

## BOOK REVIEWS

***Les Controverses de L'énergie: Fossile, Hydroélectrique, Nucléaire, Renouvelabl***, by FRANCO ROMERIO. (Lausanne : Collection Le savoir suisse, Presses polytechniques et universitaires romandes, 2007) 142 pages, ISBN-978-2-88074-590-5.

This book, appearing in the collection *Le savoir Suisse*, provides a synthesis of current issues in energy consumption and supply. It is similar to the UK's "Very Short Introductions" or the French "*Que sais-je*", which make academic research accessible to non-specialists in a pocket book format.

Given the present turmoil in petroleum markets and public concerns about climate change, such a synthesis could not be timelier. By presenting basic information on the functioning of energy markets and on their foreseeable development, this book can help the reader to develop a well-informed opinion on the current challenges of environmental and energy policies. To this effect, the book spans a large spectrum of topics, such as the links among energy, economic growth, sustainable development, security of supply, the establishment of an energy policy, competitive electricity markets, and future technological options for electricity generation.

Some of the topics, such as electricity market restructuring or energy policy, are treated mainly through the Swiss experience. But this experience is always grounded in the worldwide context and turns out to be of great interest to readers of all nationalities. For instance, one is amazed by the number of popular votes on energy matters that have been held in Switzerland as well as the complexity of the subjects involved. The need for Swiss citizens to take positions on such complex matters probably explains the origin of this book.

The author displays great pedagogical skills. For instance, an illuminating analogy is made between electricity transmission and blood circulation. He clearly defines the "rebound effect" and "backstop technologies and gives a good explanation of the structure of the electricity market." He explains that relocation of energy intensive industries can reduce energy intensity of one country but that country will then import "gray energy", i.e. the energy incorporated in imports. Overall, the author is able to describe the topics in simple terms while conveying their full complexity.

However, the clarity found in each topic or component does not permeate the book taken as a whole. The book lacks structure, so that it is hard to extract the promised "synthesis" out of it. The introductory chapter is a case in point. In a mere 9 pages, the author narrates the September 2003 black-out in Italy, lists and comments on Swiss popular votes on energy, offers interesting discussions

on the credibility of experts and on risk assessment, and presents the different measures of energy (KWh, J) as well as the first and second laws of thermodynamics. Although each of topics is a good and independently well explained teaser, the reader is left to herself to bridge the links among them and to guess on how this puzzle will be assembled in later chapters. In fact, it remains difficult to relate these introductory topics to the other chapters even after one has read the whole book. For instance, the 2003 black-out is presented in the introduction as a proof that it was “time to rethink the whole organization of the network and its operators”.<sup>1</sup> But the 2003 black-out is not directly referred to in the chapter on competitive electricity markets, not even in the section “Critical Appraisal of 20 Years of Trials”.<sup>2</sup> Similarly, the last chapter does not attempt a wrap up, but rather opens a series of discussions on ideology, sustainable development and governance. Although these discussions are interesting, they are not obviously linked to the mine of information given in the book. A passage of the conclusion even includes the idea of markets of CO<sub>2</sub> permits, which, except for a brief mention of related green certificates in the chapter on electricity generation technologies, is not treated elsewhere in the book.

Maybe this lack of unity comes from the stated aim to present facts and to let the reader come to an opinion about them. But the result is that it is not clear how to gather these facts to make an opinion. I believe that it would have been interesting if the author offered more guidance, based on the information he provides, on the course of policy that he thinks should be taken. Even though the reader would be free to disagree, this would have the pedagogical feature of providing readers a key on how to use the author’s expertise. This would also convince them of the value of understanding the concepts presented. The amount of information to assimilate and the fact that this information leads to rather weak statements that often look superficial (such as “The idea is to provoke good ruptures and avoid bad ones”)<sup>3</sup> can make the reading rather tedious sometimes.

Despite this fact, this book is highly recommendable for the non specialist. My perceived lack of unity and purpose does not hinder the fact that each topic treated brings, in simple terms, rich insights on complex contemporary issues related to energy markets. This is a rare accomplishment.

