the German Energy Sector
Edith Hollaender	Challenges to make heating renewable: an international perspective

Spatial compatibility of renewable energies

Stephan Bosch / Joachim Rathmann

By now, there are numerous high-quality studies discussing the incompatibility of the development of renewable energies with the preservation of landscape. However, no further insight is provided as to how a holistic spatial integration of renewable energies may be achieved. Central aspects such as social acceptance, participation, authorization procedures, landscape aesthetics, land use conflicts, life cycle assessments, etc. are not sufficiently considered in previous studies. Yet the ambitious aim of Germany's government of increasing the percentage of energy (electricity) obtained from renewable energies to 45% by 2025 and to 60% by 2035 will lead to an even greater spatial strain on Germany's rural areas as it has been the case so far. Therefore, it is necessary to critically investigate the currently established paradigm of site planning for renewable energies using standardized surveys and GIS analysis. Based upon the findings, an alternative, holistic concept of site planning will be developed and exemplified for selected regions in Germany.

Länder-Cities dynamics in the energy transition

Patricia Graf / Kristine Kern

Though Germany takes a pioneering role in the energy transition a spatially differentiated perspective shows differences on the level of the German Länder and cities. While some Länder and cities became international leaders, others are lagging behind (Kern 2008). A time-differentiated perspective shows that the Länder and the cities do not pursue a linear policy, but also chart new paths of development or return to old ones. Though the multilevel-governance literature tackling the energy transition (Monstadt und Scheiner 2014; Newig et al. 2013), policies of the Länder and of the cities have been treated rather separately. It seems that the interaction of state and municipal governments has been neglected; however this interaction has high explanatory power regarding the outlined temporal and spatial discontinuities. Our presentation is based on a comparative analysis of the structural factors and the trends in the federal states (e.g. carbon intensity of the industry; CO2 emissions share, nature and composition of renewable energies) and their conflicts of interests and strategies

(regional economic interests, dependency on nuclear power, wind energy vs. PV energy, etc.). We take a more dynamic (Baden-Württemberg) and a rather static state (Brandenburg) and the interactions with two cities, Tübingen and Cottbus into focus.

Radical Institutional change and organizational innovations in the transformation of the German Energy Sector

Heike Jacobsen / Patricia Graf

The liberalization of the European electricity market and the German federal policy for the energy transition fundamentally change the institutional environment of energy supplying companies in Germany. They are required to restructure their internal organizational forms and processes as well as their routines of external cooperation. Digitalization and tertiarization of the economy are further factors that intervene into these change processes. There has been little research on the question how the institutional changes of the energy transition are processed via concrete business strategies and how companies cope with multiple, often ambivalent institutional challenges.

The literature on Institutional Work assumes that policies are not implemented as a blueprint. Rather, it requires agency for creation, disruption, or maintenance of institutions outside but also inside the organization to cope with the stresses caused by political change. By using a qualitative research approach for the analysis of internal restructuring processes in a group of municipal energy suppliers in Germany we show how these companies refer to institutional changes in their environment in order to legitimize massive internal restructuring processes that tend to reverse the organizational hierarchies and introduce new practices and technology contexts.

Challenges to make heating renewable: an international perspective

Edith Hollaender

The EU climate and energy package, enacted in legislation in 2008, sets a target for the European Union of 20 % share of renewable energy sources (RES) on final energy demand until 2020. That target as well as GHG reduction and energy efficiency targets were translated into binding national targets. The project progRESsHEAT aims at assisting policy makers at the local, regional, national and EU-level in developing integrated, effective and efficient policy strategies achieving a fast and strong penetration of renewable and efficient heating and cooling systems.

In different countries and regions different potentials for renewable technologies can be identified. Policy makers do have a range of possible policy measures to hinder and foster certain technologies via command-and-control instruments, incentive regulation instruments and knowledge building instruments. The instruments can address either the supply side (several diverse stakeholders) or demand side (consumers). Four kinds of barriers can be found on both sides: financial-economic, institutional-structural and market oriented as well as perceptual-behavioural (based on Reddy and colleagues (2013)). The presentation describes these barriers and presents first results of

the project for the 6 target countries across Europe (AT, DE, CZ, DK, PT, RO).

SESSION B 5 ECONOMICS OF ENERGY TRANSITIONS: GREEN/BLUE ECONOMY, DEGROWTH, DIVESTMENT, AND OTHER CONCEPTS	
Robin Siebert	Chair
Nora Räthzel / David Uzzell	Investigating transnational corporations: barriers to energy saving practices in the production of oil and the construction of vehicles
Les Levidow	Circular economy: what prospects for lower-energy and waste process redesign?
Hendrik Sander	The German energy-politics after Fukushima: The potential of a green capitalism in the multiple crisis

Investigating transnational corporations: barriers to energy saving practices in the production of oil and the construction of vehicles

Nora Räthzel / David Uzzell

Through life-history and informative interviews of managers, workers, and trade unionists in two transnational corporations (oil company and vehicle), the authors investigate the barriers for the implementation of environmental practices into production processes combining Shove's practice theory and Lefebvre's theory of the everyday. Analysing the external (between companies and government regulators) and internal relationships (between managers at headquarters and at the factory, between departments, and between managers, work force and trade union), seven barriers to environmental practices are identified: deficient regulations, unequal dependency between controller and controlled, de-prioritisation, hierarchism, compartmentalisation, specialisation, and social unsustainability. These barriers are due to the prioritisation of smooth production and profitability before environmental concerns. The 'necessity discourse' explaining these priorities, subjugates environmental practices. The paper suggests policy measures which can unlock the potential of change agents within the workforce.

Circular economy: what prospects for lower-energy and waste process redesign?

Les Levidow

'Circular economy' has gained a prominent role in policy and research frameworks, especially of the EU. The concept means redesigning production processes and their products so that waste becomes easier to reduce, recycle, reuse and recover. What prospects for such redesign? This paper draws on mini-case studies and academic literature to identify recent priorities. The initial policy focus has been waste management, where 'circular economy' has been appropriated

to rebrand energy-from-waste, rarely process redesign to reduce waste production and energy burdens. In the agro-forestry sector, biomass production for energy has been rebranded as circular economy; likewise nitrogen recovery as biofertiliser, thus substituting for energy-intensive inputs. Such minimalist versions of circular economy may have several drivers: If there are profitable ways to reuse waste, e.g. for energy or materials, then there is a weaker financial incentive for process redesign. And end-recovery can benefit actors at the upper end of the value chain. By contrast, agroecological initiatives reduce energy-input demands, generate energy for on-farm use and transfer resources across nearby operations, benefiting producers at the lower end of the value chain. Thus 'circular economy' policy has tensions between a lower-energy, lower-waste process redesign versus the dominant economic interests prioritising recovery.

