BOOK REVIEWS

Energy and Economic Reform in the Former Soviet Union BY LESLIE DIENES, ISTVAN DOBOZI, AND MARIAN RADETZKI. (London: St. Martin's Press, 1994).

Economic analysis of the former Soviet Union (FSU) is an important, yet formidable task. Even before the collapse of the socialist state, most energy analyses were short on data and long on assumptions. The results reflected this, especially for energy production, where a cessation of oil exports has been mistakenly predicted for nearly two decades. Now, the monumental changes which the republics are undergoing raise serious questions as to the long-term outlook for the energy sector, including trade with the rest of the world.

The importance of the analytical challenge may have increased, but the difficulties have hardly dwindled. Data availability has improved, but is still below that of Western economies, and the reliability is unproven. Additionally, even when the data are not polluted by, say, cross-subsidies, the relevance of data from the pre-reform era to behavior during the present (or in the future when reforms are more advanced) is obviously questionable. Thus, any book on FSU energy which goes beyond the usual "datum and an anecdote" is particularly welcome. This coauthored volume is the most detailed analytical work on the subject now available, particularly on the subject of oil and gas supply.

Given the enormous policy uncertainties involved, the authors have chosen to describe the energy sector's behavior primarily under three scenarios, radical reform, gradual reform, and impasse, which should be self-explanatory. The book is divided into production, consumption, and exports, the first representing the bulk of the volume, and the final including a discussion of market impacts plus a section on Eastern Europe.

On the production side particularly, the book is fairly comprehensive in describing the current situation. Rising costs for oil and coal are seen as constraining future production possibilities, though the former is anticipated to recover from current lows. In terms of energy consumption, the chapter provides a detailed breakdown of usage and energy intensities by sector and in comparison with other nations.

The findings are quite instructive, but depressing. Coal is estimated to be uneconomic, despite the enormous resource, and while oil production should recover from current lows, the authors do not anticipate reaching the highs of the late 1980s in the time frame of this study (2005). Costs for natural gas will

rise sharply, but it is anticipated to continue its recent growth in production, consumption, and exports. Econometric analysis suggests that the Soviet Union's energy consumption was 58% higher than it would have been under a market economy, but the authors note the important role of energy-intensive industries in the economy and warn against simplistic comparisons with Western or developing countries.

The authors have been careful to document their data and methodologies, a most welcome practice in this field. Unfortunately, a significant portion of the supply economics relies on original Russian data and work whose validity is impossible to judge. And this reviewer, particularly, is wary of supply forecasts that seem to point to inevitably rising costs and weak production. Given the horrendous inefficiencies known to have existed in the Soviet Union's industries, it would seem logical that reforms would mean the appearance of some savings. Combined with the long record of overly pessimistic oil export forecasts, this creates a certain reluctance to embrace the forecasts wholeheartedly. Still overall, the depth of the analysis provides much greater confidence than most of the other work on the subject.

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Regulatory Power: The Economics of Electricity in the Information Age BY CARL PECHMAN. (Boston/Dordrecht/London: Kluwer Academic Publishers, 1993). 229 pages, ISBN 0-7923-9347-3.

The electric power industry in both the United States and abroad has undergone transformation. In the U.S., fundamental changes are on the horizon regarding industry restructuring, pricing, service offerings, and planning. As noted by some commentators, the direction of the industry toward markets and competition is on a collision course with the orientation in most states toward centralized planning, namely, integrated resource planning (IRP).

One could observe a trend toward a schizophrenic electric power industry: on the one hand it is placing more trust in markets, especially in wholesale ones, to produce efficient pricing and allocation of power sources from various suppliers; on the other hand, it is increasingly espousing the principles of centralized planning for determining future investments in the industry.

Analysts and other experts, currently are deeply divided over what path the industry should take. The disagreement is not as much over goals and objectives as over how, and under what institutional arrangement, specific

outcomes can best be achieved. Options range from heavy-handed regulation in the form of traditional rate-of-return regulation reinforced by centralized planning (the *status quo*), light-handed regulation in the form of incentive-based systems such as price caps, to deregulation of specific services such as bulk power. Two relevant questions for both policymakers and analysts are: (1) Which approach will prevail in the electric power industry; and (2) Which approach should be pursued?

