



BOOK REVIEWS

The Regulation of Power Exchanges in Europe, by MARTHA M. ROGGENKAMP AND FRANÇOIS BOISSELEAU, EDS. (Intersentia, 2005), 311 pages, ISBN 90-5095-317-4.

The editors of this collection of essays describe this volume as “an initial effort to answer the need for an in-depth study on the regulation of power exchanges in Europe.” While this initial effort has some value, readers looking for an in-depth exploration of this topic are likely to be disappointed. It would have been more accurate had they billed *The Regulation of Power Exchanges in Europe* as an introduction to the role of power exchanges in some of Europe’s liberalized electricity markets. Aside from the introductory and concluding chapters, the bulk of the book’s essays provide a look at the power exchanges in the Nordic market, the UK, Netherlands, Germany, France, Austria, Spain and Italy.

The focus on the Nordic market is regional and the others is national, illustrating the editors’ claim that rather than an internal market, “a system of 15 separate and divergent liberalized energy markets has gradually been established.” Despite the appearance of separation and divergence, these markets are being brought together by European Union (EU) directives and regulations, major European utilities increasingly operating across national borders, and common policy goals. Certainly the book’s nationalist approach highlights the divisions within the EU’s electricity market, but it also offers too balkanized a perspective, leaving the European dimension underappreciated.

The introductory chapter, written by the editors, provides a general overview of the state of electricity liberalization and the role and operation of power exchanges in the EU. It concisely defines the relevant market terminology and describes how spot, future, and forward markets work. It, like the essays that follow it, tends to take a structural approach, describing the legislation and the institutions regulating and participating in Europe’s electricity markets. This makes for highly repetitive reading, as the development of each liberalized electricity market is described in turn. To read one or two of these essays would be fine, to read the book from cover to cover is somewhat laborious. It would have helped if the editors had set forth early in the book the primary goals of power exchange regulation.

Wading through each nation’s electricity regime, it is easy to forget what all this regulation is supposed to be about. In the book’s last few pages, in an essay comparing legal forms of power exchanges, that would have been better placed toward the front of the book, Barry Barton offers a concise statement of the role of power exchanges in the internal market. “A power exchange,” writes Barton, “needs to be constituted and organized in a way that enables it to play its part in

promoting an electricity market that is characterized by low electricity costs, high standards of security and quality of supply, and encouragement of investment (but not over-investment) in new generation.” How regulators can help a power exchange “play its part” was worthy of exploration, and such treatment would have given the reader a barometer with which to judge the various national and EU regulatory systems that parade through the pages.

Each of the essays provides at least a competent overview of the relevant national or, in the case of the Nordic market, regional, liberalized electricity regime, with an emphasis on power exchanges within that regime. Perhaps the best essay is that on the Nordic electricity market by Odd-Harald Wasenden, but he had the most to work with given the advanced state of that market, including the presence of physical and financial trading. The regional nature of the Nordic market, consisting of four states with varying systems and power generation sources, make it arguably a model for the rest of Europe. The Nordic market as a model for Europe would have been a thematic approach worthy of a complete chapter, as it is the theme is left underdeveloped.

While the essays are all competently executed, the structural focus leaves some glaring gaps in coverage. None of the essays adequately investigates how equipped market regulators are to deal with potential gaming of the system. There seems to be an underlying assumption that all power-exchange participants are virtuous all of the time. No mention is made of the California electricity crisis, and none of the authors undertakes even a cursory examination of whether similar manipulation is possible in the markets under examination.

In the essay on the Netherlands, written by the book’s editors joined by Onno Verkuyl, there is a graph showing the daily base-load average prices on the Amsterdam Power Exchange (APX). There is a tremendous spike in the graph around August 2003, where the price shot up markedly for apparently a matter of days before falling to the lower end of normal levels. Although this spike screams out for explanation, it passes uncommented upon. A similar graph in the essay on France by co-editor Francois Boisseleau and Nicolas Charbit shows a similar price-spike at the same time as that on the APX, which is briefly explained as resulting from a heat wave and an “important reduction of French nuclear-power capacity.”

