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Book Reviews

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Politics of Renewable Energy in China
by Chen Gang—review by David C. Broadstock

Economics of Electricity. Markets, Competition and Rules
by Anna Creti and Fulvio Fontini—review by Einar Hope

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BOOK REVIEWS

***Politics of Renewable Energy in China*,** by Chen Gang (Edward Elgar, 2019). 159 pages. ISBN 978 1 78811 814 9.

Historically speaking, energy markets have held close ties to country governance and politics. Governments have been known to provide support to infant industries with new technologies (including renewables for China in recent years) or to regulate the activities of natural monopolies and promote a 'fair' distribution of welfare between consumers and producers among other things. The choices made by state/provincial or national level governors and institutions, and their associated political interactions within and between each other as well as with firms and wider stakeholders, can be used to anchor power and offer incentives to influence market activities and outcomes.

This book touches on numerous aspects concerning the political interplay within energy markets, levying specific interest on the Chinese country context, and moreover with a focus on renewable energies. The author targets the book towards "*…readers with an interest in China's model of renewable energy industries…*" hoping to deploy its content as a "*…tool for researchers and professors of public and environmental policy…*" [quotes taken from the back cover]. It is a concise introduction, yet with sufficient breadth and depth of subject matter, making it feel like a useful 'primer' on the subject, and it is in this spirit which I assess this book.

The author of the book has a track record on writing summaries of Chinese policy and political process within the area of energy markets and environmental affairs. These include within books such as Mingjiang Li (2009, ed.) and Chen (2012), and academic articles including Chen (2015, 2016). These and other previous contributions help in establishing confidence that the author is a legitimate expert in China's political affairs as they pertain to the energy sector. The analysis within the book follows in the spirit of secondary research in political/social sciences, and contains relatively modest amounts of tables and figures, summarizing market facts. This is by no means a negative facet of the book; rather, it makes the content very accessible to a wide audience.

Considering the uniqueness, importance and timeliness of the book, I offer some light remarks. Regarding uniqueness, a quick search on 'a search engine for scholarly articles' reveals that although there are many contributions on energy policy and politics, there are only a few providing broad coverage in relation to renewable energy. As such, this book positions itself quite uniquely. Regarding the importance and timeliness of the topic, the increasing price-competitiveness of renewables, the need for more flexible and integrated energy systems, and the pressing urgency to avoid irreversible climate change, all contribute to an atmosphere of increasing demand for renewables. Hence, the book satisfies reasonable criteria for importance and timeliness.

The book has an approachable structure. However, whenever first scanning a book, I typically turn to the contents and then the index, before reading the back-page summary or any preface (noting this book does not offer a preface). The contents section of the book was lighter than I was hoping for and presented only the titles of individual chapters, thereby limiting more focused navigation around the subject matter within them. The index itself is slightly more useful and at the same time very revealing as to the focus of the book, being replete with names of places, and institutions, but with only a scattering of specific topics appearing

between. This signals the nature of the book is to offer a precise outline of the present layout, including key players, within the Chinese renewable energy sector.

To aid a potential reader of this book, a brief recapitulation of the chapters, and their content, is as follows:

- Chapter 1 introduces the main focus of the book—elevating attention on the issue of 'authoritarian environmentalism' as a process to be understood and addressed.
- Chapter 2 reviews "China's mercantile strategy to boost renewable energy" and includes the following sections: discussion on the overexpansion of renewable equipment manufacturing following the global financial crisis; the move away from subsidizing export-oriented manufacturing, to domestic renewable power generation; and some discussion of unintended consequences and latent risks that have emerged.
- Chapter 3 examines "Central authorities' top-down approach of promoting renewable energy" with sections covering: further discussion on the move from subsidizing equipment manufacturing to renewable power generation; reflections on the state of renewable energy law, including analysis of the statutory and enforcement flaws; discussion of the congressional and party leadership constraints in bureaucratic politics; and positioning central leadership's changes to policy priorities against the context of resistance from interest groups.
- Chapter 4 explores local challenges, with a focus on 'geographic and institutional barriers' proceeding by: highlighting key geographic and meteorological factors; considering industrial barriers arising from grid restrictions and issues of unused capacity; then revisiting the provision of overcapacity in an 'era of excessive investment'.
- Chapter 5 moves into the process of interaction between "Interest groups and the bureaucracy" delving into: China's fragmented energy bureaucracy; 'Tigers' in China's energy realm; the interactions between government regulators and state-owned energy giants; policy priorities, interest groups and the bureaucracy.
- Chapter 6 focuses on "Disputes over how to go low-carbon" with sections including: the change in policy focus from energy-intensity based targets to carbon intensity; competition within the low-carbon electricity sector; and reviews the importance and range of diversity in on-grid tariffs.
- Chapter 7 concerns the development of "Five-Year Plans and energy policy priorities" with sections on: the evolution of fossil fuel policy priorities; the changes in low-carbon targets between the 12th and 13th Five Year Plans; and discussion on the tension which exists between efficiency and sufficiency targets.
- Chapter 8 examines "Energy policy priorities in a fragmented authoritarian state" and begins with a section on the clashes between pro-growth and pro-environment institutions. The following sections complete the chapter: competition between thermal and low-carbon power sectors, and the role of the grid; the practices and processes of lobbying for favorable on-grid tariffs and policies; and the interplay of state versus society.
- Chapter 9 concludes with a reflection on "Policy priorities reshaped by central-level relationship and interest groups" with sections on: policy interactions between local and central government, interest groups, and societal forces (including international pressure); some additional reflections on matters of geography and the challenges of distance between points of resource supply, and demand centers; the rise of interest groups; the natural conflict in the objectives of the National Development and Reform

Commission (NDRC) and the National Energy Administration (NEA); further discussion on the topic of sufficiency instead of efficiency.

On balance, I felt this book presents a solid reflection on a range of core topics which not only relate to the processes of, and interactions with, politics in energy markets, but more fundamentally that it outlines key players and institutions as well as many major evolutions of recent Chinese energy policy.

I would recommend this book to graduate students of all levels, and early-stage energy professionals looking to (or recently starting) work in China, whether within renewables or other domains of the energy sector. The price point of the book is acceptable at £70, although pushing towards the high side given the page-length; nevertheless, at this price, any reader new to Chinese energy markets is provided with a succinct and self-contained primer. Moreover, while the country sets China as the context for the discussion, much of the subject matter contained in the book applies with some degree of generality to other markets also.

Whether or not the book might be credited as being an indispensable resource for researchers is hard for me to decide. I remain somewhat unclear as to whether the book advanced my knowledge, though I must caveat that my own 'journey' has seen me work inside the Greater China region for over a decade. Therefore, looking at things from another perspective, the book usefully draws together a core summary of key evolutions in Chinese energy policy, and reflects on issues pertaining to the political economy of energy markets—a subject area one might argue is due a renewal in the academic literature. Both of these features work in the direction of making this a citable reference for scholars.

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References

Chen G. (2012). *China's climate policy.* Routledge. https://doi.org/10.4324/9780203117453.

Chen G. (2015). "From mercantile strategy to domestic demand stimulation: changes in China's solar PV subsidies." *Asia Pacific Business Review*, 21(1): 96-112. https://doi.org/10.1080/13602381.2014.939897.

Chen G. (2016). "China's Low-Carbon Electricity Strategy: A Comparison of National Approaches to Promote Different Non-Fossil Fuels." *China: An International Journal*, 14(2): 1-22.

Mingjiang Li (2009, ed.). *Soft power: China's emerging strategy in international politics.* Lexington Books.

Economics of Electricity. Markets, Competition and Rules, by Anna Creti and Fulvio Fontini (Cambridge University Press, 2019). 350 pages. ISBN: 9781107185654

According to the authors, the purpose of this book is to produce "a comprehensive yet accessible textbook on the economics of electricity". They argue that such a textbook is missing, in spite of several manuals referred to in the introduction. And further, the book "is aimed at all those who have basic training in economics, perhaps in industrial organization, but who lack the specific knowledge required in applying economic models to the electricity sector".