The German energy-politics after Fukushima: The potential of a green capitalism in the multiple crisis

Hendrik Sander

In my presentation I would like to discuss the possible emergence of a green capitalism in the multiple crisis using the German energy-politics of the seventeenth election period as a case study. My question is, whether strategies are promoted in this context which aim for a profound ecological modernization of capitalist societies. My thesis is, that there are currently no actors, who are willing and able to support a profound ecological modernization. Indeed a consensus was reached after Fukushima to completely change the electricity supply to renewable energies. Environmentalists and green enterprises, however, failed to universalize their strategies. In contrast the still dominant companies adhered to their fossil-nuclear strategies. Furthermore government leaders didn't accelerate the ecological transformation, but organized a new compromise among the rival social blocks. Though the successive readjustment of the power supply is sustained in terms of an incremental transformation. As the ecological conversion has already been proceeding for decades and is continuing today, the configuration is heading for tipping points which could trigger dynamics which can hardly be reversed. The analyzed changes can be perceived as a potential component and nucleus of a green capitalism within the limits of energy-politics.

SESSION C 4 THEORETICAL APPROACHES TO ENERGY TRANSITIONS RESEARCH	
Nona Schulte-Römer	Chair
Jan-Tobias Doerr	A small transformation-Conceptualizing the role of energy politics triggering grassroots innovationin Beckerich (Luxembourg)
Jens Koehrsen	Communicating Across Boundaries: Boundary Arrangements as a Response to Functional Differentiation in Low Carbon Transitions
Paul Upham / Les Levidow	Socio-technical change linking expectations and representations: the case of incineration and gasification for residual municipal solid waste

A small transformation-Conceptualizing the role of energy politics triggering grassroots innovation in Beckerich (Luxembourg)

Jan-Tobias Doerr

In the past 30 years, the Luxembourgish commune Beckerich has been site of numerous grassroots innovations, highly progressive for their national context. Initially centering on energy politics, the transformative local spirit can be seen to now 'spill over' into the wider region as well as into other fields of community action as the development of a regional currency and a transition town indicate. This empirical example sit against the backdrop of wider emerging research in transition studies drawing on social practice theory approach to assess social change. These studies are criticized as vague, with overly linear modeling of transitions. An exploratory study in Beckerich has discovered contingencies and conflict playing a significant role in the local development, dissenting with the local narrative and national perception suggesting a lock-in towards progressiveness. This project aims to uncover contingencies and continuities in Beckerich's practices. Initial evidence suggests individual grassroots innovation as interlinking social practices that emerge in a continuous social learning process. The presentation will discuss potentials and limitations that a social practice and an assemblage perspective might offer to unravel the local transformation.

Communicating Across Boundaries: Boundary Arrangements as a Response to Functional Differentiation in Low Carbon Transitions

Jens Koehrsen

As low carbon transitions span different social fields (politics, science, economy etc.), they involve a substantial variety of activities and actors – such as policy makers, scientists, entrepreneurs, intermediaries, public administrators, and consumers (cf. Geels, Hekkert and Jacobsson 2008) – and create high demands on the interaction and coordination between them. Difficulties in collaboration arise from the

fact that the actors involved are related to social fields that differ in their overall objectives, incorporate unlike values, interpret their environment in a dissimilar manner, communicate in distinct professional jargons, and organize their activities along different structures (Clark et al. 2011; McGreavy et al. 2013): in the end, the boundaries between the social fields risk deterring the required collaboration. The paper posits that in order to tackle the challenges of inter-field interaction, different forms of boundary arrangements evolve in the course of low carbon transitions, enabling communication across boundaries while simultaneously maintaining the boundaries. Examples of boundary arrangements are boundary objects, boundary concepts, boundary settings, boundary spanners, and boundary organizations. The paper will illustrate the evolution of boundary arrangements by referring to the urban low carbon transition in the German cities of Bottrop and Emden.

Socio-technical change linking expectations and representations: the case of incineration and gasification for residual municipal solid waste

Paul Upham / Les Levidow

As an alternative to landfilling residual municipal solid waste (MSW), incineration is becoming a dominant, if controversial, method in the UK and elsewhere. The UK government has support measures for alternatives to incineration through advanced thermal treatment (ATT), notably gasification. This paper analyses the diverse cognitive framings of gasification vis à vis incineration amongst UK stakeholders, as proponents of gasification seek to establish its relative benefits. The analysis links two theoretical concepts: future technological expectations becoming socially shared and mobilising resources; and social representations assimilating new ideas through anchoring onto familiar frames of reference. Stakeholders' social representations set criteria for technological expectations and their demonstration requirements. Conversely, stakeholders promote technological expectations in mobilising policy and financial support for gasification. Through differential 'anchoring', gasification is represented as matching incineration's positive features while avoiding its negative ones. Despite their limitations, current two-stage gasifiers are promoted as a transition technology towards a 'truly advanced' state, producing a clean syngas; R&D investment in the latter reinforces expectations for advancing the technology. The various linkages between technological expectations and social representations may have relevance to other cases, especially where public controversy arises over the wider systemic role of an innovation trajectory.

SESSION D 5 PUBLIC PARTICIPATION, DEMOCRACY AND JUSTICE IN 'OLD' AND 'NEW' ENERGY PROVISIONING	
Aleksandra Wagner	Chair
Anna Ernst	Is Participation a Main Driver for a Transformation towards a Sustainable Energy System?
Sara Heidenreich	Energy Society in an oil economy
Conrad Kunze / Mareen Hertel	The environmental protest movement against Geothermal Energy in Germany

Is Participation a Main Driver for a Transformation towards a Sustainable Energy System?