While at least this provides some information about the French price-spike, it raises even more questions about the Dutch price-spike. The Netherlands does not use nuclear power. Was the APX reacting to the French market? Is the Dutch market also prone to weather-related spikes? Certainly, such volatility raises the concern that someone could game the market, and given the age of global warming one might reasonably be concerned that future similar spikes are possible, if not likely. Are European regulators concerned about such volatility and possible market manipulation? Even assuming there is no gaming of the system, are regulators concerned with who wins and loses during such volatility? Even had the essays authors done a better job of exploring the risk of gaming these power exchanges, the nationalist limitation on the essays would leave significant gaps. Europe’s big electricity players operate across Europe, hardly limited by

national borders. If someone games the system, they quite possibly will do so transnationally. These essays do nothing to flesh out this possibility, nor how EU or national regulators may deal with it.

The Regulation of Power Exchanges in Europe suffers from a couple of other shortcomings. The absence of an index is regrettable and hampers the book's usefulness. Even worse is the editors choice to ignore the EU's 10 newest members. At a minimum, there should have been an essay looking at the development of power exchanges in these transition economies.

While it's doubtful that the editors really succeeded in "answer[ing] the need for an in-depth study on the regulation of power exchanges in Europe." They have provided some valuable groundwork. Drawing from *The Regulation of Power Exchanges in Europe*, a thematically based treatment needs to examine the subject with a European perspective, not a nationalist one. Such a work might examine: the Nordic market as a model for the EU; the role of financial electricity markets and their relationship to physical markets; the role of power exchanges in providing pricing information; the dangers of gaming power exchanges and the regulatory response to such dangers; the threat of industry capture; and, power exchanges and EU enlargement.

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The Urban Household Energy Transition Social and Environmental Impacts in the Developing World by DOUGLAS F. BARNES, KERRY KRUTILLA, AND WILLIAM F. HYDE, ISBN 1-9333115-07-6, Washington D.C., Resources for the Future, paperback, p. 141.

As the urban poor in developing countries flood into the cities, the amount and character of their household fuel energy consumption changes. Typically, there is a transition from biofuels to kerosene or coal and ultimately to LPG and electricity. The authors of this book argue that studying this transition is important because developing country governments are often extensively involved in the energy sector and an understanding of the transition will help them design more effective policies. Thus, governments can take into account equity considerations since poorer consumers usually are using the more traditional fuels and environmental concerns including the amount of deforestation and the health consequences of traditional fuels.

The authors of the book have more than half a century cumulative involvement in looking at energy, development and environmental issues. Douglas Barnes has focused on social aspects of development and is a senior energy specialist at the World Bank and a research scientist in the Department of Sociology at the

University of Maryland. Kerry Krutilla is an Associate Professor of Environmental Economics at the School of Public and Environmental Affairs at Indiana University – Bloomington. William F. Hyde's career has focused on forest economics and policy. He is currently a senior associate at the Center for International Forestry Research in Bogor, Indonesia, a visiting professor at the Environmental Economics Unit at Gothenburg University in Sweden, and an adjunct professor at the Center for Chinese Agricultural Policy in the Chinese Academy of Sciences.

Their analysis is based on a quantitative assessment of urban energy transitions based on an impressive array of surveys conducted in 45 cities in 12 countries. Their data span three continents, ecosystems ranging from rain forest to desert and from sea level to high mountains from 1984-2002. None of the cities studied has reached a level of development where urban energy consumption is disengaged from the surrounding forest. Nor has biomass from these forests been totally replaced. The authors set the stage by describing this data set, along with definitions and terminology. They include the important caveat that they have collected the best data available from primary and secondary sources to quantify energy consumption by fuel and to construct an inventory of biomass surrounding the cities investigated. However, since the data are not consistently collected panel data, the writers state that they have not relied on formal statistical methods but have provided a quantitative description of energy use.

They represent the energy transition of cities in 3 stages. In Stage 1, fuel wood is the primary fuel. Stage two is a transition stage that contains three sub-stages depending on the type of transition fuel – A. charcoal, B. coal or kerosene, or C. a diversified set of transition fuels. Stage 3 is the final stage when households are using the modern fuels – LPG and electricity. When categorizing the 45 cities, they find a wide variety in the transition stage suggesting the transition from wood to modern fuels does not follow a regular pattern.

They consider drivers of household fuel consumption including household size, income, fuel access, and price. Tables of survey results quantify some of these effects. After looking at the stages of fuel use and the drivers, the authors next consider two important policy issues relating to fuel use – equity and environmental externalities. They find that poorer families tend to pay more for energy services because of the inefficiencies of fuel using appliances and fixtures and the poor tend to pay a higher percent of their income for energy services. Their survey data show that the lowest income group pays 20% of income for energy services, the middle income pays about 12%, and the high income group spends just over 5%. Of course, government taxes on more modern fuels and subsidies on more traditional fuels reduce the regressivity of the energy burden for some of the cities in the sample.

