Book Reviews

G. Campbell Watkins (Ed.), *Petro Markets: Probing the Economics of Continental Energy* (Vancouver: The Fraser Institute, 1989), 192 pages.

This is the second collection of essays on energy published by the Fraser Institute. A prior volume examined oil in the seventies. These seven papers, by nine authors from Canada and the United States, concentrate mostly on what can be learned from the oil policy initiatives of these two nations over the last two decades. But other sources of energy supply received considerable attention.

One might question how well the contents of the volume match its title. The essays cover more ground than "Petro Markets" suggest, but their content is directed mostly toward the evolution of Canadian energy policy. Consequently, consideration of U.S. policy is in the context of Canadian events. Moreover, the implied promise of consideration of "continental energy" is addressed briefly on pages 30 to 32 and only reappears in the last two papers. But these latter discussions are within the framework of the recent Canadian-U.S. Free Trade Agreement, not in the usual broader context. This observation is offered solely to alert prospective readers, rather than as a criticism of the content of the book.

Turning to the individual essays, MIT's Morris Adelman, one of the more prolific authors among contemporary petroleum economists, offers his current appraisal of the evolution of the world oil markets. It is vintage Adelman -- a personal critique of the motives and misadventures of the prime movers in world oil. He addresses the consequences of the transfer of cartel powers from a few major, private firms to the governments of a few less-developed countries. For the future, he expects a moderate level of turbulence to persist, oil producers to continue their efforts to control world oil markets, and consumer nations to fail to use their market power effectively.

At this point, the papers turn their attention to the United States and Canada. Arthur Wright contrasts the policy reactions of the two nations to the supply and price concerns of the period 1970 to 1982, followed by the era of demand constraint from 1982 to 1988. Despite the lessons learned by both politicians and economists, he doubts that governments, in the future, can resist the temptation to intervene in times of future price instability. Nor does he anticipate that dreams of joint North American energy policy can be realized. Instead, cooperation and consultation will have to suffice as the two nations continue to pursue their own internal goals.

In the next two papers, Paul Bradley, and Ernst Berndt and Paul Greenberg, stick strictly to Canadian affairs -- first oil supply and then energy demand. Bradley's main focus is on the utility of treating oil supply as a choice among scarce resource alternatives rather than the "using up" view.

Berndt and Greenberg examine Canada as the world's most energy-intensive economy and examine its reaction to higher prices in the 1970s. This includes a close look at various elasticity measurements. These papers are then followed by G. Campbell's detailed examination of key events in Canadian oil and gas pricing from 1947 to 1987.

André Plourde and Leonard Waverman trace the changes in Canadian energy trade from 1966 to 1986. They then turn to the less certain consequences of the Free Trade Agreement (FTA). They see this as restraining policy discontinuities and making the rules of the game more certain.

The final essay is Brian Scarfe's short paper on investment and supply security. He too addresses the effect of the FTA. On balance he hopes that it will play a useful role in reducing the chance of politicians introducing market distortions.

This publication is likely to be of greatest interest to Canadians or those interested in the details of Canadian energy policy. Perhaps the most revealing facet of the papers is how, for two decades, Canada and the United States turned to regulatory efforts in response to the dramatic change in world oil. Canada behaved as a basically self-dependent, but high-cost, producer; not unlike the U.S. of an earlier era. The U.S., no longer possessing excess capacity, became more security conscious and tried to protect its energy consumers. Both now find themselves shifting into a deregulatory mode, coupled with a broad-based bilateral free trade agreement. This should make things particularly interesting for a number of years.

As a final note: if these essays had actually addressed the topic of North American continental energy, more attention should have been directed toward the current status of the U.S. as a high-cost producer/importer. And the absence of any discussion of Mexico is a glaring omission. While we may be inclined to view our southern neighbour as part of Latin America, it is still a member of the North American community, producing more oil than Canada and exporting an equivalent amount to the United States.

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David Shapiro, *Generating Failure: Public Power Policy in the Northwest* (Lanham, U.S.A.: University Press of America, 1989), 114 pages.

David Shapiro, a former Department of Energy official, has undertaken a critical review of the Bonneville Power Administration (BPA). His central theme is that public power, in the Pacific Northwest, was an inherently "failed policy" rather than an administrative "policy failure."

