


Book Reviews

 Douglas R. Bohi and Michael A. Toman, *Analyzing Nonrenewable Resource Supply* (Washington, D. C.: Resources for the Future, 1984), 159 pages.

Bohi and Toman undertook the ambitious task of summarizing exhaustible resource theory and the problems of using the theory in applied analysis. The book provides both a presentation of formal models of resource exhaustion and a purely literary discussion of the problems of extending and testing these models.

The theoretical approach starts with their preferred model of exhaustible resources. They adopt Levhari and Leviatan's view that the most relevant model is one in which exhaustion is incomplete and costs are an increasing function of cumulative output. Bohi and Toman wisely shun Hotelling's example of using continuous time, calculus of variations analysis. Instead, they employ a discrete time approach. The resulting analysis can be followed readily by those familiar with calculus-based economic optimization modes. In fact, the essence can be gleaned without mastering the mathematics.

The authors do take the time to discuss the more popular alternative model in Hotelling's article—one in which resources are completely exhausted because costs are independent of either the rate of output or cumulative output. They do not follow Levhari and Leviatan or Modiano and Shapiro, however in presenting the modern version of Hotelling's most general model in which the desirability of exhaustion is determined within the model.

What they do very well is extend the model progressively. Numerous complications are introduced, and production profiles implied by the analysis are discussed. The first extension is introduction of reserve development, using a model that delineates the optimizing conditions for both development and production. The model essentially assumes reserves are known and are not depleted. These assumptions ensure that reserve expansion prospects are properly considered in the model. This contrasts with models in which reserve additions are surprises that alter decisions.

Other extensions cover joint production, externalities, technical change, and a model of the entire market. The last discussion (the subject of a full chapter) is devoted to the problem of showing how individual producer decisions interact with demand to determine equilibrium.

Throughout the development of these models, the approach is to provide considerable discussion of the critical equations rather than overwhelm the reader with mathematics. This is particularly true of the market equilibrium chapter. Only twenty-six mostly very simple, equations, are treated in thirty-three pages of text.

Separate chapters are devoted to uncertainty and expectations and to practical problems of implementation. First, the general difficulties of treating uncertainty are discussed. As befits an up-to-date book on the subject, a discussion is provided on how the rational expectations approach now widely employed in applied economics fits into exhaustible resource economics.

The chapter on applications begins by briefly examining the specific form that various standard problems, such as model specification, take in empirical models of exhaustible resources. The discrepancy between data needed for supply analysis and actual petroleum reserve data is then discussed. A critical review of key petroleum supply models is also provided.

The book has several drawbacks. The most important is inadequate attention to arguments that depletion effects are negligible in practice. Also, a bit more discussion of the literature might have been useful and the relationship of the authors' models to those of others might have been explained more fully. In addition, the discussion of formal models of mineral resource estimates could have been considerably expanded.

Nevertheless, the book is a valuable contribution for anyone interested in the problems of modeling mineral supply. It should find considerable use as a text in advanced undergraduate and graduate courses on the subject, and those more casually interested should also examine it.

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David Glasner, *Politics, Prices, and Petroleum: The Political Economy of Energy* (Cambridge, Mass.: Ballinger Publishing Company, 1985), 297 pages.

Half a decade has elapsed since price and allocation controls were removed from crude oil and refined products, thus ending a widely misunderstood episode in American regulatory history. *Politics, Prices and Petroleum* is a layman's guide to these regulations. It details their institutional provisions, examines their market effects, and attempts to uncover their origins in political economy. The book combines the perspective that comes from hindsight with an analysis directed toward policymakers and makes a significant contribution to the literature.

The author states two objectives: first, to describe the consequences of using politics instead of market forces to allocate energy resources and second, to explain these manifestly inefficient regulations as the result of self-interested behavior in the political arena. Although Glasner's efforts to attain the first goal are high successful, I regard this attempt to provide a positive political theory incomplete. He does, however, offer some important insights in area of political economy.

