André B. Dorsman · Volkan Ş. Ediger
Mehmet Baha Karan *Editors*

Energy Economy, Finance and Geostrategy

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Foreword

The utilization, exploitation and control of energy resources are topics of immense geostrategic importance to most industrialized nations. Energy resources and low electric prices are the key to economic development, growth and prosperity. Many of the modern political and military conflicts are in countries located close to the regions with hydrocarbon-based energy resources. Terrorism, extremism, proliferation of mass destruction weapons and political refugee waves have increased the threats and political tensions in these regions.

Major hydrocarbon resources discovered or about to be discovered under the sea in the Eastern part of the Mediterranean Sea have spurred political tensions, frictions and anxiety in an already volatile region. The discoveries have attracted the interest of large oil companies that have been investing heavily in the exploration and discovery of hydrocarbon reservoirs and their economic exploitation. The involved countries attempt to maximize their economic and political benefits through the formation of strategic alliances and partnerships. The southern energy corridor passing through Turkey is a viable alternative that could potentially benefit all countries involved. However, the exploitation of the hydrocarbon resources in Eastern Mediterranean Sea, to the fullest extent, requires overcoming and solving numerous political challenges and problems.

Climate change, the costs associated with CO_2 pollution emissions and phasing out nuclear power plants have made many countries, including the European Union (EU), to search for alternative energy sources, such as green and renewable energy. Specifically, the EU climate policy requires substantial decrease of fossil fuel consumption and production during the coming years. Research evidence, presented in this book, suggests that green energy projects are less profitable than non-green energy projects and, therefore, have a negative impact on firm values. Moreover, they are likely to result in volatile electricity prices. It appears that in the immediate future fossil fuel, coal and oil, gradually will be substituted mainly by natural gas, which is less harmful to the environment.

Other topics of great interest include the deregulation and liberalization of the natural gas and energy sectors aiming at greater efficiency in distribution and production and lower prices for the consumers. There are cases, however, where deregulation led to underinvestment and higher prices. The dynamic relationship among crude oil prices and prices of basic petrochemical byproducts, such as

naphtha, benzene, ethylene, propylene, acrylonitrile and vinyl chloride polymer, is quite an interesting issue for oil producing countries and petrochemical companies alike, as well as policymakers. Uncovering such relationships enables companies and countries to use petrochemical goods as hedging instruments against oil price falls. Last but not least, major oil and gas producers faced the challenges of declining consumption on the demand side; as consumers turned to alternative energies, energy efficiency improved, and non-Organization of Petroleum Exporting Countries (OPEC) oil supplies increased.

This book includes 12 well-written chapters interlinking energy economics, finance and geostrategy. The book covers in an informative and scientific manner many of the aforementioned topics and issues. I find the book quite interesting and relevant to scientist and policymakers interested in energy economics, finance and geostrategy.

Cyprus University of Technology Panayiotis Theodossiou
Limasol, Cyprus
January 2018

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Introduction: Energy Economics, Finance, and Geostrategy

1

André Dorsman, Volkan Ş. Ediger, and Mehmet Baha Karan

Abstract

Since countries' economic independence is based on energy security, decisions on energy economy and financing are assessed mainly by geostrategic considerations. Economically optimal decisions are not enough regarding geostrategy. This situation makes it difficult to make decisions in energy markets, and it creates considerable controversy. The role of financial markets is to measure the risk of this complex structure or energy projects and price them in financial basis. Understanding behavior of energy markets, it is necessary to look at them on an event basis. The limited availability and unequal distribution of energy sources and different pricing and cost mechanism of energy supplies are hardening to arrive a simple solution. Therefore, the research articles of this book are aimed to open new perspectives for the reader and researchers.