Chapter 1 surveys the roots of the U.S. public power movement. The promises of lower rates and expanded service are related to President Franklin

D. Roosevelt's promise/reward to the voters of Oregon and Washington, the perceived "monopolization problem" of private power, the New Deal's public works philosophy. Bonneville, formed in 1937 to generate and transmit power from federally-built dams on the Columbia River, was federally financed after state voters rejected regional control and funding. By this arrangement, the Northwest succeeded in disbursing the costs of regional power to the general taxpayer.

BPA's charter gave municipalities and cooperative systems preferred access to firm power, leaving private utilities with only nonfirm surplus power. However, in its first decades Bonneville's large surplus was sold to all comers. Shapiro (p. 17) notes that the revenues generated from the nonfirm market saved the agency from " complete financial disaster."

In addition to the preference clause, the author emphasizes another important aspect of BPA's public charter that would be consequential. Uniform, average-cost pricing was implemented to recover ongoing costs and self-liquidate the federal investment over a "reasonable" (but undefined) period of time. The longer-run problems created by the access clause, the ambiguous repayment schedule, and average-cost pricing, are the subject of the next three chapters.

BPA's customer policies, and the evolution of its generation base from purely hydro to a mix of hydro and thermal resources, is examined next. The turn toward large baseload steam plants reflected a mature hydro system, a severe overestimation of future demand, legal pressure created by the preference clause, and the persistence of BPA Administrator Donald Hodel. It also represented a controversial straying from BPA's original charter prohibiting the construction of new generating facilities.

As Shapiro explains, to circumvent the ban BPA credited its firm power sales toward the preference customers' thermal plant construction costs. BPA's "net-billing" obligation applied whether or not the new capacity delivered power -- a covenant that came into play when two of three nuclear plants could not be completed. (The cancellation of Units 4 and 5 of the same project, triggering a $2.25 billion municipal bond default, did not rebound on the BPA.)

As Shapiro explains, access rights to federally-subsidized hydropower inspired much lobbying and legal fighting. The firm commitment to preference customers was increasingly challenged by industrial customers and farm and residential users, served by private utilities, who paid much higher rates. The example is cited of a private utility customer whose rate was over 140 percent higher than a nearby municipal customer. These "victims" flexed their political muscles in the Regional Power Act of 1980: a controversial overhaul of the original Bonneville Act of 43 years before. Among other things, the Act elevated private utility customers to preferential status and gave industrial customers near-firm access to supply. In return, public-body customers received rate protection for five years.

One of the book's key questions is how much BPA's power has been subsidized by the federal government. Shapiro estimates that deferred

principal repayments, made by BPA to avoid unpopular rate hikes, amounted to a $688 million subsidy from 1974 to 1984 alone. Interest rates have also been subsidized. Since the 1950s, the Treasury has charged BPA rates below rates at which the Treasury, itself, has borrowed, in order to support BPA's outstanding debt. Shapiro's present-value estimate, for these ongoing subsidies, is $1.5 billion.

Chapter 5 concludes with a review of the failures of the agency in terms of original purposes. The policy recommendations are to stop the interest rate/repayment subsidies on BPA's current $8 billion debt and look toward privatization as a more fundamental solution.

Shapiro's re-examination of the BPA gives the critic of public power much useful information and perhaps, in time, will promote needed reform. The book's only weakness is its brevity. Other BPA problems, such as the environmental costs of the agency's aggressive hydro expansions, the monopolistic use of the Pacific Intertie liking the Northwest to California, day-to-day operational inefficiencies, and costly conservation programs to manage load growth, are not examined. But short of such a full-scale effort, Shapiro effectively rebuts the rationale for public power in one of its most important applications.

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D. Helm, J. Kay and D. Thompson (Eds.), *The Market for Energy* (Oxford: Clarendon Press, 1988), xiv + 449 pages. Index.

In this collection of papers, on aspects of the U.K.'s energy sector, there are 21 contributions by a total of 24 authors. Many of them, in a somewhat incestuous manner, couple or triple with others, in various permutations, to produce the chapters almost all of which are jointly authored. There is a common element to the authorship, viz.: an institutional one based on the energy research activities, over the past decade, of the London based Institute for Fiscal Studies.