The eleven chapters in *Politics, Prices and Petroleum* may be subdivided into three subject areas. The first is a nontechnical survey of economic concepts required to carry out the ensuing analysis. This introductory discussion is engaging and erudite, and a number of subtle market phenomena are accurately explained without sacrificing the intuitive and conversational tone. Treatment of normative issues is a bit uneven, however, and would have benefitted from explicit discussion of the inefficiencies of

imperfect competition and the concept of transactions costs as a force that shapes property rights.

The second topic, an account of the evolution and public regulation of the refined product market, is covered in Chapters 4 through 6. A detailed description of the refining and distribution networks constituting this market serves to emphasize the complexity of the task faced by federal regulators. Glasner's explanation of the controls is streamlined enough to be comprehensible in a single reading, yet detailed enough to portray accurately the mind-numbing complexity of these regulations. He enlivens the discussion by integrating development of the regulations with the politics of the times.

Refined product price ceiling formulas contained terms that were essentially choice variables for those regulated and thus provided incentives for firms to alter behavior to achieve higher ceiling prices. As Glasner notes, price ceilings that appeared non-binding could, therefore, affect market out-comes. Consequently, the regulations biased investment decisions, altered inventories and refined product slates, promoted pricing below marginal cost, and misallocated products across regions and lines of business.

The analysis is thorough and persuasive. For those who thought that inefficiencies resulting from price controls are reflected only in queues, this account provides a new perspective. This section contains the only equation in the book, a stylized version of the formula used to compute a firm's ceiling price for gasoline. Unfortunately, it is printed incorrectly, although the ensuing discussion and numerical example of ceiling price determination are correct. (For an expression that suppresses certain details but is correct in other respects, see Harvey and Roush, 1981, p. 60.)

The third area, the evolution of price controls on crude oil and natural gas, is presented in Chapters 7 through 10. To place these policies in context, the analysis of crude oil controls opens with an explanation of market demand prorationing and mandatory oil import quotas and closes with a description of the windfall profits tax. Again, Glasner manages to treat complicated details of the controls (such as entitlements, the buy-sell program, and the small refiner bias) in a way that is both readily understandable and interesting. In my view, however, his consistent characterization of OPEC as a cartel conveys a false sense of predictability to OPEC behavior.

In the discussion of crude oil controls, the author presents data to demonstrate that price controls and crude oil entitlements actually raised refined product prices to final consumers; this is contrary to Kalt's (1981) finding. Glasner's conclusion is counter-intuitive and depends on the net effect of several influences. To build a convincing case would require an explicit model and more rigorous empirical analysis than Glasner offers.

The author's theory of political economy recognizes that small cohesive groups with well-defined economic stakes have comparative advantages in swaying political resource allocation in their favor. Indeed, this paradigm provides an adequate explanation for the ability of independent refiners to obtain preferential access to cheap crude oil under both the entitlements and oil import quota programs. It does not, however, yield a ready explanation for other important aspects of petroleum regulation. Why, for example, did the political fortunes of domestic crude oil producers change so radically during the period 1970-1974? Within four years such pro-industry policies as demand prorationing, percentage depletion, and mandatory

import quotas were either eliminated or rendered ineffective. The new policy controlled crude oil prices and taxed windfall profits. If domestic producers represented a group sufficiently small and cohesive to secure political preferences before that watershed period, one must wonder what has prevented them from exercising this influence since then. Although Glasner's approach yields insights, much remains to be learned about the political economy of this industry.

On balance, Glasner has provided a perceptive and entertaining economic history of the price and allocation regulations that constituted the heart of U.S. energy policy during the 1970s. *Politics, Prices, and Petroleum* merits careful reading by public officials who would re-regulate energy markets or impose similar policies on other sectors of the U.S. economy. Professional economists, particularly those not specializing in energy regulation, will benefit from Glasner's concise and comprehensible account of the institutional details and market effects of these programs.

REFERENCES

- Harvey, S. and C. T. Roush, Jr. (1981). *Petroleum Product Price Regulations: Output Efficiency and Competitive Effects*. Staff Report of the Bureau of Economics to the Federal Trade Commission. Washington, D.C.: Federal Trade Commission.
- Kalt, J. P. (1981). *The Economics and Politics of Oil Price Regulations: Federal Policy in the Post-Embargo Era*. Cambridge, Mass.: MIT Press.

