



BOOK REVIEWS

Energy Convergence – The Beginning of the Multi-Commodity Market, PETER C. FUSARO, ED. (New York: John Wiley & Sons, Inc, 2002), 254 pages, ISBN 0-471-21946-0, US \$79.95.

Peter C. Fusaro, president of Global Change Associates Inc., edited this book to show that the emergence of a wide variety of commodity markets is a means to achieving what he terms energy convergence. Convergence appears to mean assuring that opportunities for arbitrage are taken.

The book reflects changes in the energy-trading world since the 1970s to slightly after the turn of the twenty-first century. New energy products and new commercial opportunities rapidly developed. Some of these products are considered in easily understandable chapters for a general audience by authors experienced in the areas about which they write. Since these products are important aspects of energy trading, the book should be helpful to those interested in energy trading. Risk management is a prominent theme in the book, and it contains a glossary of energy risk management terms.

Fusaro starts with a terse statement of the unifying principles of the new markets and the role of Internet electronic trading. He discusses why these markets are developing now, despite prior failures. The subsequent chapters consider various aspects of these new markets.

Antoine Eustache, global index manager for Dow Jones Newswires, treats the difficulties of building new indexes in the Internet age. This draws on his experience in developing the first indexes for trading electric power for the USA and Europe. He also considers creating other metals and emission-trading indexes for emerging-market sectors.

Nick Ward, the Spectron Energy Group of London, examines the weather-reinsurance markets. He contends that weather-trading markets been rather illiquid despite the amount of media coverage. He then explains why this is occurring and the resulting return to the financial instruments in reinsurance markets.

J. P. Crametz, the RateXchange Labs of the Stanford University's Business Laboratory, contends that bandwidth trading may not become as large as the energy market but it is growing market that could be ready for commoditization and could conceivably converge with trading in electric power. However, given the debacle with Enron's bandwidth group, this contention now seems more doubtful.

Robert Brooks, professor at the University of Alabama and president of Financial Risk Management, shows the importance of pricing energy options and of modelling them. He explains the value of these unique derivatives in

terms understandable to the lay reader and claims that these highly volatile assets to manage risk are a necessity in emerging markets. This is the most technical chapter in the anthology. He treats several new analytic methods in energy options—such as the market-comparables approach (MCA), the cash-flow-adjusted approach (CFAA), the discount-factor-adjusted approach (DFAA). He also covers several energy-option-valuation models such as the LSC Market Model, the alternative stochastic processes LSC Model, the mean-reverting, multivariate normal process, and the mean-reverting, multivariate normal with the Poisson Jump Process.

Nedia Miller, options principal, MILLER CTA, New York, shows how the new accounting rules for derivatives (FAS 133) are changing the hedging and other trading strategies of companies after the fall of Enron.

Markus Reichel, president of Econ Trade Deutschland GmbH, Dresden, Germany, and an expert on energy liberalization and trading in Eastern Europe looks at the precursors of trading in emerging markets focusing primarily on Eastern Europe (especially Poland and Ukraine). Next, Alessandro Mauro, risk analyst at Energia SpA, Milan, discusses the emerging Italian gas and electric markets resulting from EU energy directives.

Kirk H. Vann, CEO of the Freight Advantage and Advance Energy, Houston, examines the changes underway in the tanker markets. He covers the shipping industry and how it should hedge its variable and volatile freights rates.

William A. Klun, vice president of DZ Bank, AG, New York, considers market risk in the financing of merchant power plants that sell only on the wholesale power market and thus have no retail customers.

P. Kumar and Shiva Gowrinathan, president and vice president Client Service of Nirvanasoft Inc., New York, explain the importance of software systems for energy trading and examine current software availability. They also scrutinize new information-technology developments for the energy industry.

Howard L. Margulis, a partner of Squire, Sanders and Dempsey LLP, New York, investigates energy risk management along with legal and tax issues in mergers. Using his expertise on energy-project finance, he shows how the use of energy derivatives can reduce the cost structure of energy projects.

Kelly Douvli, one of the owners of VTEC energy, examines retail gas and electricity risk for industrial and large commercial customers. [VTEC Energy is a privately held company that performs audits and analyses of electric and gas rates, on-site project evaluation, procurement, management, and monitoring of energy usage.]

Fusaro proposes a new approach to CO₂ emissions trading through use of structured products. He outlines the Kyoto Protocols, the US emission-trading programs, and project finance as precursors to CO₂ trading, which has now become a reality in Europe.

