

BOOK REVIEWS

Energy Economics: Concepts, Issues, Markets and Governance by SUBHES C. BHATTACHARYYA. (Springer-Verlag London Limited, 2011) 721 pages. Hardback ISBN 978-0-85729-267-4.

Energy economics is an established field without an established textbook. Bhattacharyya's book is a valiant attempt to fill this gap. The strengths and weaknesses of the book stem from the same source: its vast scope. The book provides a discussion of energy demand and supply, the characteristics of energy markets and issues facing the energy sector, energy and the environment, and regulation and governance of the energy sector. Each of these could be the subject of a fairly long book. The inclusion of all of them here means not only that "the size of the book has gone up," as the author states, but that the quality of the chapters is uneven. The book does a good job at introducing basic concepts, which may be helpful to its intended audience of students. However, only cursory attention is paid to the important topics of environmental economics and regulation, as well as the financialization of the energy sector.

THE BASICS: DEMAND & SUPPLY

After a brisk introduction to the main players in the field of energy economics and the interactions among them, Part I is devoted to energy demand analysis and forecasting. Chapter 2 introduces basic concepts that will be helpful for those who have drifted into energy economics from other sub-fields of economics. One example is the discussion of the energy accounting framework that shows how to avoid double counting in the process of tracking energy flows from original supply sources through the conversion process to end-use demands.

The following three chapters analyze energy demand at the aggregate and sectoral levels and how to forecast energy demand. These chapters provide an explanation of basic concepts of energy demand analysis, e.g., why an analysis of energy demand requires modeling the joint decisions of appliance purchase and capacity utilization. The discussion of sectoral demand analysis is quite detailed. There is also a useful introduction to concepts of energy efficiency, methods of demand side management and standard models such as the National Energy Modeling System (NEMS) used by the U.S. Department of Energy in preparing its Annual Energy Outlook).

In contrast, the discussion of econometric methods of energy demand forecasting is a disappointment. There is an overly long discussion of some very basic techniques like fitting a linear trend, while the discussion of other econometric methods for estimating and forecasting energy demand is rudimentary and not up-to-date. In general, econometrics does not seem to be author's forte; for example, co-integration is barely mentioned and there are hardly any references to econometric work over the last decade. Hence, for those who intend to teach energy economics but with a lot of emphasis on econometric estimation, the book would have to be quite heavily supplemented with additional material.

Part II contains five chapters on energy supply. Chapter 7 applies basic cost-benefit analysis to energy projects. The author notes the main characteristics of energy projects—capital intensiveness, asset specificity, long-life of assets, and the long gestation period—that make it challenging to assess their costs and benefits. The following chapter continues the description of energy projects, providing greater detail on the various stages, such as exploration, the investment decision, and field development. Chapter 9 is a very brief—5 pages in all—discussion of the theory of exhaustible resource supply, essentially the Hotelling model. The author defends this brief treatment by arguing that "the theory has not helped much in understanding the fuel price behavior."

Chapters on electricity supply and renewable energy supply conclude this part of the book. The former discusses alternative options for electricity generation and dispatch; it also discusses investment decisions in the electricity sector, providing an introduction to simple methods to determine the choice of technology such as the “levelised bus-bar cost” and “screening curve” methods. The latter chapter provides an adequate discussion of the share of renewables in overall energy supply and the cost features of supplying renewable electricity and bio-fuels.

PUTTING IT TOGETHER: ENERGY MARKETS

The six chapters that follow are on energy markets and make up Part III of the book. Chapter 12 starts with an introduction to the competitive market model, which is then extended to account for the specific characteristics of energy industries noted earlier (viz. high capital intensity and asset specificity, and exhaustible resources). This chapter also discusses market failures and the main policy instruments available to governments to intervene in the energy sector. Chapter 13, which is on energy pricing and taxation, has a discussion of average and marginal cost pricing and peak and off-peak pricing. The author then discusses the complex web of energy taxes and subsidies that various countries have in place, noting that the complexity reflects the many—often competing—goals that governments are trying to achieve.