Not only do the poor often pay more directly for energy services, they often pay more indirectly in health costs, since burning biofuels typically emits more carbon monoxide, particulates, nitrogen dioxide, and polycyclic aromatic hydrocarbons. These health costs are borne more by women and young children that spend more time at home.

Another important environmental effect of energy consumption is deforestation around cities. The authors have developed a unique data set to map the density of bio fuels around the city. Their results from the mapping are useful but not too surprising. The density of biofuels tends to decrease with distance from the city, decrease with the development of the transportation network, while larger cities have often moved farther in transitioning out of biofuels.

The authors document the importance of charcoal as a transition fuel. Moreover, they did not find much evidence in their sample to support the existence of an environmental Kuznets, curve in which aggregate biomass use declines absolutely with less stress on the surrounding biomass and less indoor pollution as income increases. Thus, the authors argue for policies that would encourage interfuel substitution away from the dirtier traditional fuels.

Hyderabad has seen a rapid transition in energy use and is the subject of a more focused case study on energy transition. As with other cities, its energy consumption patterns have been highly regressive. Unlike in many cities, Hyderabad households have largely transitioned out of fuelwood for cooking - first to kerosene. Some households have moved on to even cleaner LPG, while more and more people are using electricity. Some of this transition is the result of harvesting existing biomass in unsustainable ways that has turned forest into scrub land. Increasing income and liberalization of LPG markets have helped the transition as have the subsidies for kerosene, LPG, and electricity.

The authors lament that the majority of consumers do not know whether the fuels they consume are subsidized are not. For example, although the rich garner the majority of the subsidies because they consume more of the modern fuels, they often believe that they are being taxed. To me, a larger source of concern would be whether the policies are getting the prices right.

The authors find a high degree of variability in the urban energy transition process but that the normal drivers — income, price and fuel access pertain. They conclude with some fairly general policy options. The book is a good overview of some of the issues relating to household energy use in developing areas and would be suitable for a general audience with interests in transitions in the development process as well as the more specific energy transition and its drivers. Although the data set is impressive, the book will disappoint those interested in statistical analysis. Nor will it provide much specific policy advise on how to deal with some of the market imperfections that are well discussed in the book.

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Sustainable Energy in Developing Countries: Policy Analysis and Case Studies by PETER MEIER AND MOHAN MUNASINGHE, (Edward Elgar, 2005), 283 pages, ISBN 1-84376-753-8.

This book addresses the energy situation in Sri Lanka rather than what the title promises. More precisely, the book is a collection of (World Bank and other) papers by the two authors and covers inter alia the following topics: a review of the present situation in Sri Lanka, health damages that are caused by energy use, the economics of imported fuels, fuel choice for power generation, traffic (congestion, price distortions between LPG, diesel, and gasoline, leaded versus unleaded gasoline, and public transport), greenhouse-gas-emission reductions, renewable energy and, as a digression, real options to cover uncertainty associated with carbon trading. Finally, the book includes a flattering foreword by Karu Jayasuriya, Minister of Power and Energy in Sri Lanka.

The topics are, by and large, addressed only as they arise in Sri Lanka. The book rarely reaches beyond this narrow focus, and when it does, e.g. by using boxes, it is confined to very elementary economics or international statistics. To get a flavor, consider Box 3.1 on p. 41 on the economically optimal level of renewable-energy supply: Renewable-energy supply is described by an upward sloping supply curve and the optimal volume is given where this curve cuts the social costs of fossil fuels (out of pocket plus external costs, or value in case of carbon trading). The background material on transport is slightly more advanced but borrows heavily from a nice, but not recent, paper of Newbery (1990).

The health recommendations, including the subsequent suggestion of phasing out leaded gasoline, are based on reviews of international studies and their major findings are tabulated (as well as the short time series on Sri Lanka). In the case of leaded gasoline, the authors debunk some myths and mention the absurdity that costs must occur to remove the catalytic converters from imported and used cars from Japan (about three quarters of imported cars are used cars and on average 2-3 years old) to allow utilization of Sri Lanka's leaded gasoline. Also, the prices distortions for LPG (a most expensive fuel just making it on a tax advantage) and diesel are criticized for leading to the absurdity that Sri Lanka has to re-export gasoline from the refinery yields. Moreover, not surprising (since price manipulations are always inferior to income policies, see e.g. Ng (1984)), but important to mention is that subsidizing fuels does not reach the poor despite all the lip services by politicians.

