

Broadband networks, smart grids and climate change

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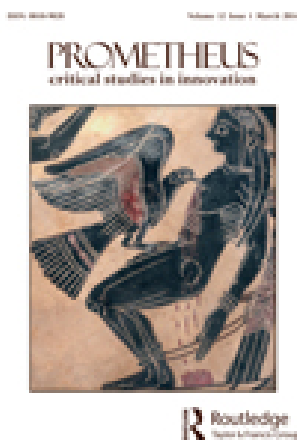
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commons will have broad implications for scholarship and public policy across a variety of fields. For academics, the book is an inspiring read. The interdisciplinary integration of these disciplines challenges the reader and demands familiarity with the discussions in these disciplines.

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Broadband networks, smart grids and climate change, edited by Eli Noam, Lorenzo Pupillo and Johann Kranz, New York, Springer, 2013, 255 pp., £92 (hard-cover), ISBN 978-1-4614-5265-2

With a contemporary topic and a wide range of high-level contributors, chances seem high that this book will become a standard reading in the multi-disciplinary field of smart grids. In trying to merge different areas, such as broadband economics, law and regulation, the book attempts to provide snapshots of different aspects of smart grid development. The authors refer to the 2010 CITI (Columbia Institute for Tele-Information) conference at Columbia University on broadband networks and smart grids at the crossroad between information and communication technologies (ICT) and energy as the impetus for the book. There are four parts: interdisciplinary perspectives on smart grid developments, national energy and broadband plans, smart grid business strategies and, finally, policy and regulatory issues. My focus is on the original contributions to the conference.

In the introductory chapter, Matthias Kurth – former president of the German regulatory agency responsible for regulating power grids and telecommunications – provides definitions of smart metering, smart grids and smart market design. He also raises concerns about (1) the current lack of smart metering and control devices

actually in the grid for smaller companies and residential consumers, (2) problems with highly integrated systems and the need for modular structure of production and distribution because of the fast innovation cycles of metering devices, (3) the need to ensure for the growth of smart grids – from the regulatory point of view – basic functionalities, guarantee non-discrimination and open access, and (4) the need to achieve cooperation between companies in energy and telecommunications to foster technological development in this area.

In the second chapter, Stefano Nocentini, Roberto Gavazzi and Lorenzo Pupillo examine the approach of Telecom Italia towards smart grids in creating synergies between telecommunication networks and electricity grids. From the expected growth in the quantity of endpoints required for connectivity, they calculate that broadband and ultra broadband will be necessary to facilitate the development of smart grids. Furthermore, they postulate that public networks need to cater for the resilience, reliability and geographical coverage necessary for the growth of smart grids.

Graham Vickery and Arthur Mickoleit contribute their (condensed) vision of the role of ICT in fostering sustainable consumption and consider the environmental repercussions (for the full paper see OECD, 2009). The paper has generated some controversy about the ‘unsustainability of broadband’ (Røpke, 2012) and inspired a broader definition of sustainability in terms of social, economic and cultural goals (Teppayayon *et al.*, 2009). Interestingly, both authors conclude that ‘innovative ICT systems enable more sustainable production and consumption across the entire economy’ (p.37).

The former chairman of the federal communications commission, Reed Hundt, characterizes ways in which the political stalemate can be overcome and investment in energy infrastructure can be facilitated. His proposal is to build a green bank as a low cost facility which could ‘borrow from the United States Treasury on a long-term note at a low rate and then lend it out into the clean energy industry at 50–70 extra basis points’ (p.45) to overcome the political stalemate. To stimulate investment, he suggests ‘opening the door to consolidation, particularly of natural monopolies in distribution, [and] opening the door to new services’ (p.45).

Miriam Horn and Marita Mirzatumy provide insights into their experience within the non-profit experiment, Pecan Street Inc., a consortium headquartered at the University of Texas at Austin. They discuss one alley of innovation research within smart grids, the combination of different sets of data coming from the real-time impact of technology and tariff experiments on air pollution. The objective of the project is to show how these data can be used ‘for good’; in other words, to see into and understand the energy system and support its transformation ‘from a top down through integrated systems management and from the bottom up through distributed, open innovation’ (p.57).