The three chapters that follow provide descriptions of the markets for oil, natural gas and coal, respectively. Chapter 14 provides a useful account of the evolution of international oil market, covering both the pre- and post-OPEC eras, and of models of OPEC pricing behavior. A major shortcoming of this chapter is the very thin discussion—barely over one page—of the commoditization and financialization of oil markets. Given the importance of this development to energy markets, a much more detailed treatment was warranted.

The chapter on natural gas markets is quite comprehensive, covering the specific physical attributes of natural gas, basic facts on gas trade and transportation, and gas pricing; in contrast, coal markets are given short shrift in chapter 16. The chapters on oil and natural gas contain no discussion of the unconventional energy boom sweeping North America at present, which is perhaps understandable as these developments are quite recent. The unconventional energy sector should be a focus of the next edition of the book. This part of the book concludes with a long chapter on an integrated analysis of energy systems, based on the author’s own work. This chapter discusses top-down and bottom-up approaches to the modeling energy systems and well as simple computable general equilibrium models for modeling energy-economy interactions.

Electricity markets are not discussed in this portion of the book, but are instead discussed in the Chapter 29, which should be renamed “Reform of the Electricity Industry” because it focuses exclusively on the electricity sector.

Part IV of the book consists of five chapters on specific topics related to energy markets. Chapter 18 provides an overview of the issues facing resource-rich and resource-poor countries. The author discusses in particular the odds of a transition away from the use of oil in the transport and how this would re-shape the global energy landscape.

The following chapter discusses how oil-importing countries deal with high oil prices and the factors that influence the impact on the economy. For those particularly interested in teaching energy-macroeconomy interactions in some detail in their courses, this discussion will not prove adequate. There is no mention of what would be considered the key papers in this literature (e.g. Hamilton 1983, Blanchard-Gali 2009; Kilian 2009).¹ Thus there is no discussion, for example, of

1. Hamilton, James D. “Oil and the macroeconomy since World War II.” *The Journal of Political Economy* (1983): 228–248; Blanchard, Olivier J. and Jordi Gali (2009). “The Macroeconomic Effects of Oil Shocks: Why are the 2000s So

how more adept reactions from central banks to oil price shocks may have muted their impacts compared to the effects in the 1970s. This chapter also discusses the impacts of high oil prices on resource-rich countries, noting the possible Dutch Disease effect and the challenges associated with management of the windfall gains. There is a brief discussion of the use of petroleum funds but not commensurate with the policy importance of the issue.

Chapter 20 continues with the theme of the impacts of high oil prices by discussing how countries have adopted diversification as a strategy to bolster their energy security. As the author notes, “the logic is simple: do not put all the eggs in one basket. This is because the risk of supply disruption is high when a country relies on a single source for its energy supply (i.e. becomes a captive consumer).” The chapter provides a good discussion of the basic measures of diversification, such as the Herfindahl-Hirschman and the Shannon-Weiner-Neumann indices; showing how countries rank in energy security based on these indices would have been a useful addition here. The chapter also discusses energy efficiency improvements and the use of strategic reserves as a means of improving energy security.

Chapter 21 tackles the important issue of investment in the energy sector. It provides estimates of the global investment needs and discusses the sources through which they could be financed, with particular emphasis on the relative importance of domestic mobilization and foreign direct investment. Chapter 22 is a welcome discussion of access to energy. It notes that though there is considerable uncertainty about the estimates, perhaps a quarter of the world’s population still lacks access to electricity and to clean sources of energy for cooking. Reliance on biomass for cooking is associated with serious health effects such as respiratory diseases. The chapter concludes with a discussion of steps that could be taken to enhance energy access.

ENVIRONMENT AND REGULATION

Parts V and VI are fairly short: Part V covers the economics of energy-environment interactions in a little over a 100 pages and Part VI skims the surface of regulation and governance of the energy sector in under 75 pages.

Chapter 23 starts out by listing the various environmental damages caused by human activities—a table in this chapter gives them the puzzling label of ‘insult’; perhaps the author meant to say ‘injury’—such as lead poisoning and mercury emissions. It discusses the environmental Kuznets curve, the view that emissions initially increase with income per capita and then decline. It notes the evidence in favor of the hypothesis is mixed; hence “proactive policies and measures” are needed to mitigate the problem. The basic economics of environmental protection that follows is taken largely from Baumol and Oates (1968).²

The two subsequent chapters discuss pollution from stationary and mobile sources. The author notes that attempts to control pollution still rely more on “command and control” techniques such as setting of standards than on taxations and trading of emissions. The final two chapters of this part of the book provide a basic introduction to the problem of global warming and the steps that countries have taken to cope with it such as the emissions trading system of the EU and the Clean Development Mechanism under international agreements such as the Kyoto Protocol.