Anna Ernst

Participation is discussed and also applied to foster the energy transformation to reach a sustainable energy system. However, a research gap exists that demonstrates whether this assumption can be confirmed or needs to be rejected. In political science it is presumed that the success of transformation processes depends to a large extend on social change, which can be described as learning processes that conclude in behaviour and value change. Therefore, policy making is defined as a process of social learning and participation processes seem to offer a governance tool to establish such underlining learning process. The paper will analyse concepts such as social learning, collective learning, procedural and distributional justice in relation to deliberative methods to develop a theoretical framework, which demonstrates the limits and possible benefits of participatory democracy. The developed normative model of participation can be applied to develop an evaluation assessment, which can measure the social outcome of participatory processes.

Energy citizenship in an oil economy

Sara Heidenreich

Sustainable transitions towards low carbon societies require that we fundamentally change how we produce and use energy. Such demanding societal changes can only be achieved with broad public support and participation. People need to engage as energy citizens, as active participants, in sustainable transitions.

This paper deals with how energy citizenship is constructed and enacted through energy dialogues with different publics. It is based on focus groups carried out in the wealthy Norwegian oil economy characterized by a large oil and gas industry and a nearly 100% renewable electricity production; a context that presents particular challenges for energy citizenship.

The paper finds ambivalence and uncertainty concerning how people construct their own role in sustainable energy transitions related to, e.g., energy efficiency and new renewable energy. While respondents

expressed concern about climate change and supported change in energy systems, they feel uncertainty about how they themselves can contribute. Prominent issues in peoples' reasoning around energy transitions were economic and environmental concerns and the othering of opposition towards new renewable developments.

The environmental protest movement against Geothermal Energy in Germany

Conrad Kunze / Mareen Hertel

Deep Geothermal Energy has enjoyed a rather positive image or at least a lack of public attention in Germany since the 1980s. In 2006 the earthquake in Swiss Basel, probably caused by a drilling for a Geothermal Energy Utility (GT), closely followed by an in German Staufen caused a decisive shift in the public and media perception of the technology (Stauffacher et al. 2015; Leucht 2010 and 2011). In Germany a relatively high number of local protest groups emerged since 2008 and continues up to this day, forming a nation wide protest movement against GT, that contests every third scheduled GT project. GT is thus more conflictive than wind parks. We provide an overview of the dissemination of protest groups, particular motives and the risk discourse (Douglas and Wildavsky 1982) and structural reasons (Kousis 1993; Schnaiberg 1993) in German mining law.

SESSION E 5 METHODOLOGICAL APPROACHES TO ENERGY RESEARCH	
Giorgio Osti	Chair
Melanie Rohse / Rosie Day / David Llewellyn / Hamish Fyfe	Co-creating stories of energy, place and everyday lives in South Wales, UK
Adam Cooper	Exploring what 'socio-technical research' for energy means for energy research practice: towards integrated designs
Michael Braito	Diverging Photovoltaic Governance of Italy and Austria: A Comparison of Households' Energy Behavior, Motives, Values and their Relationship towards Nature
Sebastian Hoffmann / Fabian Adelt / Johannes Weyer	Modelling the governance of energy transitions

Co-creating stories of energy, place and everyday lives in South Wales, UK

Melanie Rohse / Rosie Day / David Llewellyn / Hamish Fyfe

South Wales is a region on a journey from fossil fuels towards a future powered largely by renewables; however, such large scale energy

transition projects can encounter difficulties in engaging wider publics. The Stories of Change project works with the device of stories and narratives to engage diverse communities to explore and express their everyday relationships with energy in the past and present, and to conceive of their future. We explore the constructive power of stories in creating narratives about energy in everyday life and consider how the medium of stories has enabled us to work in partnership with communities and creative professionals to explore alternative energy systems. We reflect on a selection of the emerging stories, discussing themes that emerge about place, identity, energy vulnerability and security, and energy justice and consider how we as social scientists can work with the narratives emerging through creative practice, and what they can reveal about energy and society relations. In particular, we emphasise the role not only of telling but also of listening to stories in exploring the past, present and future of energy.

Exploring what 'socio-technical research' for energy means for energy research practice: towards integrated designs

Adam Cooper

Understanding energy for society requires an interdisciplinary approach. Energy systems are both a physical/technical and a social system requiring research that integrates across these domains. However, research to date is divided between these domains, leading to a partial understanding. This presents a major risk for policy-making which needs to understand how to transform energy for and with people and society. I present recent analysis by Love & Cooper (2015) exploring what integrated socio-technical research in energy might look like. This includes exploring recent developments in the UK towards the creation of an integrated sociotechnical longitudinal survey of energy across thousands of homes. I highlight in particular the novel design and methodological approaches that mark out an integrated socio-technical research design from standard energy research.

Diverging Photovoltaic Governance of Italy and Austria: A Comparison of Households' Energy Behavior, Motives, Values and their Relationship towards Nature

Michael Braito

Solar energy plants (photovoltaics) are expected to reduce CO2 emissions from energy production; and a variety of policies, among them financial incentives, support their diffusion. But, scholars warn that economic incentives may also have an effect on socio-psychological patters (e.g. values, relationships of humans with nature), which are recognized as basis for the direction of a society. I compare households of Pustertal in Italy and Murtal in Austria to explore how their socio-psychological patterns interrelate with national diverging policies. Both study sides are comparable regarding their socio-economic, biophysical and historical context. I surveyed 579 households: (a) individual photovoltaic investors, (b) members of collective photovoltaic projects, and (c) as a control group, households who did not become active for photovoltaics until data collection. Economic motives are a significant driver for photovoltaic investors in Italy and Austria. But, Italy's stronger economic incentives did not

encourage collective action and go hand in hand with respondents' lower biospheric or altruistic motives, social values or ecocentric relationships towards nature. My research contributes to a better understanding how governance might affect the direction of a society.

Modelling the governance of energy transitions

Sebastian Hoffmann / Fabian Adelt / Johannes Weyer

The energy system is currently in transition and hence subject to various changes: Increasing shares of renewables, decentral generation, the role of prosumers, advanced smart metering, new tariff structures and active load management – to name but a few. Consequently, governance is necessary in order to provide the efficiency and stability of the system.

Nevertheless, the energy system is a complex, socio-technical system that can only partly be controlled. Agent-based modelling and simulation (ABMS) tries to cope with this issue by giving rise to a system from the bottom-up: Governance interventions influence decision making of strategic actors at the micro-level (e.g. users and consumers) which then leads to emergent effects on the macro-level (e.g. overloads or a regime shift).