In his book, Pechman places great emphasis on the heavy-handed regulation/centralized-planning path. Like the pro-market proponents, he shares the view that society would be better off if electric utilities operated in more competitive markets. Where he parts from market proponents is his support for stronger and more intrusive regulation, as well as for a more politically driven regulatory environment. The major point Pechman tries to make in his book is that by facilitating the flow of information to the various stakeholders in the regulatory process, state public utility commissions (PUCs) can play a more constructive role in minimizing the harm imposed on society by a monopoly utility. One can reasonably argue, like the author, that the more and higher the quality the information available to regulators, the better they will regulate. The author, however, seems to believe in the myth that regulators with better information could achieve efficient outcomes like those in competitive markets. In reality, the staggering amounts of information required by regulators to achieve such outcomes are out of reach. Even if, assuming for the moment that, the information problem can be resolved, the academic literature has shown that regulators may not be all that willing to promote efficient markets. Regulators have their own personal or political agendas that often conflict with the advancement of economic efficiency.

Pechman correctly perceives a major obstacle to effective regulation: a utility has access to better information than regulators about its operation and the marketplace. Thus, a utility can pursue its own interests at the expense of society's with the regulators unable to do much about it.

Pechman's advice to reinforce regulation certainly has merit if one observes the history of electric power regulation. Electric utilities had things pretty much their own way until the early 1970s, when their costs started to rise and electricity prices for the first time became politically visible. Before that time it is doubtful whether utilities behaved much differently than if they were unregulated. Utilities generally used the information and opportunities available to them to help maximize their profits at the expense of economic efficiency and lower electricity prices.

In any event, regulation has always been plagued with the problem of not having enough information to regulate effectively. Pechman presents a first-hand, historical case study of this reality in New York. Although his interpretation of and prescription for past regulatory problems are difficult to

dispute, Pechman would take us down a dubious path for the future. His strong endorsement of centralized planning seems particularly equivocal in view of the current direction of the electric power industry toward more competition. It is difficult to find anything more incompatible than centralized planning and competition, but surprisingly, the electric power industry is simultaneously moving in both directions. How policymakers, especially state PUCs, will deal with this phenomenon will be a major challenge.

Pechman offers no insight into how the collision between centralized planning and competition should be, or will be, resolved. While giving some indication of favoring markets to promote economic efficiency, he devotes more time to and has certainly more enthusiasm toward centralized planning with its focus on energy conservation programs. (Electric utilities are currently spending more than $2 billion per year on these programs.) Virtually everyone, including conservationists and environmentalists, agrees that competition, especially if penetrating the retail level, would dampen the spread of utility-funded energy conservation programs. These programs are in effect subsidies funded by one group of ratepayers to benefit others. Funding these programs in a competitive environment becomes much more difficult, as the market test would govern the acceptability of such programs. Disagreement exists over whether energy conservation programs are socially good. Pechman would tend to say that they are. Others, like myself, have serious reservations over their social acceptability. A litmus test for gauging one's position on energy conservation subsidies is whether one favors retail competition. I would be curious to know where Pechman comes down on this issue. While he strongly endorses such subsidies, the author frequently reminds the reader of the large efficiency losses that have resulted from utilities' market power.

Overall, Pechman's book provides a well-documented account of the information problem that has chronically afflicted regulatory agencies. By being a long-time member of the New York Department of Public Service, Pechman offers the readers a firsthand view from the "trenches." As a former staff member of a state public utility commission, I can commiserate with Pechman's frustration over the difficulty of overseeing a utility's planning, pricing, and operation activities. Where I fundamentally disagree with Pechman is how regulators should proceed in a world where competition is rapidly moving forward in the electric power industry. Pechman advocates a more effective implementation of centralized planning and, in general, tighter governmental control of a utility's activities. Many analysts, including myself, argue that lighter-handed regulation, for example price caps or some other kind of comprehensive performance-based system, would be more compatible with the emerging trends in the electric power industry. Simply, tight regulation tends to break down in terms of serving the general public when competition penetrates a previously monopolistic public utility industry.

In short, Pechman's book contains good history but not good economics or public policy. It is a book that would have greater value if written ten or even five years ago. In today's electric power industry, its major contribution lies with describing how things were and, to a lesser extent, are. Its policy prescription for the future, however, lies counter to the current trend in the electric power industry toward markets.