Different from the 1970s?” in J. Gali and M. Gertler (eds.), *International Dimensions of Monetary Policy*. University of Chicago Press, pp. 373–428; Kilian, Lutz. “Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market.” *The American Economic Review* (2009): 1053–1069.

2. Baumol W.J. and W.E. Oates (1988), *The theory of environmental policy*, Cambridge University Press.

The economics of energy in frontier economies and emerging markets is quite different from the tradeoffs facing more industrialized countries. It is difficult to address climate policy without a more in-depth discussion of the differences facing different countries. A more in-depth analysis of differences across countries would be helpful. Although there is a discussion of resource-rich versus resource-poor countries in Chapter 18, low-income countries face unique environmental challenges that should be discussed.

Part VI consists of two chapters, of which the first is a standard discussion of traditional rate of return regulation which is largely taken from Kahn (1989).³ The remainder of the chapters discusses alternatives such as price and revenue caps and performance based regulation. The book concludes with a chapter on reforms of the electricity sector with a focus on the move towards deregulation of the sector and options for introducing competition such as open access and pooling but does not mention reforms in the natural gas sector. We note that a discussion of the regulatory environment in the energy sector is complicated because of issues related to both vertical and horizontal concentration; global trade; and regional and local regulatory issues.

SUMMING UP

The field of energy economics spans microeconomics and macroeconomics. It requires knowledge of both economic theory and econometrics, and increasingly an understanding of finance. The writers of this review are a microeconomist and a macroeconomist by training: each felt that the book was lacking in our areas of expertise but provided some useful information in the other areas. This, as we noted at the outset, is both the strength and weakness of the book: it is vast in scope but uneven in quality. The book does not have a narrative thread or a sense that one chapter builds on the previous chapters. Instead, the book comes across as a kaleidoscope where with every turn of a few pages one is presented with a new arrangement of the material.

A casual Google search reveals that the book is being adopted for courses, suggesting that it is filling a need. As the author points out in the introduction, the energy sector is a complex series of markets. The book does a good job of introducing the reader to the wide diversity of regulatory and competitive issues at the global, regional or local level within the energy sector. We hope the second edition of the book remedies some shortcomings, such as the lack of discussion of financialization of energy markets and the unconventional energy revolution in North America. One other fix that will help is to include an index at the end—a book that is already over 700 pages long would be well-served by adding a few more pages and providing readers with an easy way of perusing its contents.

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U.S. Energy Policy and the Pursuit of Failure, by PETER Z. GROSSMAN (Cambridge University Press, 2013) 416 pages, ISBN 9780521182188 paperback.

For forty years U.S. energy policy has been viewed through a framework first constructed in the early 1970s. Indeed, before the 1970s scarcely any thought had been given to the idea of a

3. Kahn, A. (1989) *The economics of regulation: principles and institution*, MIT Press.

singular and cohesive national energy policy. We may have been better off without the idea. In the name of a national energy policy, as Peter Grossman details in his book, we have been subjected to four decades of political hubris on energy topics, often followed by wasted spending and ineffectual regulation.

The common view of the energy crisis of 1973, promoted by politicians in the 1970s and enshrined now in high school history books, positions the United States as victim of an injurious oil embargo enforced by the Organization of Arab Petroleum Exporting Countries. Grossman gets the history right. The embargo may have required some shifts in import sources, but the decades-old trend of increasing oil imports continued with the merest of pauses. The crisis was created by U.S. policies, not by an international oil cartel.

The sharply higher international price of oil in the early 1970s did require adjustments, but the crisis arose because useful adjustments were frustrated by Nixon's oil and gas price controls and limits on interstate movements of oil due to the Mandatory Oil Import Quota program. What would likely have been a costly but relatively brief period of adjustment was instead a period of shortages, gasoline lines, and desperate searches for political solutions. This search for political solutions yielded President Nixon's "Project Independence," announced a few weeks after the OA-PEC embargo began, which made energy independence the centerpiece of U.S. national energy policy. As is often noted, every President since Nixon has paid homage to the idea of energy independence.