*Michel Roland*  
*Department of Economics*  
*Université Laval*

1. My translation. The original text is : “Ce black-out a prouvé qu’il était grand temps de repenser toute l’organisation du réseau et de ses opérateurs, nous verrons comment,” p. 10.

2. “Vision critique sur 20 ans de tâtonnements,” p. 101.

3. “L’idée doit être de provoquer de ‘bonnes ruptures’ et d’éviter les mauvaises”. p. 43.

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***Competitive Electricity Markets: Design, Implementation, Performance***, edited by FERREIDON P. SIOSHANSI. (Amsterdam: Elsevier, 2008) 624 pages, ISBN-13: 978-0-08-047172-3.

It should come as no great surprise that electricity reform is difficult. The (very limited) quantitative cost-benefit analyses suggest that successful reforms can reduce costs by 5-10% permanently. Two consequences immediately follow from this modest potential cost reduction: a flawed reform can easily fail to reap these gains and lead to very costly outcomes. Second, redistributions from moving to market pricing may be large compared to the net gains. In many restructurings, the (possibly new) owners typically gain (otherwise they are unlikely to buy or accept), while consumers or the government (if privatising) often lose. Small wonder that such reforms are often treated with suspicion by voters. The recent windfall profits of European electricity companies granted free carbon allowances but including carbon prices in electricity prices generated billions of euros in windfall profits and did little to enhance the reputation of liberalized markets.

Two years ago Sioshansi collected together an impressive collection of 18 chapters on *Electricity Market Reform*, which examined most of the major reform examples. Joskow's masterly introductory chapter drew out the lessons from these examples, also noting that although reforms offered the prospect of significant potential benefits, they also carried the risk of significant potential costs. Two years on, this more sober volume sets out thematically the scale of the reform challenge, and why there is such a tension between arguments for completing the reforms and arguments for re-regulation to recreate the supposed benefits of the old model.

Pollitt's introduction sets the tone by asking how to get the balance between liberalization and regulation right, and why so few countries that followed the UK model were successful – increased volatility in retail prices (and subsequent rent redistributions) appear to be part of the problem. Chao, Oren, and Wilson take up that theme in their important chapter on the costs and benefits of unbundling and vertical integration. Vertical integration was the dominant structure in both investor- and state-owned electricity industries and was remarkably robust, resisting reform for nearly a century. Unbundling introduced a significant new source of wholesale-market risk, for demand and supply are such that short-run variations in the market price can be dramatic, varying from \$5-5,000/MWh over a single day; with average monthly prices in California trebling over a few months in 2000-1. When wholesale prices are high, generators gain and consumers lose, and vice versa when prices are low.

Vertical integration between generation and retailing eliminates such risks – as could contracts, but with higher transaction costs, credit risk and short time horizons. The old model typically bundled generation and transmission, while the new model bundles generation and retailing, both potentially competi-

tive segments that might escape competition-authority scrutiny. Unfortunately, the contracts that an unbundled structure relies on to hedge risk also mitigate market power, a benefit absent from the integrated form. The political attraction of smoothed prices may thus come at the cost of greater market power. The old model resisted reform by obscuring costs and assuring security of supply. The new model may at least bring stability with some transparency, if wholesale markets are liquid and competitive.

Allocating and minimising risks emerges as a key determinant of success, and while large consumers benefit from retail competition, it is doubtful that smaller consumers do. Markets work well where innovation and product design are important and efficiency varies between suppliers – none of which applies to domestic electricity retailing, where the retail margin should be a small fraction of the total delivered price. The case for retail competition is mistrust that regulators will determine an acceptable wholesale price, although competitive tendering for a default retail supply might work, as in Alberta.

Wholesale markets transact energy, only one of the many services supplied by the system, and the book stresses the importance of properly pricing reserve capacity, fast-response balancing services, voltage and frequency stability, and the transmission system, all of which came bundled together in the previous model. One of the disputed issues is whether a decentralised power exchange and contact market with self-dispatch can deliver the efficiency of a centrally dispatched system. Another, increasingly pressing, is whether a liberalized market can deliver timely and suitable investments in both base-load and peaking generation and transmission (although the success of different jurisdictions on transmission interconnection was lamentable before reforms). Both topics are well covered in the book.

