

André Dorsman · Özgür Arslan-Ayaydin  
Mehmet Baha Karan *Editors*

# Energy and Finance

Sustainability in the Energy Industry

 Springer

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Editors

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ISBN 978-3-319-32266-7

ISBN 978-3-319-32268-1 (eBook)

DOI 10.1007/978-3-319-32268-1

Library of Congress Control Number: 2016943644

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Printed on acid-free paper

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## Foreword

Sustainability is a concept embraced by many and rejected by few. But, below the label, what does this concept mean? Sustainable in what sense? Environmental? Economic? Social? How do we move from these lofty goals to the desired outcomes? What are the indirect impacts of pursuing sustainability? Questions abound. Answers are in short supply.

The impressive volume helps to supply some of the needed answers. *Energy, Sustainability and Finance* is a collection of essays connected to the issue of sustainability, especially as it relates to the energy industry. The essays provide solid frameworks for thinking about sustainability issues and generate many tantalizing results. Apart from collecting a particularly knowledgeable group of authors, the editors have made two additional excellent choices: they have taken a multidisciplinary approach—going well outside traditional economic and financial analyses—and have focused on the energy industry—clearly the “ground zero” for many of the issues under discussion.

As a financial economist, I am, by dint of inclination and training, attracted to using financial markets to solve problems. The chapter on “Carbon rights and emissions in the Energy Industry” (Chap. 2) gives pause, as it discusses order imbalance in the European Union carbon trading market and the sensitivity of this market to sparse information from only a few regulators and major economies. The good news is that, while markets suffer imbalances, they are short-lived and quickly corrected. More sobering news is presented in two country studies. “International Arrangements, the Kyoto Protocol and the Turkish Carbon Market” (Chap. 4) documents that the devil is in the details. Without the proper legal and tax infrastructure in place, international environmental agreements will be ineffective. “Governing Energy Transitions: Transition Goals in the Swiss Energy Sector” (Chap. 7) introduces the novel concept of a “price scissors”—the subsidization of renewable energy resources provides large electric utilities, cantons, and cities with favorable economic advantages at the expense of smaller utilities, cantons, and cities. Thus, environmental policy will lead to major shifts in Switzerland in terms of political and economic influences that may have subsequent effects on environmental policy. The law of unintended consequences emerges yet again.

Considerations of terrorism usually evoke feelings of . . . terror. The interesting essay on “The financial impact of terrorist attacks on the value of the oil and gas industry: An international review” (Chap. 5) examines terror as a business risk and finds that it is largely discounted by stock market investors.

While this result highlights the power of the standard economic paradigm, several chapters disrupt the notion that sustainability can largely be viewed through the prism of economic models. Two insightful essays highlight the interactions between economics and politics. “Red Versus Blue And Going Green In The Energy Industry” (Chap. 3) shows that political preferences of CEOs matter and influence firm behavior. However, “The Economic Drivers of the Political Will for Social Responsibility in Energy Policy for Fossil Fuel Exporting Countries” (Chap. 9) shows that causation flows in the other direction, as economic factors influence the political will to implement environmentally responsible policies.

Environmentally sustainable policies can have additional effects. On the positive side of the ledger, countries that follow environmentally sustainable policies are relatively insulated from oil price shocks, as documented in “The Effect of the Relationship between Oil Price and Stock Markets in Energy Sustainable Countries” (Chap. 8). Alternatively, on the negative side of the ledger, the adoption of such policies may lead to added levels of distorting noise. “When Corporate Social Responsibility Causes Tone Inflation in Earnings Press Releases: Evidence from the Oil and Gas Industry” (Chap. 6) documents that managers of more socially responsible firms unduly inflate earnings releases in order to signal to their shareholders that sustainable investing is not hurting stockholder returns.

Good research takes us outside our traditional paradigms and allows us to see new possibilities for solving problems. A unique element in this book is the examination in two chapters of the role of Islamic finance in addressing sustainability issues—“Green Sukuk: An Innovation in Islamic Capital Markets” (Chap. 10) and “Islamic Finance Compared to Conventional Finance: The Debt Section” (Chap. 11). Islamic finance is built on the principles of justice, equity, and fairness, and there is a need for understanding how these principles impact financial relations in general and those in the energy industry in particular. The chapters do a nice job of introducing the basic concepts of Islamic finance, discussing the ways in which Islamic financial products meet the requirements of Sharia’a Law, and relating the ethical dimensions of Sharia’a Law to the protection of the environment. The latter paper focuses on the returns to sukuk in general and the former paper on one aspect of Islamic finance, green sukuk—Sharia’a-compliant bonds that support environment-friendly investments. An interesting case study of the issuance of a green sukuk by a French energy company in 2012 is also provided. Green sukuk finance has increased from virtually no bonds outstanding in 2007 to over \$50 billion in 2014. Given this substantial growth and, more generally, the exponential growth in Islamic financial products in recent years, Islamic financial products and sustainability policies will interact increasingly more frequently in the years ahead.