The analyses of the economics of imported fuels and of the fuel choice for power generation boil down to elementary net present value calculations. However, the authors aim for consistency, i.e., they support the observation that other fuel prices including coal prices increase and fall with oil prices by using statistical correlations. Yet, these feedbacks are ignored for renewables as the above discussion of Box 3.1 documents: The profitability of large volumes of renewables at present prices can be misleading, because this may simply signal that future fossil-fuel costs will come down. Another highly policy relevant but

not really surprising conclusion is the economic inefficiency of using LNG for power generation (coal is cheapest). Electricity is covered in the penultimate chapter on rural electrification studying the different options (grid expansion, diesels, photo-voltaic (PV), and village hydro).

According to the authors, private providers of power ask for much higher rates of return; this applies probably worldwide. Given the huge capital requirements, this division of labor between government and private sector may not be optimal (compare Hart 2003) unless either investment and operation cannot be separated yet more efficient private management makes up for the higher capital costs, or a country (Sri Lanka or another developing country) is severely capital constrained. Yet these interesting points are not addressed.

Greenhouse-gas-mitigation strategies are motivated by trading carbon certificates, and the analysis considers the options of mini-hydro, wind, solar, and dendro-thermal plants. Demand-side management (DSM) gets also a short note but without addressing either the familiar problems (Wirl 1997, 2000) or special problems that are of particular relevance to developing countries. In any case, the major target of such a mitigation strategy should be the losses in power distribution.

One chapter, more of a digression and written by a guest author (Chitru Fernando), presents a real-option framework for carbon trading eschewing all the mathematics. I doubt that this short chapter convinces readers of the true importance and crucial insights of this approach (it is better to start right away with Dixit and Pindyck 1994).

Summary: As a rather un-initiated reader about the field of sustainable energy in developing countries, I expected to learn something about a new and important field, but was quickly disappointed. The key problem is that the book deals only with the situation in Sri Lanka. While it is unfamiliar to me and probably to most readers of the journal, the book, therefore, in many ways falls short of its promise in the title.

In addition, the book unfortunately lacks coherence. In particular, it is not an academic book since advanced methods are not used. Thus, it ignores co-integration techniques and the related literature when estimating price and income elasticities for transport fuels. In the real option case, all analytics are left out, as already mentioned. A similar critique applies to DSM. Moreover, it also is not a textbook. In fact, the book looks like a compendium of various consultant studies undertaken by the authors. This suspicion is also documented by the vast number of tables and figures (more than hundred tables and figures of a similar order of magnitude) on the particular situation in Sri Lanka.

This is not to say that the book is of no value but it is of much less scope of what is suggested by the title. This rather narrow focus may offer some insights, first of all to people interested in Sri Lanka's energy industry but also to people involved in the energy supply of other developing countries although analogies should be careful drawn. The book may also help aspiring energy consultants to write reports for governments and the World Bank. Finally there are some policy relevant recommendations, e.g., the inefficiency of LPG in transport and of

LNG for electricity generation and debunking some myths about leaded gasoline. However, I expected more, even after recognizing the limited scope (Sri Lanka). Some examples of neglected issues need note. Is not sustainability much easier to achieve when half of a country's primary energy requirements are renewable? Does sponsoring PV delay grid expansion and is this beneficial (carbon credits) or harmful? Also missed was a thorough discussion about the governance of utilities, a satisfactory explanation of the losses (e.g. why can stealing not be better avoided? For political reasons?), public-choice explanations of the misallocations in the energy industry. Covering such questions might have violated the constraints of consultant work but could be added to the book version.

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The Economics of Energy Vol. I and II edited by PAUL STEVENS, (Cheltenham, UK; Northampton, MA, USA: An Elgar Reference Collection, 2000) ISBN 1 85898 385 1, hardback, Vol I, 547 pages, Vol. II, 547 pages, \$475 lowest new price quoted on Amazon.com when review was written. For a list of the articles included in the volumes see http://www.e-elgar.co.uk/Bookentry_contents.lasso?id=1476

Paul Stevens, Professor of Petroleum Policy and Economics at the Centre for Energy, Petroleum and Mineral Law and Policy at the University of Dundee, combed the academic literature for articles on energy economics. He selected 48 papers that span the years from 1931 to 1998 for a two volume set. Most of the papers were published since the first oil embargo of 1973, which, he notes, greatly increased the interest in energy by economists.

