

Guest Editorial

Energy Systems and Infrastructures in Society: Part 2 of 3

The previous issue of Science & Technology Studies began our collection of internationally state-of-the-art research on energy issues, an established area of interest in the social sciences and Science and Technology Studies (STS). Energy has become a timely topic in STS and elsewhere, and the number of papers that we received and that were accepted in peer review was especially high. Initially meant as a volume to publish papers from a conference event in Helsinki, the special issue was expanded to run through three numbers of Science & Technology Studies. Its first part was published in the December 2013 edition of the journal (Vol. 26, No. 3) and contained four papers. These discussed and developed new understanding about path dependence and technological expectations in UK bioenergy (Levidow et al., 2013), niche protection policies of electric vehicles in Finland (Temmes et al., 2013), political articulations and expectations about carbon dioxide capture and storage in the US and EU (Gjefsen, 2013), and the development of updated or more intelligent electricity infrastructures, so-called Smart Grids, in Denmark and Germany (Schick & Winthereik, 2013). In our introduction to the issue, we also proposed a conceptual approach that tied some of these themes together and drew on known STS ideas about large socio-technical systems and

infrastructures (e.g. Hughes, 1983; Edwards, 2003), energy system transitions (e.g. Geels & Schot, 2007; Verbong & Geels, 2008; Hodson & Marvin, 2010), technological expectations (e.g. Borup et al., 2006), and the everyday use of energy services (e.g. Ornetzeder & Rohracher, 2006; Shove, 2003; Hyysalo et al., 2013). Starting from common notions about large energy systems – as relatively coherent and controlled expert provisions – we argued that more attention could be given to the open reconfigurable character, local practices of use, and multiple possible changes of energy infrastructures. The details of this approach and its further discussion are in the previous issue's guest editorial (Silvast et al., 2013).

In this second special issue on Energy Systems and Infrastructures in Society, five papers are published that carry on advancing energy-related STS topics including socio-technical transitions, path dependencies, technological expectations, technology users, and risk management. In the opening article, Mark Winskel and Jonathan Radcliffe continue with the important theme of role of incumbent actors in energy transition, a topic also discussed by Gerhard Fuchs's contribution below and in several contexts in the previous special issue. There, authors asked how sustainable energy generation technologies become locked into centralized energy systems (Levidow et al., 2013). Another paper studied how politicians strategically select which actors and activities are to be protected

when sheltering them under so-called niche management of innovations (Temmes et al., 2013). The paper by Winskel and Radcliffe is titled as “The Rise of Accelerated Energy Innovation and its Implications for Sustainable Innovation Studies: a UK Perspective”. It raises to the fore a specific need for sustainable transition theories: to account for the multiform dynamics of energy systems across a spectrum of continuity-based and niche-led changes. The term ‘accelerated energy innovation’ has become a prominent aspect of energy policymaking, and in the UK it has a number of distinctive features that render it predominantly regime-led and continuity-based: an emphasis on relatively short term dynamics (years rather than decades), a focus on cost reduction and deployment support for large scale technologies, and a central role for the private sector and public-private partnerships. Winskel and Radcliffe show how the UK energy policy change, accompanied with accelerated energy innovation, shifted from more disruptive to continuity based agenda in the course of 2000s. Their analysis questions the portrayal of transition as predominantly niche-led in both transition management and technological innovation systems literature and calls for further theoretical appraisal on how power, resources, and strategies played by incumbents relate to landscape pressure and niche initiated changes in transitions.

The second contribution by Gerhard Fuchs, “The Governance of Innovations in the Energy Sector: Between Adaptation and Exploration”, starts by conceptualizing electricity supply as a large technological system and asks how such systems change in resonance with their perceived problems, for example environmental issues. Fuchs also introduces the common view that energy systems shift mostly after external challenges, even disasters or catastrophes – for example, energy market liberalization,

oil price shocks, the Chernobyl accident, the impacts of climate change, and the Fukushima catastrophe (see also Geels & Schot, 2007; Silvast et al., 2013: 5). The paper then extends this picture considerably by advancing an interest in how actors in energy organizational fields actively interpret and mediate system transitions and how that builds new kinds of coalitions and technological expectations. Large empirical studies about carbon dioxide capture and storage in Germany and Norway and photovoltaics in Japan and Germany are presented by the article. Analytically, Fuchs builds on the Theory of Strategic Action Fields by Neil Fligstein and Doug McAdam and demonstrates its use in exploring energy system transitions.