We develop an agent-based model of a distribution energy grid based on insights from both electric engineering (e.g. regarding grid-dynamics, power and information flows) and sociological technology studies (e.g. regarding decisions and behaviour of consumers, social or regulatory conditions).

This model and its simulation will allow us to test different transition pathways with diverse system configurations (e.g. energy, policy and technology mixes, smart grid applications, role of actors etc.), which were previously identified via literature study as well as stakeholder interviews

SESSION F 5 SMART METERS, SMART APPLIANCES, SMART GRIDS. SMART EVERYTHING?	
Ana Horta	Chair
Robin Smale	Smart and flexible energy rhythms? A householder perspective on dynamic energy pricing in the smart grid
Georgina Wood / Rosie Day / Dan van der Horst / Shuli Liu	Negotiating 'smart' energy technology in the home: Intervening in everyday life and the socio-materiality of the household
Karen Smith	Smart prepayment meters: householder experiences

Smart and flexible energy rhythms? A householder perspective on dynamic energy pricing in the smart grid

Robin Smale

Renewable energy generation is intermittent. Grid operators seek a dynamic balance between the rhythms of renewable energy supply

and energy demand, to avoid blackouts, energy storage, and other costly measures. Dynamic energy pricing (DEP) is a key feature of smart grids and method to maximize demand-side flexibility: flexible energy tariffs are communicated in real-time via smart meters and in-home displays. DEP makes energy tariffs reflect real energy costs, and provides incentives to householders to time-shift their energy consumption to when energy is abundant and cheap.

However, recent research reveals that DEP may be ineffective and unpopular among householders. DEP schemes may or may not align with established domestic energy practices and energy rhythms. In this paper, a practices perspective is applied to better understand barriers and opportunities for DEP in the household. Qualitative research among participants in three Dutch domestic energy flexibility schemes is combined with literature research to shed light on the interaction of DEP with domestic energy practices The paper discusses cultural, distributional, and environmental implications of the re-entry of rhythm into the domestic energy context. Lessons are drawn for grid-flexibility policy-making.

Negotiating 'smart' energy technology in the home: Intervening in everyday life and the socio-materiality of the household

Georgina Wood / Rosie Day / Dan van der Horst / Shuli Liu

The roll-out of smart meters will provide utility companies with detailed information about households' energy use but making that data interesting and useful to householders remains a challenge. We examine the first six months of a year-long trial in which social housing properties in Warwickshire, UK were provided with a novel interactive in-home display ('energy dashboard') connected to sensors around their home measuring electricity, gas and water consumption as well as thermal environment indicators. We will briefly explain the dashboard itself and the collaborative design process. Then, drawing on qualitative interviews with the trial participants and data from the sensors, we will discuss the household engagement with the dashboard including the extent to which they reflect on their practices in response to it and their reflections on resultant prospects for change. We further explore how different households (and members of the household) negotiate the new technology provided in a wider sense, including how the technology reconstructs relations

Smart prepayment meters: householder experiences

Karen Smith

This qualitative research explored householders' experience of using smart prepayment meter. In-Home Displays (IHD) to manage their energy use. It explored households' motivations for switching, the recruitment and installation process, and their use of the IHD.

Semi-structured interviews were utilised with 30 households. Half received a home visit; the other half just had a 15 minute telephone interview. The home visit included an interactive advice session delivered by trained energy advisers on using the IHD, with a follow-up call a month later. Overall the householders' reported positive experiences in using their IHDs. Householders visited increasingly engaged with their display for reducing energy waste and managing energy use in comparison to the control group. The research found that householders may have benefitted from more detailed advice on using the IHD. Energy efficiency guidance required during meter installation was not delivered by installers, and some households were unaware of how to use their display to reduce energy waste. The research raises policy implications for the British smart meter roll out, and recommends actions to address the practical challenges of engaging with vulnerable client groups.

18:30 – 19:30 KEYNOTE

Community Energy: Rescaling energy systems for the low carbon transition

Patrick Devine-Wright

Patrick Devine-Wright is Professor of Human Geography at the University of Exeter in the United Kingdom. He is well known for an interdisciplinary approach between Human Geography and Environmental Psychology. He is a member of the Social Science Expert Panel and the board of several academic journals like Energy Research for the Social Sciences or Environment and Behavior.

WEDNESDAY, 14 SEPTEMBER

9:00 – 10:00 ROUND TABLE

Meike Löhr	Transforming the German, Danish and French energy system
Michael Ornetzeder	Energy Transition Assessment: First ideas for a new framework to systematically study the implications of on-going developments in the energy system
Xavier Lemaire	Discourses around energy access and energy transition in the Global South
Luigi Pellizzoni	Energy movements: depoliticizing the present or prefiguring the future?
Mihaela Vancea	Social Entrepreneurship in Local Transitions to Sustainable Energy in Chile: A Case Study Approach
Slavicia Robic / Lidija Živčič	Practical and structural measures to address energy poverty in South-Eastern Europe (SEE)

Transforming the German, Danish and French energy system

Meike Löhr

The energy system transitions taking place in various countries worldwide do not only result from external events like Fukushima but build on long-term changes. These changes can be reconstructed via path creative processes. Central to these processes are not only, as often stated, technologies but also and importantly actors. Through their activities they shape transformation processes on multiple levels. But who are the relevant actors and how do they influence energy system transformations? This is the question I will focus on in my presentation. In contrast to widely used transition theories like the multi-level perspective, I will focus on an actor-centred approach based on historical and actor-centred institutionalism, path creation by Karnøe, Garud (Garud et al. 2010) and strategic action fields by Fligstein and McAdams (Fligstein, McAdam 2011, 2012). Through expert interviews in Denmark, France and Germany in the areas of politics, economy, technology and civil society I will analyse the role different actors play in the transformation process, their motivation and the ways through which they influence this process. My presentation will contribute to a comparison of different transition processes in which actors play a key role.