The papers are reproduced exactly as they appeared when first published. An introduction by Stevens highlights the major themes that appear. Volume I focuses more on the demand side, with five papers on why energy matters, eight papers on demand side issues, six on conservation, and three on energy modeling. Volume II emphasizes the supply side with ten papers on supply issues, four on market suppliers, six on energy pricing, three on markets versus the government, and four on developing countries. He chose to omit energy issues related to the environment as outside the scope of his topics but included some references for the general reader.

As the editor notes – “the choice of articles has been difficult,” but he has done an admirable job of capturing a wide range of issues that have been addressed in the literature as problems have come and gone and come again. He notes that his articles are of two types – those that survey issues and others that focus and try to provide best practice answers to more specific questions.

Although the book is entitled *The Economics of Energy*, it is heavily weighted towards the oil industry, reflecting the editor’s interests and expertise and the stress in the literature towards oil as the most problematic energy source over the two decades following the first oil embargo.

The section on the importance of energy focuses mostly on energy and the macro economy. There is an energy macro model by Nordhaus, Mork’s classic survey on the transmission of oil shocks to the macro economy, Corden’s discussion of oil price increases on the macro economy with a bit more focus on trade issues including balance of payments and transfer effects, and Neary and Wijnbergen’s review of resource booms causing Dutch disease.

Demand takes up about 40% of Volume I. Rosenberg has a short piece on the historical use of energy as economies develop, focusing largely on the U.S. from around the middle of the 19th century. Humphrey and Stanislaw go back to the late 18th century to trace energy consumption in the UK. Energy intensity or the amount of energy per dollar of GDP has received much attention in the literature; Pagá and Gürer discuss some of the pitfalls encountered measuring it including the choice of currency conversion in international comparisons – exchange rates versus purchasing power parity - along with data problems encountered when including biomass.

Watkins has a nice, but more technical, piece focusing on practical issues in econometrically estimating demand including the underlying analytical framework – consumers maximizing utility and producers maximizing profits – issues of identification, marginal versus average prices, problems of aggregation, how to measure energy, energy and productivity, and capacity utilization.

Bhatia has a useful survey on issues specifically related to demand analysis in developing countries and surveys some studies conducted on demand by sector. He notes the difficulty of measuring non-commercial fuel consumption and supply constraints on demand which limit both econometric demand and general

equilibrium modeling. Since Bhatia's piece was written in 1987, a considerable amount of survey work has been done on energy in developing countries, see for example Barnes et al. (2005). Although the transition may be better understood now, the issues he raises are by no means obsolete, and his research agenda could be consulted for students looking for theses topics about economic development.

Three other studies by 1. Greening and Jeng, 2. Ironmonger, Aitken, and Erbas and 3. Dilnot and Helm use household survey data to look at specific issues in household energy use. They are, respectively, – household life cycle energy use in the U.S., economies of scale in Australian household use, and energy as a merit good with the distribution effects of various energy-provision policies in the UK.

The works in the conservation section focus on alleged market imperfections. Although Bates focuses attention on developing countries, his comprehensive survey of imperfections includes many that exist in industrial countries as well. Bates also contends that government measures can correct these imperfections.

Other articles in this section focus on specific issues that Bates raises. Train surveys studies that measure consumer discount rates. Hassett and Metcalf argue that high consumer discount rates are not irrational but rather reflect the high uncertainty entailed in investments with large sunk costs. Awerback and Deehan support their results of rational high discount rates using a capital-asset-pricing model that includes risk in the analysis. Reddy continues with barriers to energy-efficiency investment. Greene finds the rebound effect for auto travel to be small from surveying previous work and conducting new econometric estimates.

The last three articles in Vol I relate to energy modeling. Nordhaus builds a dynamic 200 year model that minimizes the discounted costs of satisfying energy demand. He has a fairly detailed depiction of the supply side with extraction, transportation, and processing for conventional as well as backstop technologies. Bhattacharyya surveys applied general-equilibrium models, which relate energy to the economy often with an environmental component, and Salahi Isfahani surveys models relating to OPEC – competitive, cartel, dominant firm, and none of the above.

Vol II begins with the resource classic by Hotelling that allocates a fixed resource over time until exhaustion. However, subsequent articles note the problems for energy analysis that have arisen by trying to apply these stylized and terse models to forecasting and the analysis of energy markets. Gordon expands Hotelling's work on the cumulative effects of extraction on the costs of mining. As costs rise with extraction, resource owners will deplete only while resource extraction is still profitable. His article proved a spur to numerous studies on the role of exploration and cost in a Hotelling framework. Adelman carries on these arguments noting that Hotelling's rising price paradigm has not held. It is better to think of resources not as a fixed stock but rather as an inventory that has been developed. Replacement costs are the result of the race between increasing cost as the mineral depletes and decreasing costs coming from technical change. Gordon then argues that intervention in energy was disastrous.