Allow me a personal observation and reflection, when reading this book, on the major analytical developments that have taken place during the last decades in the area of electricity economics, with an emphasis on "markets, competition and rules". Thirty years ago, in 1989,

a research team at the Norwegian School of Economics (NHH) submitted a report, requested by the Norwegian government, to prepare an analytical and operational foundation for a market-based reform of the Norwegian power sector. My colleagues and I consulted all the available literature in this area at that time, taking proper account of the analysis of the specific features and properties of power systems, treated especially by engineers and physicists then. The report served its purpose well as an analytical foundation for the enactment of the Norwegian Energy Act of 1990 and the subsequent implementation of the market-based policy reform. However, when confronting the analytical level of electricity economics and the skills of economists at that time with the sophisticated level, and the scope, breadth and depth of the up-to-date analytical treatment of electricity economics, broadly defined, in the Creti and Fontini book, one is struck by the major steps taken forward in this regard over those decades.

The book is truly comprehensive, with 8 parts and 27 chapters, spanning from basic principles to smart grids, covering most aspects of electricity market design and competition; it also discusses some issues in relation to environmental challenges in the final part. Let us look at them in more detail.

In Part I, *Introduction to energy and electricity*, the authors explain some basic concepts and principles of energy in general and electricity in particular that they consider necessary to understand and design, for instance, a workable market model for electricity. This should be a required reading for every energy economist, especially for those who tend to consider electricity as any other commodity, potentially leading to disastrous power market incidents, like in the Enron case.

Part II, *The basic design of electricity system and markets*, is a sequel to Part I, going deeper into the basic features of power systems and the design of power markets. Topics cover here are, among others, the electricity supply chain, the four market designs (the vertical integrated industry, the single buyer model, the wholesale, and the retail markets, respectively), the time dimension of electricity markets, and also a discussion of some principles of electricity sector regulation, introducing the concept of natural monopoly and natural monopoly regulation. This part is a succinct prelude to the topics treated in the subsequent parts of the book, and an integral part of any course in electricity economics, even for students potentially familiar with the basics of power systems.

In part III, *Simplified isolated markets without network congestion*, the authors undertake the logical next steps in developing an organized market-based system, by focusing on simplified models, assuming away issues like, e.g., specific features of the transmission and distribution of electricity as well as the different time dimensions of markets. Chapters are devoted to load and power generation, the centralized solution to optimal dispatching, welfare maximization with time-varying load, the market solution to optimal dispatching, and issues related to balancing markets. I particularly liked the analysis and discussion of balancing markets, since this touches upon market design problems that typically have not received proper attention in the practical design and implementation of such markets, as I see it.

My favourite part of the book is Part IV, *Competition in wholesale electricity markets*, partly derived from my practical experience with competition and regulatory policies during an interlude as head of the Norwegian competition agency in the 90s, a time when such policies for the electricity sector were very much formed and tested. The authors present and discuss various types of models and strategies for the analysis of market behaviour and outcome for wholesale power markets, concentrating on Cournot, supply function equilibria, and uniform auction models. They argue, rightly, that electricity markets are prone to the exertion of market

power, partly due to the typical concentrated structure of such markets and partly due to the special characteristics of electricity in a market context. They also emphasize, however, that it may be difficult in concrete cases to distinguish between the actual exercise of market power from price spikes occurring due to the basic functioning of such markets. Personally, I would have liked to see an extended discussion of issues of competition strategies and market power in this part, because they are so central to the efficient functioning of power markets. This also should apply to any text on electricity economics in general, and economics of electricity markets in particular, including a discussion and analysis of actual cases of market power exertion. Admittedly, a few such cases are mentioned, e.g. the California power market breakdown, but only tangentially and without any deep analysis.