Keywords

Energy economy · Finance · Geostrategy

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1.1 Introduction

Aiming to cultivate the closely interconnected fields of energy and value including their relations to the disciplines of economics, finance, management, technology, and law, Center for Energy and Value Issues (CEVI) introduces the sixth book with this publication. The sixth CEVI book focuses on research articles on three timely concepts; energy economics, finance, and geostrategy. During the last decades, these concepts have been intertwined and formed an essential part of the energy arguments in the field of energy amongst practitioners, financial experts, economists, and academics. Notably, in the multi-polar world that has begun to emerge in recent decades, it is not possible for the energy economy to be independent of financial markets and geostrategic evaluations. From the planning of huge energy projects to investments at company level, all market players have to take these new developments into account.

As it will be underlined in the several sections of this book, decision-makers usually regard energy security as a priority. The natural gas pipeline projects, which are recently planned or in construction, are very good examples, showing the importance of security issues. The feasibility of transporting energy resources to the European markets from the Middle East, Central Asia, and the Eastern Mediterranean can only be explained by geopolitics or geostrategy beyond economics. Likewise, the speculation about the Nord Stream and Turkish Stream projects that are planned to transfer Russian natural gas to European markets are usually caused by such reasons. Today, financial markets give increasing emphasis on energy security and political risks beyond economic criteria. Moreover, economic and political risks are monitored with a variety of financial indices and markets react instantly to any changes in geopolitical risks.

We believe that a book containing energy markets, finance, and geostrategic issues will not only attract readers but also will inspire them for the further studies. There are 12 new research papers in the book, the writers have put forward original ideas and findings within the framework of their views and research. The second section of the study will describe the trends in the energy economy. In the third section of this chapter, the role of finance in the energy sector will be explained. In the fourth section of this work, the geostrategic vision of energy economy will be discussed. In the fifth section, the sections of the book will be presented in detail, and then the paper will be finalized with the conclusion section.

1.2 Trends in the Energy Economy

Energy economy has now become one of the principal branches of the modern economy that encompasses the use of energy resources by people and its consequences. The concept of energy economy was first used in the literature on the consumption of coal in the mid-1800s, and it entered into the economy literature after the 1973 oil crisis. Since then, not only the economic aspects of main energy sources such as oil, natural gas, coal, and renewables but also the environmental issues related with them have been examined by energy economists in detail. Until

the end of last century, the energy economy mainly dealt with coal and oil and their economies, however, after the rise of the green economy concept, energy economists' interest has expanded into the nuclear and renewable energy. After the natural gas industry has undergone a significant transformation, with the discovery of shale gas, the energy economists have started to analyze the effects of the shale gas boom on the world market, particularly to the Middle East and Russia.

Energy economists are usually interested in investigating and examining the most cost-effective energy source for different consumption areas. Moreover, in last two decades, the monopolistic structure of energy markets has been evolving into more competitive structures. The developments in the European Union and the USA are noteworthy in this regard, and significant reforms are also being carried out in many developing countries such as Brazil, Argentina, and Turkey. With these changes in the markets, energy economists began to examine not only the relationship between economic variables and energy products but also the price movements of various energy sources. As the relationship between these issues has been better understood, energy production, distribution, and consumption activities have become more efficient.

One of the important areas of study of economists has recently been a transition to green economy. This new concept includes the examination of environmental factors and modelling of environmental impacts of energy production, transportation, and use. The national policies of the European Union and many other countries towards lowering greenhouse gas emissions, pollution, and fossil fuel dependence has been reflected in the energy economy publications since the beginning of the 2000s. The public sensitivity to environmental issues brought the energy sustainability concept to top of agenda. Sustainable energy systems that are defined as serve "meeting the needs of the present without compromising the ability of future generations to meet their own needs" became a new focus area of the energy economists. Due to increasing cost of energy to the societies, energy efficiency policies are becoming a crucial part of the global energy market and researchers of energy efficiency. Studies of energy economies are not limited to macro-level researches, but also cover micro level investigations including sectors, companies and even consumers.