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Mohan Munasinghe, *Energy Pricing and Demand Management* (Boulder, Colo.: Westview Press, 1984), 161 pages.

Energy Pricing and Demand Management is one of a series of monographs produced by SUNY Stony Brook in conjunction with its training activities in energy and economic development. The book is an exceptionally good primer on the issues of energy pricing in a developing country. Mohan Munasinghe is the current dean in both the theoretical and practical aspect of energy pricing, more specifically electricity pricing in developing countries.

The purpose of the work is to familiarize individuals working in development planning with the strong interactions between energy planning and macro planning. Munasinghe says:

This study will emphasize the importance of coordinated energy planning and pricing, with particularly reference to the inter-relationships among the pricing policies adopted in various energy sub-sectors. . . .

The focus will be on the less-developed countries where the problems faced by energy planners are exacerbated by higher levels of market distortion, shortages of foreign exchange and resources for development, larger numbers of poor households whose basic needs must be met, greater reliance on traditional fuels, and a relative paucity of energy data.

Given these objectives, the book offers valuable insights to readers encountering these issues for the first time. The discussion of the energy pricing framework is clear and well presented. The second chapter on energy efficiency and conservation is superficial but effectively highlights policy issues to be considered in the setting of conservation objectives and programs.

It is not surprising that the most complete chapter in the background section is that on electricity tariffs. Here the discussion is thorough and easily followed. Munasinghe is best known for his work in long-run marginal cost (LRMC) pricing, and this chapter summarizes many of his other writings.

The first three chapters and two appendices present the theoretical background of energy pricing. The final three chapters are case studies of "Electricity Tariffs in Burma," "Inter-Fuel Substitution for Cooking in Sri Lanka," and "Industrial Inter-Fuel Substitution Issues in Thailand." As has become Munasinghe's custom, the case studies offer the reader background information and instructions for carrying out an energy pricing and/or energy policy analysis for a specific country.

The book handles questions about electricity pricing well and in sufficient depth to allow a first reader to proceed to more detailed texts. Munasinghe and Schramm, *Energy Economics, Demand Management and Conservation Policy* (Van Nostrand Reinhold, 1983) would be one such text as would Munasinghe and Warford, *Electricity Pricing* (Johns Hopkins Press, 1982). The discussion of energy pricing in general is less complete than that on electricity. An experienced reader will find them shallow, although again, they represent a useful introduction.

The title, *Energy Pricing and Demand Management*, may be misleading for the casual reader who might assume the book discusses both economic and physical means of demand restraint. In fact, the text focuses more on means of energy supply and demand planning and intersectoral planning than on ways to restrict demand. This thrust continues throughout the background and case study chapters.

In summary, *Energy Pricing and Demand Management* is a useful introduction to energy pricing, more specifically electricity pricing, and to sectoral energy planning. Its greatest benefit will be to the reader with an understanding of economics but with a more limited background in either marginal cost theory or application. For more experienced readers, earlier Munasinghe works clearly are superior both in presentation and depth.

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William Spangar Peirce, *Economics of the Energy Industries* (Belmont, Calif.: Wadsworth Publishing Company, 265 pages.)

Peirce has provided an overview of energy clearly directed at college undergraduates. It can be used either as supplemental reading or as the text for a course in energy for noneconomists. The book has enormous breadth. The first part is a good introduction to energy problems, the measurement of energy use, the relationship between energy and economic growth, and forecasting. The chapter on markets and efficiency is too brief but effectively punctures the net energy bubble in a few pages.

The next two parts deal with specifics. Introductory material is provided on reserves and resources and on the economic theory of the mine. Then six chapters successively treat coal, oil, gas, electricity, nuclear, and other forms of energy. Concluding chapters deal with externalities and public policy.

The specific sector and environmental chapters provide good descriptions of both the industries and policy problems associated with them. The discussions cover technology, uses, and the competitive situation. A particularly useful part of the book is its careful, dispassionate review of the uncertainties about the hazards of different energy options. The industry chapters also discuss public policies relevant to each area. A separate chapter treats environmental issues. The concluding policy chapter deals with residual issues such as security of supply, economic growth, conservation, and government support of research.