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The authors have made important inroads into the jungle of issues that surrounds sustainability. This volume contains many thought-provoking results and insights that moves thinking forward in important ways. It helps us begin to progress from platitudes to action, from a fragile world to one that is sustainable.

University of Illinois at Chicago and CESifo  
Chicago, IL, USA  
March 2016

Robert S. Chirinko





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## Abstract

Sustainability has become a central issue for firms in the energy industry. These firms have been under increasing pressure to uplift not only their environmental consciousness but also social impact of their actions. One constraint of these firms is prevention of trading off shareholder value maximization with increasing their corporate social responsibility activities geared to the long term benefits of stakeholders. Based on the principles of fairness and equity, Islamic Banking and Finance also provides a vehicle for the firms in the energy industry by incentivizing their corporate social responsibility activities.

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## Keywords

Sustainability • Corporate social responsibility • Islamic banking and finance • Finance and energy

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## 1.1 Introduction

Extraction, transportation and transformation of resources are the stages in the energy industry that are managed by people and subject to human error. Therefore energy industry imposes significant costs on society, including air pollution, oil

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spills, injuries, and even deaths. Perhaps more so than in any other industry, people demand sustainability from energy companies. Nowadays societies require energy companies to do more to guard against risks to society than merely comply with the law. This book intersects the sustainability aspects of the energy industry with finance, namely; trading, pricing, markets and project management. Specifically, this book also reflects the Islamic finance from the perspective of sustainability in the energy industry.

This chapter begins with a discussion of the importance of sustainability for the energy industry. The chapter then provides insight on the environmental and social impacts of the energy firms and the concept of Corporate Social Responsibility (CSR). The next section explains how energy economies, financial market research issues and sustainability are integrated with Islamic Banking and Finance. This section provides some examples of the recent Islamic financing activities geared at improving the environmental impacts of the firms in the energy industry. The next chapter provides the discussion of the chapters of the book showing the relevance of academic research in the area of financing and sustainability in the energy sector for the academics and policy makers. The chapter ends with the last section presenting the conclusions.

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## 1.2 Importance of Sustainability for Energy Industry

Many use the terms sustainability and CSR synonymously. Sustainability amalgamates environmental and social consciousness with economic growth. Moreover, CSR is currently more popular than ever in the business world. CSR goes beyond charity and requires the company to act beyond legal obligations and integrate social, environmental and ethical concerns into company's business process. In other words, in CSR, responsibility of businesses is towards their stakeholders and society at large and thus it extends beyond its legal and enforceable obligations. However, one should note that sustainability and CSR only overlaps when the socially responsible actions acknowledge the long run impact on communities. Put differently, overlapping of sustainability and CSR is ensured when CSR activities do not trade off short-term benefits to stakeholders with some long-term costs.

Demonstrating an authentic and visible commitment to sustainability is a key in building and regaining trust from the stakeholders. Currently almost all Fortune 500 companies publish some form of annual CSR report about their investments in environmental sustainability, and social progress.

Perhaps more so than in any other industry, people demand CSR from energy companies. Energy is one of the industries that are exposed to environmental issues at most. Particularly, oil and gas companies face environmental risks, health and safety risks and liability risks. Extraction, transportation and transformation of resources are the stages in the energy industry that are managed by people and subject to human error. The industry may impose significant costs on society, such as; air pollution, ozone depletion, acid precipitation, forest destruction, emission of

radioactive substances, injuries, and even deaths. The trust of societies has somewhat been shaken by recent environmental and social issues affecting the energy industry.