Another message that cross-country comparisons bring out is that the European model of a Transmission System Operator (TSO), owning and managing the grid with incentives to minimise system operations costs, has advantages over the Independent System Operators (ISOs), who are forced to follow rules that can frequently be gamed by powerful generating companies.

Subsequent chapters pick up various themes. Chapter 2 by Correljé and de Vries explain the different patterns of restructuring, noting that fast growing developing countries that restructured to finance investment chose models that yielded “an ambiguous, unstable situation, particularly in the context of macro-economic shocks” while many European countries, under pressure from various Directives, suffer from ineffective regulation, lack of transparency, inadequate signals for generation and insufficient interconnection investment, among other problems. Cornwall takes up the issue of European market integration in a useful chapter that sets out the agenda of key pan-European institutions such as ETSO, Ergeg and CEER.

Part II deals with market performance with helpful details of the U.S. experiments in chapters 4-5. Sioshansi, Oren, and O’Neill address the question of self-commitment vs. central dispatch. Unsurprisingly, the central bidding processes are not strategy proof, as we know from the UK Electricity Pool, and can ap-

parently arbitrarily redistribute rents. Such criticisms favour self-dispatch, which risks losing some of the benefits of coordination. The choice is thus between two imperfect designs.

The authors simulate the two models (assuming competitive behaviour) using data from ISO New England (ISONE). The results are instructive – profits to the generators would be 85% higher under self-commitment but commitment costs are higher by 1.4% of (centrally dispatched) settlement (or 2.1% of gross profits). This efficiency loss would amount to \$90 million annually for ISONE's 6.5 million customers, or \$15/customer, significant compared to the potential efficiency gains of liberalization. The example points to the importance of quantifying the costs and benefits of these alternatives.

Part III deals with capacity, resource adequacy and infrastructure investment, the major concerns of liberalized markets. Chapter 9 by Adib, Schubert, and Oren assesses whether capacity payments are needed to justify investment in energy-only markets, arguing that the problem of the “missing money” (needed to compensate new investment) are “a direct consequence of the fragmented oversight of electricity markets in the United States.” Other, better designed or regulated, energy-only markets do not seem to suffer from this problem, perhaps again signalling the critical difference between the ways in which TSO's are better incentivised and given more discretion outside the U.S. The authors argue for “energy price risk managed by loads and investment risk managed by generation developers” while accepting that “institutional realities of piecemeal electricity deregulation have made it seem unrealistic to many in the US.” Bowring's chapter then examines the performance of capacity markets in PJM, finding that net revenue was well below the replacement cost of generation between 1999-2006, leading to a major reform of the capacity market.

The final part of the book is a catch-all category, discussing renewable energy, distributed generation, and climate change issues which each present challenges to liberalized markets, not least because they give governments excuses to intervene again. Chapter 12 by Haas et al assesses programmes to support renewable energy sources with useful evidence on costs and effectiveness. Thus, the UK level of support to on-shore wind is about 7 Eurocents/kWh compared to 5 in Germany, but the latter has nearly three times the per capita wind generation despite a poorer wind resource, indicating that the form of support (feed-in tariffs rather than market-based instruments) matters for cost-effectiveness. Spain does even better with 2c/kWh support and nearly five times the UK penetration. Given that carbon is now priced in Europe, the case for extra support to renewables must be based on cost reductions such support will induce, ultimately encouraging deployment elsewhere to mitigate climate change. One should perhaps query why charging electricity consumers, many of whom are relative poor, for this public good is prudent on public-finance grounds, rather than using carbon auction revenues instead.

The editor is to be congratulated for recruiting such knowledgeable experts to report on reform progress. The book is at its best when the authors quantify the costs and benefits of alternatives, offering the prospect of learning from

mistakes. It also usefully reminds us that institutional and political constraints make it hard to move from the current to a better system.

*David Newbery*  
*University of Cambridge*