In the concluding chapter, Fusaro summarizes the main themes of the book and discusses the “convergence” of financial, energy, and Internet markets in a time of “market liberalization, consolidation and globalization.” The premise

of the book is a fascinating one, and there have been moves in this direction in the recent decades. However, with the fallout from Enron, the once leading promoter for commoditization and energy convergence, some of the prognostications of this book seem to be less likely or, at the least, to be longer in the coming.

Jose R. P. Manso
Beira Interior University, Portugal

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Making Technology Work: Applications in Energy and the Environment
by JOHN M. DEUTCH and RICHARD K. LESTER, (Cambridge University Press, 2004), 272 pages, ISBN 0 521 52317 6, Paper Back.

The authors claim that their purpose in writing this book is to help undergraduate and graduate students in the sciences and engineering to more fully understand, and to become more fully active in, the non-technical aspects of the application of new technologies. In many ways this book could be seen as a call for multidisciplinary, holistic approaches to the analyses of the nonlinear, and sometimes chaotic and unpredictable, processes leading from the development of a new technology to its commercial application. For that reason, and others, this book could be a helpful, and a very interesting read, for economists, business people, government officials, and others whose work is in energy and the environment.

Military officers and diplomats could also learn and benefit from this compact and, excepting in the more technical scientific parts, very readable book. This can also be seen as a primer for engineers and scientists in major corporations who, like the authors, believe that the application of technology is too important to be left to mostly non-technical people to decide upon. This book could also be seen as a technology, politics and diplomacy primer for economists who look into energy and environmental issues.

The short introduction and conclusion chapter aside, this book is a series of case studies on energy and environment issues near and dear to the hearts and minds of many in the IAEE: gasohol, solar power, wind power, photovoltaic technologies, electricity from coal, controlling acid rain from coal-fired plants, greenhouse gases and global warming, nuclear power and its fuel cycle, managing nuclear waste, nuclear power and weapons proliferation, natural gas, safety and risk analyses, synthetic fuel, fuel cells for automobiles, energy models and statistics, and the Government's role in innovation. That is a lot to cover. They do it very well.

Each technology case study has compact and concise descriptions of the technologies and some of their alternatives; and well as economic, political, and, in some cases, diplomatic analyses of the applications of the technologies. The economic analyses are clearly written and well done. Net present value analyses, the importance of internal rates of return, sensitivity analyses, levelized costs,

cost/benefit analyses, learning curves, linear regression models (for the energy models chapter), the economics of risk assessment, the economics of exhaustible resources, and more are discussed where appropriate. Accounting identities and concepts are also strategically applied. The idea of opportunity cost during stages of technology development is considered more implicitly than explicitly. Impressively concise and comprehensive economic analyses can also be found in the discussions of greenhouse gases, energy models, nuclear waste, and the role of government. The non-linearity of many of these issues and processes is pointed out regularly, as are the contingent natures of them.

This really is a strategy book for scientists, engineers, economists and others. It is also an important argument for analyses, rather than the sometimes seemingly “theological” arguments one hears from the “true believers” in some of these technologies, as well as from some of the “true believers” in certain perspectives on environmental issues like global warming and the potential effects of nuclear energy.

As the authors show throughout this book: good intentions and determination are not effective substitutes for good analyses.

The authors use a very clever systems analysis that considers energy and mass balances, as well as economic, other technical, political and diplomatic aspects of these systems. Only by looking at the full costs and benefits of going from, for examples, corn to gasohol, and the original energy source for the electricity to the running of electric cars, can one fully understand whether a technology should be chosen or not. This systems analysis approach could help many people work through the complexities and nuances of, for example, the environmental costs and benefits of hydrogen and electric vehicles when the source of the feedstock to the “environmentally friendly” part of the system is originally a highly polluting source like oil and coal. The authors’ analyses on what feedstock to use to produce gasohol, as well as their analysis of fuel cells for automobiles, also show the importance and validity of their systems approach. It is intellectually comforting and stimulating to see such consistency and depth throughout their analyses.

Most things are made from other things. Only by getting to the basic beginnings of a system of processes, and following through to the end of the system of processes, can we understand the full sense of the positive and negative externalities, who gets effected by them, and what are the total costs and benefits of the full system of processes.

Part of the problem with their systems analysis method could be that for some technologies and processes it is potentially not clear where the systems may begin or where they may end. In technology application, as with war and business, sometimes the best plans look great on paper, but lose their full usefulness once the battles and businesses begin.