Currently, managers of the energy industry have been more committed to ensuring sustainability through their CSR activities. In their latest report, Hanna and Lacy (2015) survey 53 CEOs in the energy industry from 30 countries. They report that 94 % of the CEOs in the industry believe that sustainability issues will be critical to the future success. The extension of this outcome is reflected on some activities of the firms targeting at environmental and social issues. For example, in 2002 BP, has developed an initiative that offers micro-credits to the local community in Trinidad and Tobago to start their own businesses. Shell also initiated *LiveWire Smarter Future Programme*, which aims to help young entrepreneurs. In 2014 alone, the programme trained almost 8000 participants.<sup>1</sup>

Growing environmental awareness also has shaped the development of new strands in the energy industry, such as the wind energy. Energy companies have taken environmentally conscious actions such as reducing corporate gas emissions, comprehensively recycling and composting, avoiding harmful extraction of fossil fuels,<sup>2</sup> and policies specifically targeting at minimizing the impact of production on water quality in terms of nutrient, thermal and chemical pollution.

Sustainability is built on three pillars; social, environment and economic concepts. Energy companies have been actively engaging in social and environmental strands in differing terms. This book aims to bring together all these three pillars by providing results from studies investigating the financing activities of the energy firms by incorporating the social and environmental CSR actions.

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### 1.3 Sustainability and Energy Industry: Islamic Banking and Finance

This book also discusses the sustainability concept from the perspective of the Islamic Banking and Finance. Since its inception in the early 1970s the Islamic Banking is one of the world's fastest growing financial markets, with an estimated annual average growth rate of 20 %. This growth is further enhanced during the latest financial crisis.

The attractiveness of the Islamic Banking and Finance lies on its adherence to equitable, fair and socially responsible principles, which were not necessarily prioritized by the conventional banks. The principles of Islamic Banks are based on the notion that they are not only responsible to their shareholders but also to the society. Regardless of religious consideration, Islamic finance has a potential to

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<sup>1</sup> <http://www.shell.com/sustainability/communities/local-employment-and-enterprise.html>

<sup>2</sup> For example, Green Mountain Energy avoids mountaintop removal for coal mining to prevent the destruction of the landscape (<https://www.greenmountainenergy.com/wp-content/uploads/2014/04/Ceres-2009.pdf>).

provide a model for sustainable changes in the financial system for firms in energy industry (For further details, see, Myers and Hassanzadeh 2013).

Nowadays we see more juxtaposition of CSR and Islamic finance leading the energy industry to be “more green”. Through acquiring a part of its external funding requirements from Islamic Financial sources, energy industry can be motivated to be more environmentally conscious. In this vein, Malaysia announced guidelines for issuance of socially responsible sukuk, aimed at helping firms raise money for projects ranging from renewable energy to affordable housing. In April 2014, the Dubai Supreme Council of Energy, a government planning body, and the World Bank signed an agreement to develop funding for the Emirate’s green investment programme, including “green” Islamic bonds. Dubai aims to derive 5% of its energy from sustainable sources and retrofit buildings to reduce energy consumption. Nevertheless, in their study, Ghoddsi and Khoshroo (2015) explains how Islamic Energy Bonds can be used for financing socially responsible projects, such as financing on-grid and off-grid solutions in low-income communities.

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## **1.4 Energy, Sustainability and Finance: Issues Covered in This Book**

The chapters selected for this book are genuine academic pieces of writing. All the chapters have undergone blind double peer-review process. The first group of chapters concentrates on the environmental actions of firms in the energy industry. The second group of chapters discusses social impact of energy firms. Lastly the last two chapters introduce the Islamic Banking and Finance and explain its potential role in promoting CSR actions of firms in the energy industry.

### **1.4.1 Green Energy**

Our book starts with chapters discussing the different arrays of green energy from the sustainability perspective.

The second chapter by Jiayuan Chen, Cal Muckley, Don Bredin and Liming Wang is the first to conduct a systematic study of information assimilation in net order flow in the time vicinity of the major policy and macroeconomic announcements in the complete Kyoto Phase of European Union Emissions Trading System (EU ETS). The authors contribute to the information assimilation literature in the European carbon market. Specifically, the authors find that the prevalence of the information assimilation via the indirect channel of net order flow in carbon emissions within the 5 minutes of major relevant announcements.