An implication of Hotelling's model, known as the Hotelling valuation principle, is that the price of energy reserves should equal their present value when conserved. Adelman and Watkins empirically test this principle econometrically but do not find that Canadian data support it. McCabe in the debate over the availability of energy reserves comes down firmly on the side of the optimists citing plentiful non-conventional fossil resources.

Garnaut and Ross discuss the ability of a variable resource rent tax to garnish a high proportion of resource rents for the government. Palmer extends their discussion and includes simulations of such taxes for Papua New Guinea to demonstrate their feasibility. Blitzer, Lessard, and Paddock look at contracts between companies and producing countries – service, per barrel fee, and production sharing – and consider the incentives and risk allocation of the different contracts. On a little studied market, Zannetos considers the feast or famine nature of the tanker market and relates freight rate and shipping cycles to high capital costs and price expectations.

In the market-player section, Penrose has two early pieces that consider profit sharing between companies and producing countries and vertical integration in the oil industry. In the first, she notes that foreign companies bring technical and management skill and the countries supply the resources with the right to manage them as they wish within contractual boundaries. In the second piece, she outlines some of the agreements that have developed in Middle Eastern countries with international oil companies having joint producing ventures upstream but competing with each other in downstream markets.

Gately's classical article outlines OPEC behavior through the decade from 1973-1983 in the context of bounded rationality. He includes models that attempt to explain OPEC behavior and notes the major uncertainties facing OPEC – demand elasticities, lag structure, feedback from oil markets to economic growth, geological resource base, costs and developments of alternative energy. In a complementary piece, Lynch outlines a 30 year retrospective on large US oil-company strategy – the focus in quantity in low-cost areas in the 1960s, the diversification in other energy products in the 1970s, the return to oil in the 1980s with a shift towards developing U.S. reserves, and the shift back in the 1990s to the core petroleum business and overseas drilling.

In the pricing section, Adelman attributes the high cost of oil in the 1980s less to Hotelling and the market and more to OPEC restricting output. Mabro surveys views on oil prices. One compares Hotelling's position of allocating an exhaustible resource over time with Adelman's position of reserves as inventory with more waiting to be developed. Another pre-1970 stream considered, not only economics, but also political considerations, particularly the relationship between government and industry, and a fourth includes more formal energy-market models.

Stevens focuses on supply, demand, and their shapes at various prices and capacity and their degree of transparency to explain the evolution of oil prices from

1945 – 1995. Mitchell stresses the behavior of the oil market during the disruptions of 1973, 1979, and 1980. Huntington concentrates on why the 10 models in Energy Modeling Forum 6 on world oil forecasting in the 1980s went so wrong in their forecasts for 1990. They badly overpredicted price, were within 1 or 2% of total oil consumption, but did not catch the shift from OPEC to non-OPEC producers.

The last paper in this section is the only one that does not focus on oil. Munasinghe looks at efficient energy pricing in developing countries and recommends that energy pricing as a policy tool should be closely coordinated with energy planning. The next section considers markets versus the government all in the UK context. Helm, Kay, and Thompson note the potential role of the government when there are market failures and the reality of regulations that worsen the situation. Robinson makes an even stronger case for markets being allowed to operate, citing the poor record of British energy policy. Newbery looks at what had been learned from UK energy restructuring through 1995 following the institutional features that developed through gas and electricity privatization. He concludes that electricity privatization reduced electricity cost, which dramatically raised rates of return in the industry when only part of the reduction was passed on to consumers. However, he feels that competition and regulation will rectify this imbalance. He finds the gas privatization results to be a bit different with a spot market developing that benefited consumers but left some share-holders with stranded assets.

Stevens ends his compilation with four papers on developing countries. Pearson and Stevens look at energy forecasting and planning in developing countries and the problems that arise when traditional or non-commercial fuels are not taken into consideration. Pearce and Webb consider the rationalization that rural electrification is somehow special but contend that energy planning should focus on integrated energy planning rather than just rural electricity. Munasinghe reinforces the notion that rural electricity decisions should be made as part of integrated rural energy planning. He details steps in rural electricity project selection and implementation along with a case study for Malaysia.