There are many good sections in this book. Some of the most outstanding include the analysis of historical greenhouse gases data going back hundreds of thousands of years, the political analyses of nuclear waste storage, the connections between nuclear energy and nuclear proliferation, the truly fascinating botch-up

on synfuels development, and the analyses of safety and risk perceptions. Their descriptions and analysis of some wayward government policies are good “war stories” with excellent analyses attached. On the other hand their seeming disdain for tax incentives and subsidies seems a bit over the top. Some potential long run benefits to these types of government policies are not fully discussed.

Some technical terms could be better explained in the text, or at least have footnotes that might explain things a bit better for the non-specialist. In a book that has the purpose to head toward a specialist-generalist approach one should expect more explanation and in-depth analyses of some of the most important issues – which seem to hang in the air in places. A more extensive bibliography and a section on “recommended further readings” could also have helped.

This book is written in a way that a lot is assumed of the reader. Those who have engineering degrees, and have had a course or two in economics and politics would likely find this book an easy read. Some economists might find the more “heavy science” parts of the book to be a tough slog. Some engineers might have some difficulty understanding some of the economics. Even so, many of the important lessons of this book can be learned by skimming or even skipping some of the toughest technical sections and going straight to the steps in the arguments, their conclusions and basic data.

A toned down and less technical version of this book for public consumption could lead to some thoughtful, analytical steps forward in some of the more emotionally laden debates surrounding these technical, economic, political and diplomatic issues.

This is a thoughtful, well-written book. It is clear the authors have done a huge amount of work developing and writing this book. It is also clear that they know a great deal about what makes technology work.

Paul Sullivan
National Defense University,
Washington, DC¹

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Energy Price Risk by TOM JAMES. (2003, Palgrave MacMillan [<http://www.palgrave.com>], Houndmills, Basingstoke, Hampshire RG21 GXS and 175 Fifth Avenue, New York, NY 10010), 538 pages, ISBN 1-4039-0340-9.

This is a thorough, comprehensive, timely and well-written book on the very important topic of energy derivatives and their use as tools for risk management. Energy trading and energy risk management strategies have resurfaced again all over the world after the meltdown of the industry in 2001-2002. The NYMEX has

¹ All opinions expressed are those of the author alone and do not necessarily represent those of the National Defense University or any other entity of the US Government.

recently launched the global energy futures trading in Dublin, operating under the open outcry system. In addition, Mumbai, India, based National Commodity and Derivatives Exchange (NCDEX) could enable online wholesale gas trading, bringing greater transparency and vibrancy to the fast growing international gas market. LNG trading may take the shape and form of oil trading in next 10 years. This book is targeted for anyone dealing with energy risk assessments and analyses on a regular basis and can truly serve as a practitioner guide for energy risk management.

The author has provided a good recipe for various risk strategies and tools to consider for mitigating pricing risk inherent in the volatile energy markets. The book contains separate chapters on almost all aspects of risk analysis. Chapters are dedicated on energy futures, options pricing, VAR analysis, operational risk analysis, hedging, On-Exchange and OTC markets, accounting standards for derivatives, fundamental and technical analysis approaches, Enron's collapse, and a guide to managing credit risk exposure.

The author provides well-written chapters on some of the very complex energy derivative concepts and has successfully provided relief to readers who always felt that the lexicon of the energy derivative market is "all Greek." For example; the concepts of Gamma to Vega in the options market are explained splendidly in plain English.

The book contains the full spectrum of the energy resources, including crude oil, petroleum products, natural gas, LNG, LPG and electricity. The chapter titles and contents are carefully selected to ensure that it appeals to an international reader. For example: in discussing energy futures contracts, detailed discussion of IPE (London), NYMEX (United States), SGX (Singapore), and TOCOM (Tokyo) are provided. In many instances, the author provides a comparison of the US, European and the Asian energy market structure and operation. It is a treat for someone whose operations are truly global in nature and movements in one market may impact assets in another.

There are altogether eighteen chapters, one glossary of terms and four appendices. The first chapter provides a basic commentary on risk management and covers the three components of risk matrix; financial risk, basis risk and legal risk; that enables an understanding of various factors influencing energy prices. The chapter also provides a discussion of Brent crude futures traded on London's IPE and the West Texas Intermediate (WTI) crude futures traded on NYMEX including the genesis of "Cushing Cushion."

The second chapter provides a thorough discussion of energy derivative markets and the on-exchange as well as over-the-counter (OTC) platforms where they can be bought or sold. A brief history of the futures market is provided followed by a discussion of the convergence of the OTC market and the futures. Discussion of swaps include separate treatment of plain vanilla swap, differential swap, participation swap, double-up swap as well as margin swap. All three types of options; American style, European style and the OTC Asian style; are also covered. The chapter has a 5-page glossary of terms commonly used in options and derivatives markets.