The next chapter focuses on manager specific characteristics and their potential impact on energy firms’ CSR activities, and particularly corporate environmental performance. The authors, Özgür Arslan-Ayaydin and James Thewissen, study whether the political orientation of the managers of the energy firms influence the development of corporate environmental actions. This chapter shows that managers

that contribute to the Democratic party have lower environmental concerns than the managers contributing to Republican party. Their chapter does not show a significant difference between the two types of managers in terms of endorsing environmental strength. Their overall results suggest that political party orientation of a manager in the energy industry has an influence on poor social performance, rather than on promoting and enhancing good environmental performance.

Environmental impact of energy firms came into heightened awareness, particularly their role in global warming, after the ratifications of United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The forth chapter by Doğu Sever and Necmiddin Bağdadioğlu assesses Turkey's obligations deriving principally from the Kyoto Protocol. The authors argue that unless the necessary legal adjustments are established, the carbon trade in Turkey has a potential to be exposed to the carbon trade fraud, which is one of the principle problems in the EU ETS. This chapter provides estimation of Turkey's volume of voluntary emissions trade and potential income of emission trade. The chapter concludes with applicable policy suggestions.

The fifth chapter, written by David Holwerda and Bert Scholtens, touches on the strategic risk management. The authors study the impact of terrorist attacks on the stock market returns of firms in the oil and gas industry. Specifically the research question asked by the authors is "Are the companies that are the target of terrorist attack experience a significant abnormal return at or shortly after the event date?" The authors do not find that oil and gas companies that are attacked more frequently react significantly different from those that are attacked less frequently. The chapter concludes that financial markets are found to be efficient in absorbing the impact of the terrorist attacks.

## 1.4.2 Socially Responsible Investments

Starting with the sixth chapter, the book has more emphasis on the social impact of energy firms.

The writers of the sixth chapter are Özgür Arslan-Ayaydin and James Thewissen. The authors argue that managers of good CSR firms in the oil and gas industry resort to impression management techniques by manipulating the tone of earnings press releases (EPR). The authors investigate 1700 EPR issued by US oil and gas firms between 2005 and 2014. Their results show that, to signal to shareholders that their wealth is not threatened by their CSR involvement, managers of more socially responsible firms opportunistically use more optimistic tone in their EPRs. The authors also find that the tone of the EPR by socially responsible oil and gas firms contains less incremental information value to predict future firm performance.

The next chapter addresses how the Swiss energy transition is governed under changing social and technical system dimensions. The chapter is written by Reinier Verhoog and Matthias Finger. The theoretical contribution of the chapter is extending multi level perspective (MLP) with the concepts of politics, power and



agency by applying in the Swiss energy market. The authors conclude that the promotion of renewable energy through subsidization causes a price scissor effect, which is disadvantageous for small Swiss utilities.

The eighth chapter integrates energy sustainability, economic performance and energy prices. Şahnaz Koçoğlu, Mehmet Baha Karan and Ayhan Kapusuzoğlu are the authors of this chapter. The authors group countries by using the Energy Sustainability Index of World Energy Council (WEC). Then they look at the relationship between stock market performances of the each group and oil prices. They use Johansen Co-integration Test and Granger Causality Test for period between 2004 and 2014. Their results show that the relationship varies in accordance to how the county ranks in the Energy Sustainability Index.

The next chapter is written by John Simpson, Abdulfatah Alsameen and John Evans. The chapter centers on the equilibrium relationships between political risk, domestic stock market prices, global benchmark stock market prices and global oil and gas prices, particularly in the period following the global financial crisis. The chapter provides evidence on ascertaining the relative importance of domestic and global economic factors while explaining that country's political will to implement policies of social responsibility in fossil fuel exports.

### 1.4.3 Islamic Finance

The last two chapters discuss the sustainability and finance in the energy industry from the perspective of Islamic Banking and Finance.

Green *sukuk* represent a new asset class that lies at the intersection of three investment trends: Islamic mutual funds, socially responsible investments (SRI), and *sukuk* (Islamic bonds). Chapter 10 written by Nafis Alam, Meryem Duygun and Rima Turk Ariss, looks into the potential for Green *sukuk* in major Islamic finance markets. The chapter introduces a means by which environmentally conscious investors can bring the Islamic values into their investing practices.

Finally the last chapter by, Özgür Arslan-Ayaydin, Mohamed Bejaoui, André Dorsman and Khurram Shahzad, provides insight on the external financing by Islamic principles. The research question of the chapter is whether the financial risk-return window is influenced when one invests in bonds that follow the Islamic financing principles. The authors find that, after correcting for risk, the returns on the Islamic bonds (*sukuk*) are significantly higher than those on conventional bonds.