Energy Transition Assessment: First ideas for a new framework to systematically study the implications of on-going developments in the energy system

Michael Ornetzeder

Energy systems are in a state of flux. Within the next 40 years the world will move from fossil fuels to renewables and higher levels of efficiency. This transition certainly will involve new technologies and infrastructures as well as different institutions and social practices. So far, most changes in the energy sector are driven by research activities and technological innovation proposing a wide range of competing and sometimes inconsistent options and pathways. The strong emphasis on decarbonisation, however, runs the risk of 'technocratic reduction' (Stirling 2014) eventually leading to new technological fixes. In order to avoid early lock-ins and systemic inconsistencies a much broader understanding of energy transitions is needed. This paper discusses first ideas for a new framework to systematically explore the various socio-technical implications of energy transitions. It is called Energy Transition Assessment (ETA) and builds on transition research (Verbong/Loorbach 2012; Geels 2011) technology assessment (Decker/Ladikas 2010, Ely et al. 2014) and complex systems approaches (Funtowicz/Ravetz 1994). It aims to minimise risk migration and to broaden policy options for energy transitions. The new framework should allow for a better understanding of local and regional as well as systemic effects of on-going developments and consequently enhance the societal value of innovation in the energy system.

Discourses around energy access and energy transition in the Global South

Xavier Lemaire

Energy access was until recently not so well prioritised in the field of development aid: in the majority of developing countries, priorities were given to infrastructure investments in urban areas, rarely to rural areas; investments in energy infrastructures have to compete with other infrastructures like access to water, sanitation or roads; energy access is often been reduced by policy-makers to the extension of the electricity network, even if the importance of access to energy for cooking or - in some cases - heating has constantly been underlined by a minority of researchers. Competitive discourses on energy regime are trying to legitimise different technological fixes to energy poverty. The debate is made complex with the now recognised necessity of promoting not only energy access but also energy transition (to clean energy). Some stakeholders think that energy access can indeed be achieved with decentralised renewable energy technologies, while other pretend that both objectives are incompatible and that priority shall be given to energy access with conventional centralised system. This paper presents discourses and ideologies around energy access, related to stakeholder's power analysis in a number of African and Asian countries.

Energy movements: depoliticizing the present or prefiguring the future?

Luigi Pellizzoni

Ecological concerns traditionally found expression in protests, educational campaigns and individual consumer choices. A range of flourishing experiences, however, focuses on everyday practices. Building on new or rethought social solidarities and more immersed or embedded orientations towards the materiality of things (natural entities and technical artefacts), emergent practices challenge conventional production, circulation and consumption processes, allegedly pointing to, and prefiguring, a more sustainable society. Among these experiences – which include food and agriculture initiatives and a new domesticity of crafting and making – energy movements, such as community energy initiatives and the 'transition towns' network, feature prominently. Evaluating their impact, however, is not easy. The literature (e.g. Kenis, Mathjis, 2014; Schlosberg, Coles, 2015) shows a certain polarization of readings, between 'game changer' and 'window dressing', or even 'perverse effects' (for example in terms of depoliticization and 'defensive localism'). The presentation will discuss the issue, first by interrogating the theoretical underpinnings – from new materialism (Coole, Frost, 2010) to radical democracy (Mouffe, 2013) – of expectations and critiques about these mobilizations, and, second, turning to the Franciscan notion of 'use' (recently discussed by Agamben, 2013), as gesturing to a new type of emancipatory politics, connected with, but possibly overcoming, current accounts of the common.

Social Entrepreneurship in Local Transitions to Sustainable Energy in Chile: A case Study Approach

Mihaela Vancea

This paper aims to question current institutional arrangements by analysing new forms of governance and organisation in the sustainable use of energy in various cities and regions of Chile. Accordingly, the study examines grassroots initiatives and projects in energy governance and how these are shaped by the interactions between global discourses and local action. It also pays attention to the spatial reconfiguration of the energy system between centralisation and decentralisation in the Chilean politics. Grassroots initiatives and projects in the use of energy will be approached from a social entrepreneurship perspective. The study will employ a case-study approach and qualitative research methods.

Practical and structural measures to address energy poverty in South-Eastern Europe (SEE)

Slavicia Robić / Lidija Živčič

Understood as the inability of households to secure adequate level of energy services, energy poverty (EP) has become a widespread societal concern that demands structural responses. 10-25% of EU citizens are estimated to be energy poor, the situation being even worse in SEE region, where it is likely that up to 50% households are affected. The existing policies for promotion of energy efficiency are

not designed to target EP households and EP households do not use them because the application is too demanding.

This is why project REACH tries to provide practical and structural solutions to the EP in SEE, creating path to social reintegration by empowering affected households to reduce their energy and water use through cheap energy efficiency and energy saving measures. Aim of the project is also to advocate for structural and policy measures to address EP. While there are many attempts to create universal definition for energy poverty, in practice regional differences in manifestation and severity of EP in the EU are clearly visible, although not properly tackled. The research presented will outline proposals for structural measures and highlight the CEE/SEE specifics in the EP challenge.

WEDNESDAY, 14 SEPTEMBER

10:00 – 11:30 PARALLEL SESSIONS 6

Session A 6
Local, regional national and international energy strategies, pathways and policies

Session B 6
Economics of energy transitions: Green/Blue economy, degrowth, divestment, and other concepts

Session C 6
Research at the nexus of energy-environment-water-food-mobility

Session E 6
Methodological approaches to energy research

Session F 6
Smart meters, smart appliances, smart grids, Smart everything?

SESSION A 6 LOCAL, REGIONAL NATIONAL AND INTERNATIONAL ENERGY STRATEGIES, PATHWAYS AND POLICIES	
Martin David	Chair
Alfredo Agustoni	Interest Groups, Environmentalist Associations and Energy Policies. An Investigation on the Italian Case
Mags Tingey	Financing, ownership and performance indicators in UK- Local Authority energy supply and energy efficiency projects
Kamilla Karhunmaa	Disruptive knowledge brokerage: the case of an expert group on energy policy in Finland

Interest Groups, Environmentalist Associations and Energy Policies. An Investigation on the Italian Case

Alfredo Agustoni

With a particular attention to the politological theory on lobbing, interest groups and to the theory of collective movements, in our speech we convey an analysis of the role the most relevant non-governmental actors (great economic groups, environmentalist associations, lobbies, …) play in the field of Energy Policies within the Italian context, with a particular attention to the possible impacts on energy transition. Our investigation is primarily founded on several stakeholders interviews and on the analysis of the material produced by the considered subjects, with a particular heed to the material available on Internet. A particular attention is dedicated to the strategic access channels to policy making and to the relations with the public opinion (and, then, to the relations with the media and to divulgation activities). In our analysis, a great emphasis has been placed on the historical peculiarities of the investigated context, considering for example the transformations that interested the Italian energy sector in the last decades and the changing configuration of the multilevel governance in Italy and in the context of the European Union.