The third chapter covers a discussion of energy futures contracts. Key facts about futures contracts and a discussion of specific items included in future contracts are provided in the chapter. A list with website information and specific terms and conditions of key global oil, gas, coal and power futures exchanges are provided.

The fourth chapter provides a discussion of OTC energy and related derivative markets. A sample of worldwide oil, gas and power OTC trading/pricing hubs and a list of key products traded on specific OTC markets is also provided. The chapter also contains the current status, and usage trends in weather derivatives.

The fifth chapter covers various types of options used today, and provides a commentary on steps for effectively using them. Chapter 6 covers a brief overview of energy option pricing models. Chapter 7 covers a discussion on the three complimentary risk measurement methods; VAR analysis, stress tests and sensitivity analysis. Chapter 8 contains a list of key issues to be considered before establishing a risk management or trading program at a company.

Chapter 9 covers basic tenets of management controls, corporate culture, and policies required for efficient operation at a firm from energy risk management standpoint. Reasons for the collapse and lessons learned from the collapse of Barings (the oldest UK bank) bank and Enron are also covered in the chapter.

Chapter 10 covers nine great remarks on misunderstanding the concept of “hedging” in corporate corridors, boardrooms, back offices and trading pits and author’s comments on the correct way of thinking about hedging. Chapter 11 contains key components of operational risk and ways an organization can be affected by them. The discussion also includes how corporations can facilitate efficient and effective management and reporting structures for managing operational risk. Chapter 12 covers a discussion on hedging and contains specific hedging application examples that can be applied to any firm consuming energy resources. The chapter also contains a global list of liquid energy derivatives.

The thirteenth chapter of the book contains key guidelines for creating effective risk management policies at a firm. Chapter 14 provides discussion and key approaches for technical analysis of historic energy prices to predict future prices. The discussion includes trendlines, bar chart, candlestick charts and their use in gauging market movements. Other concepts covered in the chapter include Fibonacci retracement levels, relative strength index (RSI), and moving averages.

Chapter 15 of the book points to one of the most critical facts of the energy industry—credit rating—and indicates that a strong credit rating should always be one of the top priorities of energy firms. The author indicates the pattern in energy companies of managing credit lines as rigorously as banks since the collapse of Enron. The chapter provides a timeline for Enron’s collapse and provides the reader with the details necessary to develop a broad understanding of the reasons for such a disaster. The chapter also provides a practical guide to credit control and risk mitigation methods. Discussion of credit derivatives such as credit default swaps (CDS) is also covered in this chapter.

Chapter 16 provides a discussion on credit rating and the factors credit rating agencies such as Standard and Poor’s and Moody’s, consider in defining

investment or non-investment grade rankings. Energy indexed loans and bonds are also covered in the chapter. Chapter 17 provides a discussion of legal risk control and documentation needed for an OTC derivative market. Coverage includes a discussion about the International Swaps and Derivatives Association (ISDA) and ISDA documents, publications, master agreements, and proposed ISDA changes. The chapter also contains a section providing a step-by-step explanation of a typical ISDA master agreement schedule between a trader and a bank. The last chapter, Chapter 18, covers the International Accounting Standards for Derivatives act.

The author realizes the importance of terms and definitions in energy risk management arena and has provided a thorough glossary of terms at the end of the chapters. This glossary is over 100 pages by itself and contains an excellent coverage of terms used in the industry.

There are four appendices in the book that supplements chapter contents. These appendices are over 70 pages and contain miscellaneous information useful for understanding risk management procedures. The first Appendix contains an example of a risk management review conducted by an expert for a trading company. This helps readers in understanding the procedures of an independent audit of specific risk management protocols used at a company utilizing derivatives for hedging purposes. The second Appendix contains a list of energy sector and transportation credits traded in the CDS market. The list contains over 230 such entities and helps the readers understand the key players involved in energy trading. The third Appendix contains a sample International Swap Dealers Association (ISDA) master agreement. This ISDA sample agreement provides key pointers and features that can help readers in evaluating such agreements or developing their own such agreement. The fourth and final Appendix contains the terms and conditions of an ISDA transaction and an example derivative trade confirmation agreement under ISDA.

In summary, Tom's ambitious work on describing components, factors and tools necessary for managing energy pricing risk is a great contribution to the energy literature. The contents of the book are exhaustive, timely and help in demystifying the world of risk management effectively.

Shree Vikas, Ph.D.
Manager of Energy Markets Practice, SAIC