The theory of the mine chapter is both the most analytic and the least successful in the book. Three related issues are covered: what differentiates costs of extraction from different deposits, optimum exhaustion, and rent taxation. An effort is also made to convey the role of discounting in the process, but this proves too much to handle in the available space. The situation is made worse by the author's failure to separate the issues properly.

Peirce has strong views. He shares the disapproval of most energy economists for energy price controls. His views are epitomized in a comment about the "sheer stupidity of policy in the United States" (p. 51). He is sympathetic to nuclear power but also skeptical about fears of environmental damages from coal.

These characteristics limit the book's usefulness. Given its weaknesses on the analytic side, it can best serve as a supplement or as a text for a course in which analysis is deliberately deemphasized. An interested layman could benefit from the book, although not as much as someone who has an instructor to fill in the gaps. However, the nature of book marketing may prevent such readers from ever learning about this book.

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Michael Chapness and Gilbert Jenkins, *Oil Tanker Databook: 1985* (London: Elsevier Applied Science Publishers, 1985), 347 pages.

Gilbert Jenkins, *Oil Economists' Handbook 1985* (London: Elsevier Applied Science Publishers, 1985), 378 pages.

David R. Weber, *Energy Information Guide: Volume III, Fossil Fuels* (Santa Barbara, Calif.: ABC-Clio Information Service, 1984).

Diffuseness of data is a chronic problem in energy research. These books make an effort to deal with this issue. Weber lists numerous sources; the other two are data books based on two standard energy publications.

Jenkins' contribution is an extension of the invaluable *BP Statistical Review of World Energy* published annually. He has provided over 200 pages of tables and over 150 pages of text covering data on oil prices, exchange rates, oil trade, oil production, and energy consumption including wood. These areas are supplemented with growth rate calculations, selected indicators of general economic activity, seasonal adjustment factors for oil markets, weather, conversion factors, characteristics of leading crude oils, refinery capacity, tankers, pipelines, and weather. The text consists mainly of a modestly named "Dictionary of Terms." It is supplemented by a chronology of events.

Chapness and Jenkins present over 300 pages of data and a 278-page "Dictionary of Terms." The vast majority of the data directly concern tankers and other bulk carriers of oil. The material assembles that reported in John I. Jacobs *World Tanker Fleet Review*.

Weber's work is a long annotated bibliography of energy data sources. The full work covers fourteen energy areas. This volume is devoted to general fossil fuels, a combined petroleum and natural gas section, and coal. Each section is further subdivided among types of material such as statistical and bibliographic sources. The coverage is mainly of U.S. materials and thoroughly and accurately explains the sources. A skimming of the germane statistical sections should answer most basic data questions.

Those familiar with the *BP Statistical Review* probably will wonder to what extent the *Oil Economists' Handbook* provides data for years prior to those reported in the *Review*. In fact, it does so for refining, oil production, consumption of all fuels, and oil trade. It does not do so for oil reserves or for the production or reserves of nonoil fuels. Price data in the *Handbook* are far more extensive than in the *Review*; tanker data in the *Handbook* cover more years but give less information than in the *Review*. However, the *Tanker Databook* more than makes up for that.

The contents of the sections listed above are usually what would be expected and need no further comment. The main exceptions are the conversions and quality data. These include both familiar but critical basic conversions among weights, volumes, and heat contents and more specialized data on oil. Tables present the specific gravity and volume/weight relationships in several units associated with different American Petroleum Institute (API) degrees gravity levels. The degrees gravity, specific gravities, and weight-volume relationships for crude oils from different countries (and different grades of the crudes from major exporting countries) also are given. This is a welcome replacement for material no longer reported by API.

The dictionary defines terms in a properly broad fashion that includes concepts, organizations, publications, and people. Generally, the material is well selected and

well done. A few errors were spotted in skimming the section. One relates to IAEE. It is listed, but *The Energy Journal* is credited to our affiliate, the British Institute of Energy Economics. Others may, nevertheless, enjoy their own skimmings to glean new insights.