Grossman's first chapter, "Crisis," describes the political floundering in response to energy issues. But Grossman only reluctantly employs the phrase "energy crisis," claiming the term lacks sufficient substance to be analytically useful. A section termed "Energy Crisis Economics" interjects a discussion of basic supply and demand analysis and connects the discussion to the policy narrative. It is in this mixing of policy narrative with basic economic analysis that sets Grossman's book apart from similar energy policy books.

Grossman continues with a chapter presenting a foundation for energy policy analysis, including both the familiar market failure approach and a complementary examination of government failure. Beginning with the Carter administration's Executive Order 12866, each president administration has declared regulatory efforts should clearly identify the market failure or other specific problem intended to be addressed. The principle may have had modest effects on regulatory practice, but it has not constrained political ambitions for managing energy production and consumption.

Subsequent chapters continue the policy narrative accompanied by short explications of the economic principles applied or ignored by policymakers. Grossman is particularly sharp in his examinations of the vast gaps between ambitious political claims and everyday economic realities. Grossman repeatedly observes, as a Carter aide once said, when the public perceives an energy crisis, the government must do something, anything, even if it is wrong. Political logic drives politicians into action, whether or not they understand the problem. Therefore politicians speak of gaps emerging between supply and demand, as if prices play no role. Seemingly every time energy prices jump, a politician will invoke the Apollo program or the Manhattan Project in defense of grand energy projects. Grossman distinguishes clearly between well-delineated government projects in pursuit of grand goals, in which cost is a minor concern, and the creation of a commercial energy resource or product intended to be taken up by consumers, where price is critical. Over the past forty years the politicians have changed and the issues shifted a bit, but the policy failures have remained strikingly unchanged.

The lessons Grossman derives from his chronicle of failure are summed up in his final chapter, "Modesty." Fortunately, in his view, the ineffectiveness of most energy policy efforts have left energy industries mostly in the hands of the market. Nonetheless, policy failures have reduced economic efficiency and cost American taxpayers billions. The final chapter explains Grossman's program for a more modest energy policy.

Grossman's book is a bit of a hybrid. For the most part he presents a thorough analytical narrative of the past forty years of national energy policy. Intermingled in the narrative are explanations of basic economic and political analytical tools useful in understanding his critiques. But despite recourse to standard tools of analysis, Grossman's book is not entirely a dispassionate review. His clear enthusiasm for, or perhaps particular point of view on, energy policy is displayed repeatedly, as when terming one politician's bill "especially inane," another bill "implausible on every conceivable margin," and editorializing that Nixon's desire for energy independence was simply absurd. The shifting tone from calm analytical narrative to opinion-charged commentary was a bit off-putting. More substantively, not every target of Grossman's commentary will feel the condemnations justified within the text.

The book would have benefited from a stronger editorial hand. The readers gets too much detail on the coming and going of people and policy proposals, especially in the chapters covering the Nixon, Ford, and Carter administrations. Nothing in the grand narrative arc of U.S. energy policy depends upon the name of the head of a short-lived energy policy agency in the mid-1970s. Perhaps all of the bureaucratic shuffling well illustrates the floundering of the Nixon, Ford, and Carter organizations as they struggled to do something about energy. Still, the swings from high level analysis to bureaucratic minutia makes for less than compelling reading. The unevenness of tone could have been smoothed out without losing Grossman's obvious enthusiasm for the topic. The final chapter could have been a clarion call for a more modest energy policy, but it lacks the organization and polish needed to shine.

Nonetheless, the book presents a well-founded critique of U.S. energy policy over the last four decades, provides a grounding in the tools of analysis needed to assess policymaker action, and sets out a thoughtful program for reform. According to Grossman the first step in reforming energy policy is to change the narrative away from energy dependence, and the second is to make energy policy about identified energy market failures. Even these two straightforward changes would yield big improvements in energy policy making. Despite its flaws, the book is a valuable assessment of U.S. energy policy and ought to be read by policymakers, students of energy policy, and policy analysts.

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