The content of the book (except for two contributions) is concerned with aspects of energy policy, energy supply, demand and pricing, and energy industry organization and performance in the U.K. In spite of a seemingly broad coverage, there is a heavy bias towards organization in general, and towards the privatization of the energy industries in particular. The title derives from the description by the Secretary of State for Energy, in 1982, (in a speech he made to an early international meeting of the I.A.E.E. in Cambridge) of the state monopolies which had dominated the energy sector of the U.K. economy since the late '40s. Instead, he said, market forces would determine prices, investment and supply in the industries concerned. Since

then, successive Conservative administrations have legislated to achieve this grand design, in what has undoubtedly been an important exercise in the reduction of state control and, moreover, an example which is being followed by governments in many other countries in various parts of the world. This importance is further heightened by what has, in essence, been a frontal attack on the hitherto broadly accepted idea that activities, such as gas and electricity transmission and distribution, constitute natural monopolies in the context of which competitive markets cannot be established so that privatization must be accompanied by state regulation.

Most of the papers on gas and electricity are concerned with description and analysis of what the Thatcher revolution has done -- or is still doing -- to achieve the objectives, and how successful the efforts have been, at least for gas, which was privatized some four years ago. This is the meat of the book, as the collection of articles it brings together on the subject is significant. It thus ensures easy accessibility to the attempts to establish "the comparative merits and demerits" of the options taken.

The previously large and powerful, but now small and weak, British coal industry (already outcompeted by oil, gas and nuclear power before Thatcher) remains a target for privatization, so that the inclusion of a section on coal is relevant to the main theme of the book. One of the two articles (by Colin Robinson and Marshall) favours liberalization, believing it likely to "offer the prospect of a more efficient industry, responsive to the needs of consumers and gradually reversing the long-run decline of the industry". The other paper (by Bill Robinson) believes liberalization to be "ideological baggage" of the same kind that led to the nationalization of the private mines over 40 years ago, and suggests that the economics of the industry and the long-term interests of the country deserve better. Meanwhile the coal industry is gradually disappearing.

The inclusion of a section with three papers on the oil industry in this volume is a mistake. Partly because the oil industry in the U.K. has largely been privately owned and, moreover, little subject to regulation. Partly because the contributions are not concerned with the oil industry as such, but, instead, with the impact of the recent development of the offshore upstream oil activities on the U.K.'s macroeconomy and its fiscal system. The articles themselves are neither uninteresting nor unimportant, but they are not concerned with 'The Market for Energy'. They do not, indeed, give any view at all of the role of oil in the energy economy nor, indeed, of the role of the private oil companies as opposed to state companies for other energy sources. Interestingly, moreover, neither article answers the question as to where the British economy might have been now had it not been for the rapid exploitation of North Sea oil reserves and the fact that oil gave Britain self-sufficiency in energy at a time of maximum values for energy inputs. The difference North Sea oil has made to the British economy and to British politics seems likely to make the effects of the change from public to private ownership pale into insignificance.

Overall, the book is a very substantial collection of work on some issues of importance in the recent evolution of the U.K.'s energy economy, but partial and unequal treatment means that the book cannot be used to achieve a comprehensive overview of the U.K.'s *Market for Energy*. It is much more useful for the specialist reader interested in the structure and organization of the energy industries.

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Fred C. Schweppe, Michael C. Caraminis, Richard D. Tabors and Roger E. Bohn, *Spot Pricing of Electricity* (Boston/Dordrecht/London: Kluwer Academic Publishers, 1988), 355 pages.

This book covers the theory and implementation of real time marginal cost pricing for electricity, called hourly spot pricing by the authors. Between them, the authors bring to this task a combination of economics and engineering expertise hitherto unmatched in works on electricity pricing. The result is a book that significantly advances the possibilities for implementing spot prices. The book is most accessible to, and can be read with profit by, policymakers, economists and engineers, with very little required technical background. Part I gives a broad-brush treatment of spot pricing and the technical issues involved. Part II derives spot pricing theory from a mathematical standpoint. A series of technical appendices give the non-engineer a survey of the technologies involved in power system operation and planning. It is written in a refreshing style which shows the authors' enthusiasm for their subject.

One of the main benefits of the book is that it derives hourly marginal costs based on expert knowledge of power systems. To an economist interested in electricity pricing, this book can give a good feel for the technical subtleties for peak load pricing involved in factors such as possible equipment outages, network losses, and problems which arise when output approaches generation or network capacity. Another high point is the detailed and realistic discussion of the kinds of communication, between the utility and its customer, that hourly spot pricing would require, as well as a survey of the mechanical and microelectronic devices available to make this communication possible. The authors have apparently had actual experience in implementing spot pricing with large industrial customers, and this background is shown to excellent effect in their discussions of how to convince plant managers that spot pricing can actually benefit them. In short, as well as by presentation or theoretically elegant treatment of hourly spot pricing, the authors convince because they have "been there".