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The European Carbon Tax: An Economic Assessment BY C. CARRARO AND D. SINISCALCO, EDS. Fondazione Eni Enrico Mattei (FEEM) Series on Economics, Energy and Environment. (Dordrecht, The Netherlands: Kluwer Academic Publishers, 1993). 284 pages.

This book is the result of the March 1992 conference on "Energy Taxation and CO_2 Emissions," exploring the economics of a proposal for a unilateral European Community (EC) mixed energy/carbon tax. In 1991, the EC Commission proposed implementing the tax in 1993 to control emissions of greenhouse gases. The proposed tax is one of several measures to stabilize CO_2 emissions from EC countries at 1990 levels by the year 2000. The carbon component of the tax is aimed only at carbon dioxide emissions from burning fossil fuels. The carbon portion of the tax would presumably (i) induce fuel switching to lower carbon fuels, and (ii) promote energy conservation. The energy portion of the tax also would encourage energy conservation and eventually influence technological innovation in energy efficiency.

The book has three sections following an overview chapter by Carraro and Siniscalco. The three chapters of the first section expand the policy debate. Broader issues such as the global dimensions of a unilateral European energy/carbon tax, supply side responses, distributional impacts, and revenue generation from the tax are treated.

The second section contains six papers using country level analysis within the EC (Germany, France, the United Kingdom and Italy) and China. The work raises a number of issues and illustrates a variety of modeling approaches (including partial and general equilibrium analysis). Of specific importance are inter-country differences in energy composition; supply, demand, and cross-price elasticities for different fuels; and country specific policies that create second-best implications for optimal environmental taxation. Analysis of China is relevant as a critical example of carbon leakage—increased coal use

nullifying any EC gains in CO_2 reductions. Carbon leakage may result from switching to high carbon fuels due to decreased prices following lower EC demand for high carbon fuels. Carbon leakage may also be a secondary consequence of decreased EC competitiveness raising non-EC economic growth and thus carbon-based fuel demand.

The three papers of the final section address broader issues of the appropriate design of a emissions control program and the likelihood that the proposed instrument could achieve its goals. Questions of whether a uniform carbon tax is preferable to individual country emissions stabilization, whether the carbon tax can achieve global CO_2 emissions reduction, and optimal methods of implementing such a tax are discussed. The final paper integrates the results of a number of simulations to draw some conclusions from the preceding papers and other research in this area.

Several issues are emphasized throughout the book and were the focus of the FEEM conference. One concern is the impact of the tax on competitiveness of EC firms. Thus, exemptions have been proposed for energy intensive industries until other OECD countries adopt similar emissions reduction programs. As pointed out in Hodgson's paper, in Great Britain 1.3% of the firms use 45% of the energy, and thus exemptions would make achieving desired reductions much more difficult.

A second key issue is the question of revenue redistribution. This depends in part on the origin of the tax (in energy producing versus energy consuming countries). With a unilateral EC tax, revenues are retained within the EC. Redistribution can make GDP impacts virtually zero but may have significant distributional impacts within and between countries.

A major limitation of the book in providing policy information is the lack of any consideration of benefits, and thus the net value of the mixed tax. The papers also consider the distribution of costs, but these should be compared to the distribution of benefits or compared to the distribution of the generation of the negative externality being corrected by the tax. As pointed out by Barker (p. 250), other benefits from reducing energy use and carbon emissions are ignored in this volume.

Modeling results generally are presented without extensively describing the models. This facilitates understanding the policy implications without overwhelming the reader in details (adequate references to the sources of the models are provided). In many of the models, the results depend heavily on the elasticity estimates used (especially own price elasticities for different fuels types and cross price elasticities which will determine inter-fuel substitution). Improving elasticity estimates may prove more important than more sophisticated modeling.

A concern I share with several of the authors is the efficacy of a mixed tax to reduce GHG emissions that are essentially carbon emissions. Why not simply tax carbon content as a proxy for CO_2 emissions and omit the energy

tax? The energy tax portion is perhaps proposed (as suggested by Lanza and Sammarco) to induce energy efficiency.