Scott Hempling, former executive director of the national regulatory research institute (NNRI), proposes that decision makers should integrate broadband networks with the operations of each of the interconnected power systems in the United States.¹ In order to guarantee such integration, policy-makers should provide guidance with respect to ‘performance expectations and about the roles, responsibilities and rights of incumbent electric utilities, alternative power suppliers, telecommunications companies and other service providers’ (p.6).

Beatrice Covassi discusses recent initiatives of the European Commission for smart grids and smart metering. She concludes that there is a need for smart

policy-making which should take the fundamental role of consumers into account and should focus on the ‘local dimension, notably the urban environment’ as this seems to provide ‘an ideal test bed for ICT solutions related to sustainability and energy efficiency’ (p.98).

Philip Mayrhofer and Benedikt Römer characterize the ambitious political objectives with respect to the growth of renewable energy sources in Germany. They focus on the e-energy initiative, which started in 2008 based on a consortium of industry and academia in six model regions. Initial results of the e-energy initiative have shown that the commercial sector has been able to save 20% of energy through the use of ICT, with households attributing 5–10% energy savings to ICT use. Additional benefits of the initiative have been achieved by load shifting in the commercial sector.

Lawrence Plumb from Verizon, discussing the changes in the rules of the federal energy regulatory commission (FERC), aims to provide electricity end-users with more negotiation power and with better ways to transact with the electric grid via wholesale electricity markets. He proposes, lest electricity use be considered as a kind of asset which can be monetarized, new rules by which FERC can stimulate innovation and investments in energy efficiency throughout the economy. In his view, broadband and information technology provide the platform for energy efficient services.

Johann J. Kranz, Arnold Picot and colleagues propose that the growth of innovative services requires a level playing field based on non-discriminatory access to advanced metering infrastructure and metering data in the energy sector. Their contribution is a condensed version of a research paper for the national regulatory research institute (Kranz and Picot, 2011). They show that regulatory remedies are necessary to ensure a ‘neutral smart grid’ and that ‘new market entrants have to be guaranteed a transparent and stable regulatory environment’ (p.167).

The last part of the book discusses policy and regulatory issues with an introductory chapter by Lillie Coney, focusing on the privacy protection issues surrounding the implementation of smart grids. As information flows are not transparent to users with smart grids, there is a threat of greater surveillance if data are not used properly. She concludes her chapter by proposing 13 recommendations, the last one challenging the traditional ownership model in the industry: ‘Reject the data model of ownership and adopt a model based on customer control over data about energy usage’ (p.191). She further postulates that a key issue in the successful adoption and use of smart grids is privacy protection: ‘failure to develop robust and implement privacy policy will hinder adoption of applications and services’ (p.191).

Lorenzo Pupillo and Bérenger Serre look at problems related to the diffusion of smart metering and ways in which policies can support solutions to overcome these problems. In focusing on the e-cube project, funded by the Italian ministry of economic development and supported by a consortium of 12 major companies and universities, both authors recommend a more active role for government because incentives for the beneficiaries of smart metering are currently so unclear. In using a framework of a cost benefit analysis (CBA) evaluation developed by KEMA in the Netherlands (KEMA, 2010), they conclude that major beneficiaries of smart metering still have to be convinced about the benefits of these applications.

John Chapin and William Lehr conclude the book with a ‘short paper for a big idea’ (p.238). The paper focuses on the emergence of ubiquitous smart environments capable of automatic sensing and interaction with the physical world. As the

capabilities for supervisory control and data acquisition are located with major electric power utilities, water management systems and chemical plants, as well as other major infrastructure control applications, both authors focus on control networks which can be utilized by small- and medium-sized businesses and local governments (p.216). They propose a road map based on a small, unlicensed spectrum band of a new type which could be allocated to support growth of smart grids in the mass market.

The book surely is a good, multidisciplinary introduction to smart grids. The link between broadband communications and smart grids is interesting as it characterizes the ongoing convergence between broadband and the energy sector. Some contributions in the book point to emerging problems in energy markets which must find solutions if there are to be a level playing field, market transparency and non-discriminatory access. The depth of the contributions varies; some chapters are more successful than others in stimulating the reader's interest in such issues as sustainability of broadband, the challenges of convergence for investment behavior of companies, and regulatory agencies. The book will surely foster further theoretical discussion in the field of smart grids, and might generate more interest in the area.

Note

1. There are three interconnections which are not synchronized in the United States: the eastern interconnected system, the western interconnected system and the Texas interconnected system.

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