The book concludes with an article by Hall on biomass. He outlines worldwide use of biomass, includes some well known case studies, acknowledges the data limitations in measuring biomass use, and argues that biomass is reasonably plentiful and would provide environmental benefits with low sulfur and no net CO₂ emissions.

I very much enjoyed this impressive compilation. It includes a “Who’s Who” of many influential thinkers in energy economics, and I found especially useful the wealth of references for follow up and the survey pieces—many familiar classics but some new to me. There is much for the serious energy economics scholar. This is a useful reference text and should be in libraries where there is a serious interest in energy, especially oil. It is pricey and probably not systematic enough to serve as the primary text book for a course in energy economics, but selections and lectures could be drawn from it for courses in energy or resource

economics. Although Stevens has drawn from the academic literature, the majority of the articles are very accessible to the general reader, and even the more technical will often be readable and useful to the general reader.

As with any edited volume, there is some overlap as well as omissions, but the breath of coverage is very good. I might have added a paper on the resource curse after the Dutch Disease paper and tried to squeeze in Solow's paper that concern over fossil-fuel exhaustibility depends on whether energy is a substitute or complement to other factors. Although there is an index of authors, editorial annotation cross referencing the articles and an overall topic index were not provided.

These papers were written in a different time and place with many now decades old. However, the recent run up in oil and U.S. gas prices has, like being hanged in the morning, again focused our attention. You may be more skeptical of regulation and trusting of the market than some of them. You may view OPEC as having moved to being more like their earlier counterparts - the multinational oil companies - seeking freedom from political constraints with commercial goals of long term profitability. Thus, you may not agree with all the answers in these papers, but the readings raise many useful questions for thoughtful contemplation.

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Barnes, Douglas F., Kerry Krutilla, and William F. Hyde (2005) *The Urban Household Energy Transition Social and Environmental Impacts in the Developing World*, ISBN 1-9333115-07-6, Washington D.C., Resources for the Future.

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The Future of Russian Gas and Gazprom, by JONATHAN P. STERN, (Oxford University Press for the Oxford Institute of Energy Studies, 2005), ISBN 0-19-730031-6, 270 pages.

Jonathan Stern is a renowned expert on Russian gas industry and a director of the Natural Gas Research Programme at the Oxford Institute for Energy Studies. This book is the outcome of his research of more than 30 years. Having written extensively on the Soviet and post-Soviet Russian natural-gas industry and its export markets, in his latest book Stern presents a detailed analysis of Russian gas market developments in late 1990s and early 2000s and industry outlook until the 2010s. Russia possesses a third of the world gas reserves and supplies a

quarter of European gas requirements and Gazprom owns more than 60 per cent of Russian reserves and has a monopoly on Russian exports. Thus, this book will be of great value particularly to anyone interested in the natural-gas markets in general or the security of natural-gas supplies in Europe in particular.

Stern's main conclusion is that the future of the Russian gas industry and Gazprom will be different from their past in terms of sources of supply and export potential. The author starts with a detailed analysis of Russia's and Gazprom's reserve base according to the Russian and international classifications. Gazprom has 25-35 years of reserves at currently producing fields and regions close to existing infrastructure. As the output from its three super-giant fields in Western Siberia declined, so did Gazprom production in 1998-2001. During this time the share of oil companies producing associated natural gas and independent natural-gas companies in both the domestic market and regional trade increased. In 2004, the share of non-Gazprom production in total Russian gas output and sales rose to 14 per cent compared to 5 per cent in 1995. New production from its new super-giant Zapolyarnoye field that reached its plateau in 2005 offset the decline in Gazprom's production. Moreover, without any new sources of supply, Gazprom production will peak around 2010 and decline thereafter. Around this time, Russia plans to be exporting LNG to North America and Asia whereas significant pipeline deliveries to Asia are likely to begin in the 2020s.

Gazprom considers Yamal Peninsula fields (north-western Siberia) and offshore Shtokman field (the Barents Sea) to be the next sources of supply. The cost of production and transportation of natural gas from both of these sources are considerable. Gas from the Shtokman field will be liquefied and shipped to the US markets in 2010 and thus open new markets of LNG and North America for Gazprom. At the time of writing, Gazprom was uncertain about the timing of development of Yamal fields, a delay that increases the importance of independent gas suppliers. The author shows that, given its substantial development costs and current and expected levels of regulated prices in 2010, Yamal development will not be feasible in the near future.