Unfortunately, other important issues are given too cursory a treatment. For example, little is said about the regulatory system under which utilities operate. Under rate of return regulation, if the firm's allowed rate of return exceeds its cost of capital, which must happen occasionally, the utility would maximize profits by setting its peak period price below long-run marginal cost; so as to expand peak output, total capacity and, hence, the allowed level of profit. With these incentives, how can we be confident that a firm going to a system of hourly prices would actually implement the correct marginal cost prices analyzed in the book? Also, the problem of revenue reconciliation is not given a clear treatment. The authors state: "an optimum power system's marginal costs yield revenues which exactly match operating and capital cost" (p. 32). The authors do not say what an "optimum" system is in this context. Assuming that technology is neoclassical and that all periods use the same capacity, the issue of whether or not marginal cost peak load prices break even depends on returns to scale; not being "optimal". Third, although the authors are certainly aware of the importance of forecasting both the spot prices and resulting demands, there is no serious effort to show that industrial demand is known sufficiently well for practical purposes. Finally, and related to this, it would have been valuable for this reader, at least, had the authors done some simulation studies to give some idea of the likely effects of spot pricing, and also to give the reader a feel for what spot prices might actually look like. The authors explicitly state that they decided against doing this because high quality data were not available, and they could be right. However, unless the data are so bad as to undermine the credibility of spot pricing, some effort to at least explore the range of possible parameter values would have been well worthwhile.

These *caveats* not withstanding, the authors have written a most informative book which will give economists and utility engineers a much better idea of how to implement real time marginal cost prices than they have had until now. The book is important and deserves to reach a wide audience.

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Catherine M. Desbarats, *Empirical Modelling of Canadian Petroleum Exploration Activity* (Oxford Institute for Energy Studies, June 1989) 81 pages.

Over the past decade or so energy demand modelling has made considerable progress. Parallel advances do not seem to have characterized supply modelling. The reason is not surprising. Models have difficulty in dealing with the degree of uncertainty that characterize additions to the supply of oil and gas: the gap between powerful 'Kaufmanesque' statistical techniques and the economic determinants approach has not been bridged.

Yet the importance of trying to get a proper handle on petroleum supply is undiminished. In this light, scholarly attempts to expand the frontiers of supply analysis are welcome.

Catherine Desbarats's succinct monograph on petroleum supply -- using Canadian data -- is in this vein. It is based on a PhD. thesis, in which many of the details are buried. Thus, the monograph does suffer somewhat from the problem of compression.

She rightly (in this reviewer's opinion) focuses on the modelling of exploration expenditures as a first step, rather than jumping straight in at reserve additions. Exploration expenditures are what petroleum firms decide upon, not reserve additions. The difficult problem of translating such expenditures into reserves is commented on, but not addressed, by the study.

The contents of the monograph consist of three main chapters. The first deals with Alberta exploration activity and the impact of policy influences. The discussion is comprehensive, but perhaps could have benefitted from greater appreciation of the way prices affect the extensive and intensive margins of exploration.

The second chapter concerns empirical Canadian literature, focusing on two strands: variable profit models typified by Uhler's work used to derive reserve additions, and exploration expenditure models of the ilk of Scarfe and Rilkoff (1984). Most of Desbarats's attention is directed to the latter. She does provide a valuable service in alerting the researcher to the problems of using constructed reserve price series as an independent variable, if such series incorporate variables appearing elsewhere in the analysis.

Desbarats submits the Scarfe-Rilkoff model to detailed econometric specification tests, and suggests that improvements could be made. A new model is put forward in the last main chapter, predicated on investment theory. The details shown on the model development are sparse. There is no explanation of why a CES-CRTS production function should be adopted in preference to more flexible functional forms. Also it is not a good assumption to treat all sources of reserve additions as a function of exploration (p. 47), since the role of development activity is also crucial.

The empirical work could have benefitted from some industry feedback. For example, the suggestion that firms "...form exploration expenditure plans 'contingent' on netback values rather than expected values of future returns" (p. 65) could have been checked out with industry practitioners. Desbarats's econometric work is especially carefully structured and tested. And while the resulting model of exploration expenditures raises a lot of queries, it does provide new insights on relevant variables and their interrelationships.

Overall, I found this monograph makes a useful addition to the literature; I commend it to researchers of petroleum supply.

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