Financing, ownership and performance indicators in UK Local Authority energy supply and energy efficiency projects

Mags Tingey

Localising problems and solutions of energy offers potential to create new ways of delivering and using energy in low rather than high carbon societies. However, developing such new 'business as usual' has implications for energy governance and hence societal organisation. In the UK there is growing interest in the role of local government in carbon reduction and development of sustainable energy systems at local and regional scale. Little is known however, about how decisions about investment in sustainable energy initiatives interact with the contemporary market-based governance context within which UK Local Authorities operate. This paper contributes to filling this gap by examining the sources of finance and financial model, ownership arrangements and performance indicators of 40 UK local authority energy projects. Data is drawn from online questionnaires and

interviews with local authority officers, and energy project business case and tender documents. Economic sociology concepts about actions of economic valuation are used to interpret findings. Whether a project is financed through public or private sources of finance, calculations such as internal rate of return are perceived as crucial to decision-making. Overall priority is given toward demonstrating the economic benefits of energy projects over and above other environmental or social benefits.

Disruptive knowledge brokerage: the case of an expert group on energy policy in Finland

Kamilla Karhunmaa

Finnish energy policy has focused on large-scale solutions and been based on strong state and elite control, with limited openness to other actors. In 2013, a group of ten Finnish professors gathered as an informal 'Professor Working Group' arguing that Finland needs a transition away from a centralized, fossil-fuel based energy regime through bringing transparent, science-based knowledge to inform energy policy. The group carried out extensive knowledge brokerage efforts to promote these aims.

This article examines the professor group as an example of academic activism aiming to influence a dominant energy regime. It examines what type of knowledge brokerage the professor group has carried out. The material consists of interviews, reports, and media articles. These sources are analysed to assess how the key messages of the professor group have been adopted in public discussions of energy policy, and if elements of them are contested publicly. The initial findings suggest the working group has disrupted energy policy debates in Finland and through that created space for other actors to question the dominant energy regime.

SESSION B 6

ECONOMICS OF ENERGY TRANSITIONS: GREEN/BLUE ECONOMY, DEGROWTH, DIVESTMENT, AND OTHER CONCEPTS

Dan Tamir	Chair
Maik Günther / George Ferns	The construction of disapproval: Discursive stigma work of the fossil fuel industry
Meike Spitzner	Economics of energy transitions: The „Crisis of Care Economy" and the neglecting of gender biases in energy debates
Tina Schmieder-Gaite	Framing finance in the literature of sustainable transitions

The construction of disapproval: Discursive stigma work of the fossil fuel industry

Maik Günther / George Ferns

Despite the proliferation of research on organizational stigma, there is a dearth of knowledge of how and why stigma emerges (Devers, Dewett, Mishina, & Belsito, 2009). That is, we know little about the process through which organizations and industries become stigmatized, i.e., collectively evaluated as being fundamentally flawed (Hudson, 2008). To understand the ways in which stigma is constructed over time, we adopted a work-based perspective (Lawrence & Suddaby, 2006) and conducted a six-year argumentative discourse analysis (from COP 15, 2009 to COP 21, 2015) to examine the global divestment movement's attempts at changing fossil fuel-climate change discourse. Specifically, we show how divestment campaigners, by employing four discursive strategies—death labeling, demoralizing, ostracizing, belittling—were able to shift the meaning surrounding fossil fuels and climate change: From fossils fuels as a necessary evil, their environmental impacts being 'fixable' through technological innovation, to something that needs to be rid of given its diseased and incurable nature. We also show how this change occurs as, over time, stigma categories diffuse into the wider discursive realm as they become adopted by more central actors (investors, policy-makers, politicians). We argue that stigma emerges through the collective, albeit not necessarily coordinated, discursive action of multiple actors engaging in a relational stigmatizing process.

Economics of energy transitions: The „Crisis of Care Economy" and the neglecting of gender biases in energy debates

Meike Spitzner

Energy debates and policies are mostly dominated by technological and market perspectives. Their framings not only assign social sciences a subordinated place, merely to questions of acceptance or of „use" of applications etc instead of basing on reflexions of society and energy interdependencies, but also express basic gender hierarchic constructions. Using the nonandrocentric concept of the economical social environmental „Crisis of Care Economy" (Spitzner 1999, cf. Schildberg 2014) potentials for basic developments of energy research as well as for energy policies could be made accessable. Some outcomes from the ongoing research project „energy sufficiency" (supported by BMBF, SOEF programme) will be presented. Looking on the household's re-productive sphere of care economy, the energy necessities depend on basal different factors than personal needs: e.g. amount of active care givers, distribution of care responsibility (work, services) between public infrastructures and private household, „care economical styles", modernization paths of caring, political gender equality strategies. Though ‚energy use' turned out - methodological – needing a basic differenciation between the meso level ‚care economical' requirements and the micro level ‚personal' needs. Gender energy research suggests a transfer of core transport sector's strategies to the energy sector questioning for strategies of limitating structural generation of energy necessities.

Framing finance in the literature of sustainable transitions

Tina Schmieder-Gaite

Finance and investment are increasingly becoming a topic in the sustainability transitions literature. As such, they occupy a role in many recent publications, both as barriers (Campiglio 2015, Eames et al 2013) and enablers for the low carbon transition (Smith et al. 2005, Jacobsson and Bergek 2003). Moreover, they have been a topic of priority in the recent climate change talks in Paris. Colenbrander et al. (2015, p. 12) emphasise that "ongoing low-carbon investments will be required to maintain the lower carbon intensity of economic growth". And while the need for more carbon finance appears a common denominator across the transitions literature, it has "not been an explicit focus" and often occupies a peripheral position in the argument (Bolton and Foxon 2015). This paper offers a critical review of the role of finance and investment within the body of literature of sustainability transitions. It suggests that the finance dimension has not yet been paid adequate attention and remains underexplored. As this is contradictory to its importance for making transitions work, this paper argues that the economic and financial dimension within the transitions literature merits further study and suggests some ways forward.