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## 1.5 Conclusions

Aftermath the recent environmental scandals and social unrests, the sustainability of the activities carried out by firms in the energy industry has attracted tremendous attention. Therefore, energy industry has not only been under higher scrutiny of the public but it is also heavily regulated. Specifically the one of the main questions

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centering on this book is how can the firms in the energy industry maximize the shareholder value by also optimizing their CSR activities.

The chapters of these book shed light on timely and innovative concepts by intersecting the energy economics, law and financing with environmental and social activities of energy firms. Furthermore, the last two chapters aim at introducing the Islamic Banking and Finance as a new concept and showing how it can be a vehicle for incentivizing CSR activities of energy firms. The chapters in the book provide important results for not only the academic research in the area of energy economics, social responsibility, law and financial markets, but also practitioners and policy makers. We hope that the readers both enjoy and benefit the book.

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**Part I**

**Green Energy**

Jiayuan Chen, Cal Muckley, Don Bredin, and Liming Wang

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## Abstract

In this chapter, we examine high frequency order imbalance in the European Union emissions trading system carbon market at announcements of current and prospective economic activity and verified emissions. We verify that analysts do strive to forecast announcements accurately but that our scheduled public announcements nevertheless indeed do contain important surprise components. Our findings suggest that the preponderance of the order imbalance related information assimilation in carbon emission rights occurs within 5 min of the German (DE NO) and European Union new order (EU NO), European Union industrial production (EU IP) and United States non-farm payroll (US NFP) scheduled announcements. This is new evidence of information assimilation in the carbon emissions market. The extent of information assimilation is documented for 15 min both before and after each announcement in contiguous 5-min windows, and relative to same time interval observations on non-announcement days. The findings are of especial importance to firms in the energy sector as, above certain capacity thresholds, power stations and other combustion plants, oil refineries and coke ovens are regulated in the European Union emissions trading system.

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## Keywords

Carbon rights • Emissions • Information assimilation • Net order flow

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## 2.1 Introduction

Does net order flow vary substantively at scheduled macro-economic and verified emission announcements? In this chapter, we address this question to better account for an important candidate channel for the assimilation of information in the European carbon rights market. Regulated European Union carbon emissions stem to a large extent from the European energy industry. The functioning of the European carbon rights market, in respect to the assimilation of new information, is, thus, of paramount importance to the energy industry in Europe.

Traditional ideas of market efficiency suggest that asset prices should completely and instantaneously reflect news in market related fundamentals. However, Biais et al. (2005) conduct a survey and show that market microstructure matters. Due to order handling and inventory costs, adverse selection and market power, trades do have an impact on prices and perfectly efficient allocations are not in general achieved. In particular, with respect to the focus of this chapter, Evans and Lyons (2008) show the importance of net order flow variations to determine currency price dynamics, especially following the arrival of public macro news. The net order flow measurement is calculated as the averaged over the time interval product of best bid price and size minus the product of best ask price and size. It thus reflects the level of order imbalance in the market at a given time. Evans and Lyons (2008) therefore identify an indirect channel of price discovery, which reveals dispersed information to dealers who can revise their spot rate quotes accordingly.

A centrally important concern of scholars, regulators and market practitioners is the capacity of markets to form prices and provide liquidity in response to new information. Indeed, a key question should be how is this market performing from a market microstructure perspective? An extensive microstructure literature has contributed to addressing these issues on mature markets, such as the US equity and government bond markets and the major international foreign exchange markets. An absence of information assimilation at macroeconomic and policy announcements would suggest that the European Carbon market is disconnected from market fundamentals. This should raise important concerns about this markets prospects and feasibility.

In the context of the carbon markets, Conrad et al. (2012) study the direct channel of information assimilation. They show that announcement releases concerning the European Commission National Allocation Plans and unexpected news on the future and current economic development in Germany and the US can have an impact on EUA price dynamics. Bredin et al. (2016) provide evidence in the same vein with respect to prices, trading activity and illiquidity. In this chapter, we contribute to the carbon rights and emissions literature as we provide a novel study of the impact on net order flow of scheduled current and prospective economic announcements and at verified emission announcements. Net order flow can constitute a heretofore overlooked channel for the assimilation of new information in the European carbon market. We outline and we test for stylized regularities in net order flow imbalance which can be related to the information assimilation process, about market fundamentals, around scheduled public announcements.