Given the general consensus that a unilateral EC action will have little impact on global emissions, it seems more emphasis should be placed on answering the question: "Can such a unilateral action induce greater international cooperation in controlling greenhouse gas emissions?" Although the final chapter by Botteon and Carraro sketches a game theoretic analysis of this question, the importance of this question emphasizes the need for more work regarding the formation of international environmental policies.

The general conclusion of the work appears to be that the European energy/carbon tax would have minimal impacts on GDP and inflation (with recycling of the tax revenues appropriately designed for country specific dissimilarities). It would have important impacts on competitiveness and distributional concerns in EC countries which must be balanced into the policy decision. Perhaps most important though, due to carbon leakage and the small portion of global CO_2 emissions generate by the EC (13%), the tax would have little impact on global CO_2 emissions. Thus, the main use of the tax would be to generate pressure for international agreements. As such, it may serve as a model for international agreements, but the details of such a tax probably increase geometrically with the number of countries involved.

Most of the English translations are very readable. The book is well-written, illustrates both a variety of theoretical implications of policies to control global warming and a diversity of modeling methods to explore these implications, and serves as a valuable introduction to the complexity and uncertainty inherent in this issue.

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Environmental Economics and the Mining Industry BY WADE E. MARTIN, EDITOR, Studies in Risk and Uncertainty. (Boston: Kluwer Academic Publishers, 1994). 130 pages.

The Martin book is a compilation of papers presented in 1990 at the Colorado School of Mines. Following an overview in Chapter 1, the four substantive chapters deal with two issues in environmental economics and policy that have impacts on mining and the mining industry; natural resource damage assessments (NRDAs) and global warming.

Unfortunately, the book is poorly edited and reproduced; the text is double spaced. Second, little of the discussion concerns special implications to

mining. Third, and most critically perhaps, is that the discussion is outdated and superficial.

In Chapter I, Martin sketches relevant federal environmental legislation focusing on the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). He points out that CERCLA liability affects every phase of mining. Martin then raises the issue of global warming. Global warming policies are likely to impact the mining industry indirectly by regulating energy use.

In Chapter II, V. Kerry Smith focuses on natural resources damage assessments and the application of non-market valuation methods. Non-market valuation methods will be used extensively in NRDAs. As natural resource values often involve non-use values, direct methods [primarily the contingent valuation method (CVM)] have become the focus of much research in damage assessment. Smith presents an introduction to the methods and issues involved in using non-market valuation methods (see Freeman, 1993 for a rigorous presentation). Several research issues about non-market valuation methods are explored.

In Chapter III, Cummings, Ganderton, and McGuckin criticize the use of CVM surveys in damage assessment because they are not sufficiently reliable in providing values consistent with accepted economic theory. However, a panel of economists and researchers (Arrow, Solow et al. 1993) recently endorsed the use of contingent valuation in NRDAs.

Chapter IV by Ralph d'Arge considers issues of global warming policy and questions of equity between generations. D'Arge discusses: (1) the predicted differential regional impacts of global warming, (2) the uncertain intertemporal impacts of global warming, and (3) that the nations contributing the bulk of CO_2 emissions are also those with the least incentive to mitigate.

H. Stuart Burness and Wade Martin continue d'Arge's discussion in the final chapter on *Global Warming and the Mining Industry*. The authors point out that the relevance of global warming policy to the mineral industry is likely to be the regulation on energy use. After reviewing some of the likely impacts of global warming, Burness and Martin discuss an economic model of global warming based on work by Nordhaus.

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REFERENCES

Arrow, K., R. Solow, et al. (1993). Report of the NOAA Panel on Contingent Valuation. Federal Register, 58.

Freeman III, A. M. (1993). *The Measurement of Environmental and Resource Values: Theory and Methods*. Washington, DC, Resources for the Future.

Electric Utility Mergers: Principles of Antitrust Analysis BY MARK W. FRANKENA AND BRUCE M. OWEN. (Westport, CT: Preager Publishers, 1994). 183 pages. $55.00.

Policymakers are using competition as a means of better regulating the electric utility industry. As a result of this trend, mergers are more likely to occur between utilities as the industry reorganizes. The authors of *Electric Utility Mergers: Principles of Antitrust Analysis* have written a timely book directed by both industry executives and regulators. The authors succeed in their purpose of explaining the central principles of antitrust economics and their application to the analysis of proposed electric utility mergers.