The *Tanker Databook*, as noted, largely lives up to its name. Comprehensive historic data are provided on capacities, scrapping, and orders. A few supplemental tables overlapping those in the *Handbook* cover such areas as oil production and trade. The dictionary in the *Databook* shares some entries with the *Handbook*, but many inclusions are specific to the *Databook*. The *Handbook* has even more nonoverlapping entries.

Clearly, these are all books for the reference shelf. I would recommend them to librarians, not individuals. However, these volumes may be more useful than many of the mindlessly prepared studies regularly inflicted on the library market.

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Jonathan P. Stern, *East European Energy and East-West Trade in Energy* (London: Policies Studies Institute, 1982), 94 pages.

Jonathan P. Stern, *International Gas Trade in Europe: The Policies of Exporting and Importing Countries* (London and Brookfield, Vt.: Gower [formerly Heinemann Educational Books], 1984), 204 pages.

Jonathan P. Stern, *Gas's Contribution to U.K. Self-Sufficiency* (London and Brookfield, Vt.: Gower [formerly by Heinemann Educational Books], 1984) 83 pages.

Jonathan P. Stern, *Natural Gas Trade in North America and Asia* (London and Brookfield, Vt.: Gower, 1985), 272 pages.

Bijan Mossavar-Rahmani and Sharmin Mossavar-Rahmani, *The OPEC Natural Gas Dilemma* (Boulder, Colo.: Westview Press, 1986), 160 pages.

Growing interest in natural gas is demonstrated by the five books reviewed here. Four reflect the accumulated research of a veteran observer; the fifth is an interesting effort by two writers with considerable industry experience.

Stern has used his expertise in natural gas and in Soviet energy to produce four useful contributions. All are part of the British Institute's Joint Energy Program. The principal works are the two volumes on international trade in natural gas. One centers on gas for Europe; the other, on supplies for the United States and Japan. Each case has peculiarities that inspire different treatments. In Europe, he considers the critical issue of supply sources. He devotes most of his discussion to this subject, specifically, profiles of each of the major potential or active suppliers. In case of the United States, the major consideration is overland trade with Canada and Mexico; ocean trade in LNG is a failed option. Again, Stern structures his discussion to reflect these realities.

The last remaining set of issues involves Japan's willingness to accept the gas alternatives available to it.

The European gas trade book has chapter-length surveys of gas in Norway, the Soviet Union, Algeria, and the Netherlands. Another chapter is devoted to other potential suppliers and to a general discussion of importer country problems. These last are characterized as commercial criteria, security of supply, and preferences.

The North American half of the second gas trade begins with an overview of the United States, proceeds to chapters on Canada and Mexico, and then discusses LNG trade and U.S. policy. The Japanese half begins similarly with an overview of gas in Japan, a broad but deliberately not deep survey of supply prospects, and an examination of Japanese policy.

The surveys of suppliers deal with production abilities, public policy, and (where relevant) what Stern terms geopolitical considerations. This covers matters as diverse as the relationship of gas trade to Norway's position in Europe and the national security implications of importing gas from the Soviet Union. As would be expected, his approach works best for the less complex cases. These prove to be those concerning Soviet and Algerian gas to Europe, U.S. LNG imports, and U.S.-Mexican relationships. The treatments of Norway, the Netherlands, and Canada seem to compressed.

Stern excels at collecting the relevant facts, recognizing the critical economic and political concerns, and presenting them lucidly and tersely. He sticks to his strong point and makes no effort to provide exhaustive treatment or elaborate economic analysis. Knowing when to stop is an art all too many writers fail to master, so Stern's restraint is welcome. Ideally, the discussions of how falling oil prices destroyed the basis for high gas export prices might have been more systematic, but Stern clearly covers what is critical. He is particularly good at conveying the political problems associated with accepting lower prices. This is particularly apparent in his discussion of Mexico, LNG for the United States, and Algeria LNG in Europe. His approach is least satisfactory with Japan, where keeping the economics implicit greatly lessens clarity. It would have helped to make more explicit the glaring disparity between exporter ambitions and economic realities. Specifically, to Japan each gas supplier represented one of many options whose terms had to be competitive with those of its rivals. In contrast, Japan is the only outlet available to most suppliers. On the world oil market, however, Japan is still a pricetaker. Determination of whether Japanese buyers exercised monopsony power in gas buying should have been easy to effect.