SESSION C 6 **RESEARCH AT THE NEXUS OF ENERGYENVIRONMENT-WATER-FOOD-MOBILITY**	
Magdalena Wallkamm	Chair
Jens Marquardt	How power affects the energy – water – food nexus:A conceptual approach
Janet Stephenson	Transforming systems of production and consumption – an 'energy cultures' approach
Tineke van der Schoor	Energy scripts

How power affects the energy – water – food nexus: A conceptual approach

Jens Marquardt

Energy transitions can be understood as power struggles between various local, regional, national and international interest groups. This also affects and competes with other policy fields such as water and food security. This presentation conceptualizes the role of power in energy transitions and provides a theoretical approach for understanding power in the nexus of energy, water and food security – especially in developing countries. Based on pluralist ideas from authors like John Gaventa (1980), Steven Lukes (1995) or R.A.W. Rhodes (1986) a power-based multi-level governance approach is

developed. Power is defined here as a means of coordination across different jurisdictional levels and the distribution of various hard and soft power resources. Conflicts related to water and food security need to be incorporated into the model. The framework is finally being discussed in the context of Indonesia – a country that struggles to foster renewable energy development due to decentralized political structures and fragmented power resources. Taking a power-based nexus perspective, this contribution aims to foster a debate about the role of power in promoting energy transitions especially in developing countries with their complex governance systems.

Transforming systems of production and consumption – an 'energy cultures' approach

Janet Stephenson

The energy transition, at its most fundamental, involves massive change to systems of both production and consumption. This has implications not only for the energy sector, but for other sectors which are implicitly tied to the sector such as transport and agriculture. The energy cultures framework offers an integrative approach to exploring the 'cultures' within these sectors which drive quite different consumption outcomes. In this paper I discuss the development of the energy cultures framework since 2010, and its applications to a variety of sectors and at a variety of scales. In particular, the framework has proved useful for characterising groups (households, businesses) and the heterogeneity of their 'energy cultures', exploring how and why these cultures change, and identifying potential interventions to stimulate change. I also discuss our recent extensions of the framework to explore mobility cultures, and the potential for its application to other fields such as climate action, water use and agriculture.

Energy scripts

Tineke van der Schoor

Technology is infused with scripts that indicate how we as users should behave around, live in or use an artefact. Akrich & Latour (1992) described how expectations about users' knowledge and behavior were embedded in the design of electrical appliances. In this way, engineers or architects contribute to 'materialize morality' (Verbeek, 2006). However, users are not necessarily the passive receptacles of these scripts; they can ignore, resist or even redesign built artefacts. Drawing inspiration from literature investigating user scripts and gender scripts, we develop the notion of energy scripts, which we define as the way the distribution of light, heat and power within a building choreographs its functional use and stimulates or discourages energy use. We apply this concept to buildings, to analyse if and how the energy demand of buildings is choreographed by architectural design. We investigate three examples of energy-scripts embedded in dwellings: cool storage, kitchens, and the diffusion of natural gas. Furthermore, we look at 'passive design'. Our contribution is to further our understanding of the constraints and flexibilities for reduced energy demand in buildings. Historically, there have been 'paths not taken', which could have led to a less energy demanding

built environment. Retracing these paths can lead to new perspectives on building design and retrofit.

SESSION E 6 METHODOLOGICAL APPROACHES TO ENERGY RESEARCH	
Francoise Bartiaux	Chair
Ana Pocas Ribeiro	Material consumption and energy – highlights and limitations of multidisciplinary research
Robert Lowe *Lai Fong Chiu* *Tadj Oreszczyn*	Methodological pluralism: the role of socio-technical imagination in informing building energy epidemiology
Anna Ernst	How to Integrate Social Science into Energy Scenario Modelling: the Case of the German Coal phase out

Material consumption and energy – highlights and limitations of multidisciplinary research

Ana Pocas Ribeiro

Little to no attention in energy policy is paid to the consumption of goods and services, even if recent research shows its significant contribution to energy demand and GHG emissions. There is however, increasing attention to consumption in civil society movements, and in energy research (LCA, consumption based-accounting, among others). Moreover, consumption has been for a long time addressed by social sciences (e.g. economics, psychology, sociology, anthropology and others). In order to provide an overview of accumulated knowledge on the topic, from the multiple disciplinary perspectives, a multidisciplinary literature review on material consumption is currently in progress. This review focuses on 1)what is known about what influences material consumption; and 2) identifying how the different disciplines approach material consumption.

This research will produce the following outcomes: a taxonomy of how the different disciplines (perhaps due to its diverse epistemologies) address material consumption in different ways; a conceptual framework of factors that influence material consumption; and an identification of research gaps. Finally it will also ponder on the added value and limitations of the methodology of multidisciplinary reviews when researching topics at the interface of energy and society, such as material consumption.

Methodological pluralism: the role of socio-technical imagination in informing building energy epidemiology

Robert Lowe / Lai Fong Chiu / Tadj Oreszczyn

Energy Epidemiology (EE) draws its inspiration from health epidemiology, which has its origin in public health with a history going back to Snow's studies of the causes of Cholera outbreak in London and rickets in children in 1850's (Snow, 2003; Hardy, 2003). EE is currently defined as the systematic collection and analysis of data on

energy use. Methodologically, the current focus of EE is on the distributions and patterns of energy use and their causes or influences in stocks of buildings. A review of current approaches to EE reveals the application of primarily quantitative methods. This paper argues that EE needs to broaden its methodological approach. It does so by considering the methodological limitations of the current definition if applied in isolation from qualitative methods. Inspired by the concept of sociotechnical imagination offered by Social Science, the concept of buildings as a complex sociotechnical system emerges, and with it the need for a plurality of methods to understand energy use in buildings. A selection of case studies that draws on this perspective is than presented to suggest that by applying sociotechnical imagination, a richer picture of energy use and of potential interventions to reduce it could emerge.