The contribution “Constructing Expectations for Solar Technology over Multiple Field-Configuring Events: A Narrative Perspective” by Heli Nissilä, Tea Lempiälä, and Raimo Lovio continues and deepens the theme of expectations work by protagonists in sustainable transitions. It examines multiple “field-configuring events” in an effort to map out expectations building over time in furthering a nascent technology field, in this case Solar technology in Finland. The analysis identifies six narrative themes and their evolution in the building of complementary visions and expectations for a new technology. The analysis reveals that rather than explicitly aligning expectations, events can lead to an initially narrow storyline gradually spreading into multiple narratives upon which a field’s future can be projected and its advocacy guided and strengthened.

The paper by Mikko Jalas, Helka Kuusi, and Eva Heiskanen “Self-Building Courses of Solar Heat Collectors as Sources of Consumer Empowerment and Local Embedding of Sustainable Energy Technology” moves to examine energy infrastructure change from the end-user perspective. They explore the Finnish

solar heat collector self-building courses by asking what impacts the courses have on the participants and in promotion of new renewable energy technology. The authors show that self-building courses offer possibilities for material engagement that has outcomes beyond the immediate objectives of the course. The course participants started to follow energy discussions, collect information, and actively advise others, viewing themselves as increasingly capable actors in renewable energy. They also began to engage in energy saving and renewable energy at home on a wide front, even as only 41% had installed the collectors they built on the course soon after. Self-building courses served foremost as a first step into renewable energy even as they have been previously identified also as stimulus for user innovations, local embedding, and diffusion of renewable energy technology. Drawing from practice theory and science and technology studies Jalas et al. empirical material consists of field observations, interviews with teachers, and a survey of participants beginning from the early activities in late 1990s. Their exploration into solar building courses continues the line of S&TS research that seeks to examine the role of different citizen groups and user collectives in the building of competences related to renewable energy technologies. Hyysalo et al. (2013) similarly stressed how the engagement with renewables was slow to deepen, and considerably facilitated by peer interactions, in their case Internet forums.

Finally, Yael Parag's discussion paper turns to the theme of energy security, commonly understood as energy provision that is adequate and reliable as well as affordable, or in some recent depictions, "competitive". The title of the paper is "From Energy Security to the Security of Energy Services: Shortcomings of Traditional Supply-Oriented Approaches and the

Contribution of a Socio-Technical and User-Oriented Perspectives" and it focuses on policy work about energy security from all over the world. Parag raises a specific bias in the policies as the starting point: in many cases, what has been at stake in national and other policies is the security of energy supply rather than the security of the energy services that citizens critically depend upon. Drawing insight from STS literatures, the author then assembles a way of conceptualizing energy security where the role of energy-using practices and everyday energy services is better acknowledged, with a link to the end-user perspective presented by Jalas et al., above. Accordingly, paying attention to the resilience of energy services posits a key means of this conceptualization.

A number of additional articles submitted to the special issue are almost finalized or in their last round of peer review. One paper is called "Not in Anyone's Backyard? Civil Society Attitudes towards Wind Power at the National and Local Levels in Portugal" and combines the study of policy and institutional frameworks and civil society attitudes to uncover how wind energy is currently developed and deployed in Portugal in comparison to other countries. In "The Meanings of Practices for Energy Consumption - Comparison of Homes and Workplaces" the authors write about a transition to more sustainable everyday practices by exploring and comparing two case studies on buildings' energy use in Sweden and the UK.

The contribution "Adjudicating Deep Time: Revisiting the United States' High-Level Nuclear Waste Repository Project at Yucca Mountain, Nevada" ties together anthropological themes about expertise and law to highlight techniques of risk governance in nuclear waste management of a famous nuclear waste repository in the US. "System Management and System Failure: An Analysis of Experts' and Lay Persons'

Insights into Electricity Infrastructure and its Problems” presents a systems theoretical comparative analysis of electricity management and use in two infrastructure control rooms and households, highlighting differing structuring temporalities, external constraints, and personal skillsets in the three field sites.

Another empirical case is a study on a shift in nuclear power production from a research phase to an industrial phase. The paper examines the development of Fast Breeder Reactor technology (FBR) in France, from the 1950s to the early closure of the FBR Superphénix plant in Creys-Malville in 1997. The authors discuss how framing a reactor prototype as “industrial” is not only a matter of rhetoric; it may have an important impact on the trajectory of an innovation.

When the peer review and acceptance or rejection of these papers has been carried through, we will present them in the third special issue on Energy Systems and Infrastructures in Society, due in 2/2014 to appear in 15th of August.

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