Instead, Stern proposes an alternative low-cost supply strategy: develop a large number of small Gazprom fields in Western Siberia close to the existing infrastructure, purchase gas from other Russian producers, and purchase balancing supplies from Central Asian producers. Through an analysis of different price scenarios, the author concludes that the above strategy of unprecedented dependence on non-Gazprom supply will also be a low-risk strategy (in the sense that Yamal development will not be required) in the case of high prices and low demand both in Europe and Russia.

Domestic prices, industry restructuring, and changes in efficiency are the key factors in determining the future of the Russian gas industry. There have been substantial increases in regulated prices for Russian industrial consumers. This, together with a better reflection of customer location in price schedules and dramatic improvement in payment collection, allowed Gazprom to make profit in 2004 after years of losses in the domestic market. However, price reform in

the residential sector is much slower, and the government is planning to continue subsidizing this type of consumers. Transmission tariff setting practices are also criticized because they are often deemed as arbitrary. Despite this, third-party access to the national transmission network owned and operated by Gazprom has grown considerably and compares favorably to those of many European countries. In general, further gas-sector reform will depend critically on the power-sector reform to start in 2006. Power plants and industry account for 70 percent of Gazprom domestic supplies and all of the independent-producer supplies selling at unregulated prices.

Unlike the domestic market, liberalization of Russian export markets remains limited. The Russian government supports the idea of Gazprom acting as “the single export channel” in all directions of trade: the Commonwealth of Independent States (CIS), Europe, Asia, and North America. Europe will remain the most important export market currently accounting for 60 percent of Gazprom’s export revenue (30 percent of sales volume) and 13-16 percent of Russian export proceeds. The author shows that the future position of Gazprom in Europe will depend on its ability to compete with other suppliers in a more open EU gas market as well as a successful resolution of Russia’s transit problems. So far new pipeline projects that allow Russia to avoid transit proved unsuccessful and more expensive than refurbishing existing pipelines. The author suggests that Russia should attempt to resolve the problems of transit via Ukraine and Belarus in a multilateral context such as the Energy Charter Transit Protocol.

Having regained its control and displaced independent companies from the European and much of the CIS trade, Gazprom is giving increasing attention to Asian and North American markets and East Siberian and Far Eastern gas projects developed by independent domestic and foreign companies. The most advanced one is the Sakhalin 2 project that will start deliveries of LNG to the west coast of North America in 2007. Gazprom is trying to ensure its control over the future Asian pipeline exports and has received support from the Russian government for its involvement in negotiating all Asian export terms and conditions. However, China’s disappointment from its negotiations on Russian oil-pipeline routes and unsettled Russian-Japanese political tensions suggest that significant pipeline exports to Asia will start not sooner than 2020.

Regarding structural reform of Gazprom, it has carried out legal unbundling but no ownership unbundling of its production, transportation, sales, and service. The government has no plans for breaking up the company. In fact, it supported Gazprom’s acquisition of oil and electricity assets which will likely slow down gas-sector reform. The author suggests that Gazprom and the government should set clear priorities regarding the sector’s future development: should Gazprom pursue aspirations to become a global energy company or concentrate on being a domestic utility handling distribution, transmission and sales including social responsibilities to domestic consumers.

To conclude, I would definitely recommend this book to anyone interested in the topic. The author gives a very detailed analysis of sector development, uses a

wide range of Russian and international data sources, provides many informative diagrams, tables and maps. Among the things I liked is the author's analysis of the uncertainty of speed and scope of structural reform and efficiency improvements. This indecision complicates projecting Russian natural-gas demand, currently representing 50 per cent of the country's primary energy demand. I also found it interesting the way the author analyzes different concepts of utility reform and concludes that the Russian government's control of Gazprom is actually common to the Continental European and Asian culture of utility management as opposed to the Anglo-North American culture of independent ownership. Overall, the author was successful in persuading me that the Russian gas industry and Gazprom face a future, that will be considerably different from their past. Indeed, the Russian export horizons are widening, industry structure is changing, and domestic sales are becoming increasingly more profitable. I noticed, however, that there are some developments described in the book that make the industry and Gazprom, in fact, quite a bit like what they were at the time of the breakup of the Soviet Union. Gazprom's close connection to the government was reestablished. Gazprom's monopoly over exports and control over the CIS trade was regained. Dominant position in the domestic market and company integrity were preserved. As an expert on the Soviet and post-Soviet Russian gas industry, Jonathan Stern would be the best person to acknowledge or refute the validity of these observations.

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