In this brief book, antitrust analysis is addressed both from a theoretical and practical perspective. The example the authors frequently utilize is the failed merger attempt between Southern California Edison and San Diego Gas and Electric, in which they were retained by the City of San Diego to examine possible anticompetitive consequences. This example sets the tone of the book: the authors are skeptical of electric utility mergers in a couple of respects. First, they heavily discount the cost savings claims utilities make when they propose to merge. In a chapter dedicated to this point, written by Robert D. Stoner, common sources of cost savings are analyzed and compared to utility projections. Second, the authors believe some cost savings can be accomplished without a merger, such as through power pools or contracting arrangements.

The most useful aspect of the book, particularly for the non-antitrust specialist, is the careful but detailed explanation of the importance and methodology behind market definition as applied to electric utility mergers. In addition, the authors devote separate chapters to both horizontal and vertical mergers. One of the most interesting observations is how yardstick competition—comparisons of the performances of different utilities—may create pressures to reduce prices. The implication is that even if two utilities do not compete directly, any indirect competition a merger would eliminate may be a reason for not allowing the merger to proceed. The authors, however, only discuss the inconclusiveness of the literature on this point and cite their experience in California.

The requirements a merger needs to meet, along with past pitfalls, are carefully outlined, providing an inexpensive way for utility executives to check if their merger expansion plans have a chance of gaining approval. Unfortunately, the authors do not provide any insight into the likely impact of competition on the frequency of mergers. They do suggest that the industry is inefficiently structured based on the historical and political processes that lead to utilities gaining service franchises. Competitive forces may allow mergers to address this "balkanization" problem, something the railroad industry is now confronting. However, the authors stop there. A more forward-looking chapter

would have been interesting and would have allowed readers to test their new skills in antitrust analysis against the views of the authors.

Along these lines, the authors should have provided a more comprehensive motivation and description of electric utility mergers. Some basic facts, such as the number of mergers proposed, the number that succeeded, the stated reasoning behind these mergers, and other associated data would have helped the reader put some of the authors' points in context. Two major mergers, between El Paso Electric Company and Central and South West Services and between PSI Energy, Inc. and CINergy Corporation, received no attention, although they are more recent than the California example. Although the FERC's ruling in the El Paso and South West Services attempted merger came after the book's publication date, this decision is extremely important in establishing new requirements that mergers must meet. Merging utilities must provide " comparable transmission services" to other transmission users—the so-called "golden rule."

The authors do provide some industry perspective with two short sections on cable television and telephone service. They use these two industries because they are somewhat similar to local distribution of electricity: each uses a network to deliver their respective service. However, the authors do not develop these comparisons nor do they mention other industries with analogies to generation or transmission that have been partially or wholly deregulated.

The reference to networks raises some important technical, economic, and public policy issues. The technical issue is whether the electric grid can be operated as an intelligent system, one in which information as well as kilowatt-hours are exchanged between suppliers and customers. Depending on these technical capabilities and limitations, some important economic questions arise in the context of mergers. Will this information exchange lead to a more concentrated industry? In the railroad industry, the ability to provide "seamless" transportation point to point has resulted in customers putting a high value on coordination, producing a concentration of the industry with overall benefits to consumers. The public policy concerns flow naturally from these questions: What concentration should be allowed in the industry to take advantage of these informational benefits?

This book does accomplish its basic objective by providing a concise, introductory text on antitrust issues in the electric utility industry. It is well-organized and points the reader in the right direction on topics about which they may want to know more. It also has the advantage of touching upon most major issues in this area along with most of the important mergers. Unfortunately, in several respects the authors could have done more, which may leave some readers unsatisfied.

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ACKNOWLEDGMENTS

All papers received and published by *The Energy Journal* are regularly sent to international referees for anonymous peer review. Without the help of many expert reviewers, the quality and standards of this journal could not be maintained. Below is a list of referees who have volunteered their time to appraise manuscripts for *The Energy Journal* in 1993-94. The editors sincerely thank all referees for their important contribution to the field of energy economics.

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VOLUME 15 INDEX

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TITLES