To a lesser extent, similar problems arise in the analysis of North American gas. Too little attention is given to unrealistic economic assumptions made by U.S., Canadian, and Mexican policymakers. What Stern criticizes as policies overly influenced by short-run developments, others would consider indications of the collapse of expectations about future energy prices. He tends to make too little of earlier policy mistakes in all three countries and shows inadequate understanding of why subsequent events have forced new arrangements. Stern also pays no attention to the difficulties of pursuing a rational import policy when maintaining an irrational set of controls on U.S. gas. Readjustment of Canadian policy since the book appeared supports the conclusion that greater attention to economics would have imported Stern's appraisal of North America.

Conversely, his commercial criteria analysis of western Europe shows proper recognition of what is economically relevant. The discussion of security of supply shows that his approach to politics is far more realistic than that of most users of the term *geopolitics*. Stern sensibly recognizes that political blackmail is only one source of supply disruption. He argues convincingly that the only relevant concern about gas trade with the Soviet Union is that it will unduly aid the Soviets. He proves able to be fair to both sides of this emotionally charged debate.

The implications of dealing with the Soviets is also a major theme of Stern's 1982 pamphlet on Eastern Europe and East-West Energy Trade. As the title suggests, the work considers energy problems in Eastern Europe, Soviet output potentials, Soviet energy exports, and their interaction and implications.

The first half of the pamphlet treats energy problems in Eastern Europe; the second surveys East-West trade. The essence of the first half is that Eastern Europe faces severe difficulties in meeting its energy goals. The second half suggests that in spite of this, exports to the West will expand. Again Stern provides a good review of the facts, sensible political analysis, and limited economics. The principal problem again is this failure to deal adequately with the underlying economics of eastern Europe's energy problems. As a result, he necessarily exaggerates the attractiveness of political solutions and thus suggests political constraints on such intervention. Communist systems do have poor mechanisms for allocating resources, but they are capable of making economic adjustments, and this Stern underrates.

Stern faced his most difficult task in the gas self-sufficiency pamphlet. Like other authors in this series, he has difficulty criticizing the concept of self-sufficiency without making the project seem silly. One problem is that because uncertainties are far greater for gas resources, their current prices, and future extraction and delivery costs, it is far more difficult to assess their impacts than those coal and electricity and probably, oil.

Stern weaves his way through these intricacies and concludes that, under the best of circumstances, self-sufficiency would be uneconomic. At the margin, gas imports would be preferable.

In sum, these publications are valuable introductions to the issues and do a remarkably good job of conveying the many technologic, political, and economic forces involved. The economically trained reader should have no difficulty in correctly appraising the issues from what Stern provides.

Mossavar-Rahmani and Mossavar-Rahmani have covered ground similar to that covered by Stern from the perspective of the OPEC countries. The content of this short book is divided between an introductory survey and an analysis of the OPEC situation. The first half is an overview of the nature of natural gas, its markets, production, and world trade patterns. The analysis deals successively with pricing in world trade, alternative markets, and the situation in each OPEC country.

Although the first portion makes the book more self-contained, most of the material is familiar to those involved with energy—it is the later discussions that are most valuable. Treatment of the critical market issues is sound and well supported by empirical evidence. Also, the country surveys are useful.

The exposition, however, is rather uneven. More attention could have been paid to areas in which work was more recent. The authors straightforwardly criticize overstatements about the free good nature of natural gas and warn of the costs inherent in any

efforts actually to utilize the gas. However, they timidly back into showing the defects of oil purity theories of gas pricing and never explicitly point out exactly why the concept is flawed. The case for using gas to release oil for export seems overstated. One minor irritation: pagination started with the preliminary matter. What would be page one in conventionally designed books in page seventeen here.

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