How to Integrate Social Science into Energy Scenario Modelling: the Case of the German Coal phase out

Anna Ernst

Energy scenarios are an important tool in order to develop energy strategies and policies to change towards a sustainable energy system. However, existing energy scenarios mainly concentrate on technological feasibility and economic impacts and lack integration of social impacts. However, human behaviour based on social norms and principals can both be a barrier or a driver of the energy transition. Therefore the integration of findings from social science research in energy scenario modelling is crucial in order to improve the development of energy strategies and policies. Transitions are already observed and studied by social scientist, which have resulted in an understanding about transition processes. These findings will be analysed and structured in order to develop an evaluation scheme, which can be fed into the modelling process and resembles social and political conditions. The possible German phase out of coal will be used as a case study in order to direct and apply the evaluation scheme. Therefore, the paper will not only demonstrate a methodology approach to integrate social science into energy scenario modelling but also reflects on strategies towards a coal free German energy system.

SESSION F 6 **SMART METERS, SMART APPLIANCES, SMART GRIDS, SMART EVERYTHING?**	
Pia Laborgne	Chair
Mette Kragh-Furbo / Gordon Walker	Knowing and governing energy demand in smarter local grids
Sophie Nemoz	Electric car sharing and the smart grid: approaches, methods and perspectives in social sciences
Friederike Rohde / Martina Schaefer	The Role of Institutions and Organisations in Smart Grid Developments
Esther Hoffmann / Franziska Mohaupt / Frieder Schnabel	Integrating users in smart grid innovations

Knowing and governing energy demand in smarter local grids

Mette Kragh-Furbo / Gordon Walker

New ‘smart’ metering technologies and associated software have made it possible to know energy consumption in new spatial and temporal terms. The mundane world of metering is being transformed by organisations that are marketing hardware, software and analytical services that enable a much more dense, spatially differentiated view of patterns of energy use. At the core of these developments are flexible and wireless metering technologies that enables half hourly through to second by second energy readings to be analysed and fed into real time control systems. This flow of data across ‘smarter’ energy grids thus enables new ways of knowing and evaluating energy consumption, as well as generating new possibilities for the active governance of energy demand. The agency to govern energy demand is thus becoming distributed in new configurations across networks of actors, across material technologies and infrastructures of different forms and devices of knowledge management, data processing and data representation. How can we conceptually think about these technology-knowledge-governance developments? In this paper, we present preliminary thoughts and findings from a research project on the governance of energy demand in ‘smarter’ local grids within large organisations in the UK.

Electric car sharing and the smart grid:approaches, methods and perspectives in social sciences

Sophie Nemoz

Nowadays, the energy implications of transport systems lead to an experimental deployment of smart devices for a transition to sustainable mobility. In this field, the presentation offers to throw light on the researches engaging in the projects of electric car sharing linked to smart grids. Covering the latest in innovative technologies and services that promise to enable human communities to produce green energy and to optimize its uses for transportation, they are proving to be of particular interest. It is becoming a significant topic of concern for social sciences. Among these disciplines, the study aims to explore the spectrum of approaches, methods and perspectives applied to these local processes of energy production and consumption. In this review of scientific literature and experimentations around the world, attention will be paid to the different ways in which the various social science disciplines investigate the existing pilots and contribute to their theoretical analysis. The second section will go further into the case study that I conducted as a sociologist who took part in the action research named “Smart Campus” (EUROGIA+ label, 2012-2015). In the light of an international overview and local insights, we will finally discuss the challenges of opening up the socio-technical interface.

The Role of Institutions and Organisations in Smart Grid Developments

Friederike Rohde / Martina Schäfer

Establishing Smart Grids is generally viewed as essential step towards a sustainable energy system based on renewable energy technologies (IEA 2011, Gellings 2009). Numerous pilot projects demonstrate that „key obstacles and challenges still appear to be at the social and regulatory levels“ (Catalin 2014: 11). Still there is little sociological research on the smart grid implementation process, the multiple actor constellations and the role of different organisations (such as energy providers, net operators, service providers and demand- side companies) involved in smart grid development.

Based on field concepts in organizational theory (Fligstein/Mc Adam 2011) we explore the underlying meso-level social order as well as the institutional developments – the rules, norms and beliefs (Hoffmann 1999) - that constitute smart grid developments. Which organisations are relevant for the development of a smart grid? What are the motivations of these organisations to participate in smart grid developments? Research will be based on data drawn from qualitative interviews and participating observations accompanying the pilot project “Energy grid Berlin Adlershof”.

Integrating users in smart grid innovations

Esther Hoffmann / Franziska Mohaupt / Frieder Schnabel

The transition of the German energy system (Energiewende) causes radical changes in energy production and consumption. It includes growing shares of renewables and of consumers producing their own energy. In addition to producing and marketing electricity energy suppliers are developing new products and services to meet these challenges. Here, an intensified dialogue between producers and energy users is needed (Geelen et al. 2013; Hoffmann 2012). We will present the experience of three user integration processes: three German energy companies conducted innovation workshops with users to develop concepts for new services in a smart energy system, focusing on optimising the interplay between decentralised energy production, storage and own consumption. We identify crucial aspects for user integration such as (i) acquiring users who are capable of understanding complex changes in the energy system and of anticipating future requirements while dealing with its high uncertainty, (ii) developing scenarios and narratives about future energy use, and (iii) using creativity techniques, which support users in imagining the future. We find that the energy companies appreciate the intense dialogue with consumers for getting support in redefining their role and tasks as supplier. Finally these workshops help to integrate user needs in previously technically coined innovation processes.

11:30 – 12:00 CLOSING REMARKS

13:00 EXCURSIONS

City walk Leipzig

A guided walk to energy-related sites around the conference venue: a solar energy plant, a local natural gas company and the large amazon hub. As an extra, the tour guide is an expert in pedestrian-traffic and urban mobility politics and will explain the mobility concept of the city while walking.

Energy-saving Community Colditz

The village Colditz runs a community wind turbine which provides renewable electricity and financial support for a school. A local guide shows us around and explains the financial and social aspects.

Revitalized lignite mines, now the new lake district of Leipzig

This excursion leads to the impressing open cast coal mines around Leipzig. A regional planner informs about present and past lignite exploitation and methods of revitalization of the mines. Swimming is possible.

Former world´s largest Uranium Mining Site

Few still remember that former German Democratic Republic was for some time the world leader in uranium production. Since the closure of the German-Soviet “Wismut” company after the fall of the wall, the region hosts the world´s first large uranium site that is closed down completely, with huge investments made to protect the environment from radiation and experiences made, how to cope with the long term effects from mining.

AUTHOR INDEX