Part V, *Introducing transmission networks: Network congestion and electricity import-export,* focuses on the economic analysis of power transmission and its coordination with power markets. This is perhaps the most thorough and innovative part of the book. Transmission networks are of fundamental importance for the efficient functioning of electricity markets and their role has not received in my opinion sufficient attention in many market analyses. Five chapters are devoted to the analysis of transmission networks in the book: Electricity transmission: basic principles; Meshed networks and congestion; Transmission pricing in practice; From nodal pricing to transmission capacity expansion; and Transmission rights and price risk hedging. The analysis is lucid and rigorous and this part should be a required reading for anyone who would like to come to grasp with the important interplay between the transmission system and the electricity market. This said, however, one should warn against a development where transmission system considerations are prioritized over market allocation mechanisms, or interfering unduly with the proper balance between the two. This is not meant as a criticism of the treatment of transmission system issues in the book, but rather as a comment to the proper division of labour and responsibility between the two systems in practice in the organization and regulation of some power systems around the world.

Part VI on *Economics of electricity retail markets* is a natural sequel to parts IV and V, representing the end of the power supply chain. Issues treated here are different pricing schemes and formulas, like real-time pricing, second-best pricing, and two-part tariffs. In Chapter 20, there is an interesting box on retail pricing and retail competition in Europe, comparing prices to households and industrial customers across European countries. This illustrates well the problems of undertaking such comparisons on a uniform basis, because, e.g., of different electricity tax and levy systems, and tariff systems, across countries. An inherent problem with the efficient functioning of retail markets is to supply consumers with relevant price and market information, as a basis for decisions e.g. to switch supplier and thus stimulating competition, in addition to the inertia of consumers of switching for a commodity like electricity, even when they have the relevant information. This may well change with the introduction of new technologies and digitalised systems at the consumer level; discussed for smart grids in the final chapter (Chapter 27) of the book.

Wholesale electricity markets may in general function well within a given generation capacity but maybe not so well when capacity expansion is needed. This is the focus of Part VII of the book, *Investing in power generation*. The analysis starts in Chapter 21 with the optimal investment problem in a planned setting, i.e., in a framework where a central planner must decide on the optimal level of investment. Optimality conditions are derived and compared with the similar short-run conditions for a monopolistic case in Part III. To me, the analysis and discussion of capacity remuneration mechanisms (CRMs) in Chapter 23 were particularly

interesting and enlightening. The authors classify such CRMs into capacity payments, capacity auctions, capacity obligation, strategic reserves, and reliability options, and refer to examples of power market systems where different CRMs are applied.

The final part of the book, Part VIII, is devoted to *Environmental challenges and the future of electricity markets*. It begins with a chapter on global warming and electricity markets, where the immediate connection is, of course, that electricity production, particularly based on fossil fuels, is a major source of greenhouse gas emissions (GHG). This is an external effect and calls for proper regulation. There is a brief reference to the European Emission Trading Scheme (EU ETS) and a discussion of grandfathering, i.e. when the initial permit allocation is given for free. A main takeaway from this part is an illuminating analysis of renewable energy sources, a discussion of support schemes for such sources, and how to integrate renewables into the electricity system. As mentioned above, the book ends with a chapter on smart grids. The topics and issues treated in Part VIII will undoubtedly be given more space and attention in future texts on electricity economics.

My evaluation and conclusion are that Creti and Fontini have written an excellent textbook on electricity economics, integrating relevant knowledge and insights from different scientific fields into a coherent analysis of modern electricity markets. The book is comprehensive in coverage, rigorous in analysis, and terse in style. Perhaps too comprehensive, rigorous and terse, even for graduate-level students of electricity economics. The authors provide a guide to possible teaching sequences, depending on the length and level of a course, but then the very comprehensiveness of the book is a learning asset in itself. The book is technically demanding to read, partly due to some long mathematical derivations in the text that could have been relegated to appendices, without undue loss of understanding, I think. I would also have liked to see more practical examples included from electricity economics and related fields, e.g. from competition and regulatory policy cases. All this may have improved the book and even made it more interesting and accessible for a wider audience of readers.

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