Finance of energy projects and corporations constitutes an important part of the micro energy economy. In the past, energy financing was largely based on project funding, but now energy markets and business financing have become important, and energy economists have been increasingly interested in micro-level research. On the other hand, access to secure and convenient sources of energy has become necessary to the functioning of modern economies. However, the unbalanced dispersion of energy sources among countries has led to significant problems. Today, due to increasing energy security threats in the world, geopolitics and geostrategy have been started to be linked with energy economy studies.

1.3 Role of Finance in Energy Sector

According to the International Energy Agency (IEA), the total global energy investments reached USD1.7 million, corresponding to 2.2% of world GDP in 2016 (IEA 2017). While the electricity sector received the most significant share

(USD718 million), the total oil and gas investments amounted to USD649 million. On the other hand, energy efficiency investments on a global basis reached to $232 million, 5% more than the previous year. The investments on electricity generation from renewable sources, which have been increasing in the last decade, also have a considerable share with USD297 million.

Undoubtedly most of these investments have been realized with project financing. Since the energy projects are usually large and have high returns, they are very important for both national and international finance sectors. The most significant difference between project financing and other types of financing is that the investors see the project assets as collateral, rather than the cash flow from the project. Assessing and pricing of risk is a fundamental component of project financing, and especially the energy investment projects are subject to some technical, economic and geopolitical risks. Therefore, most of the researches on financing energy investments focus on these variables.

As energy companies have become increasingly competitive in recent years, research on financial management has also increased. In addition to the investment and financing activities of companies, financial management is also interested in the efficient use of their assets. While energy companies are concerned with the management of their current assets ranging from cash management to inventory management, the area of capital budgeting is also important for financial management. The capital structure decision of the energy companies, the calculation of the debt and equity costs and the selection type of financing are also the responsibility of the financial management.

Technological, environmental, economic, and geostrategic factors determine the new structure of international energy markets. The European Union is the leader in market restructuring, integration of national markets, internalization of environmental costs, and the introduction of new technologies (Vasconcelos 2009; Karan and Kazdagli 2011). Especially since 2000, energy markets have developed substantially due to the growing activity of financial investors. Thus, by removing the obstacle between energy investments and the finance sector, every sector in society has been investing in the energy-related projects. Moreover, financial innovations and derivative financial instruments have created new sources to energy investors and made energy market more competitive than before. As the energy markets have been integrated into the financial markets, finance researchers have continued to examine the energy industry more deeply. The most significant task of financial markets is to evaluate the risks of this complex structure (or energy projects) and price or value them on a monetary basis. Eventually, all financial activities including project financing, the management of financial sources and investments of energy companies, security and commodity markets have become an integral part of the energy economy.

1.4 Geostrategic Vision of Energy Economy

The geostrategy, which deals with the combination of geopolitical and strategic factors has become a global concept with the ever-increasing importance of energy sources after the World War I. However, the widespread use of geostrategy in energy

economy has only begun after the 1973 oil crisis, which was a widely accepted bottleneck in the supply of petroleum to the world economy (Isswi 1978). The 1973 oil crisis not only slowed down the global economic development but also one of the underlying reasons behind the conflicts emerged as a result of geopolitical rivalry in the Middle East. Following the 1973 crisis, the United States abruptly lost its energy independence, speculative finance has risen, and the neoliberal ideology reshaped global trade relationships (Smith-Nonini 2016). Inevitably, most of the researchers on energy economics have begun to include geostrategic and geopolitical interpretations in their studies.

Another major oil shock began with Iraq's occupation of Kuwait in 1990. The United States' rapid intervention contributed to reducing the potential risk of future oil supplies, thereby calming the market and restoring global confidence. The Gulf War of 1991 and also the dissemination Soviet Union were often regarded as the first test of the new world order, which is associated with the ideological notion of global governance and economic liberation only in the sense of new collective efforts to identify, understand, or address worldwide problems that go beyond the capacity of individual nation-states to solve. Thus, integrated markets, especially energy markets, are included in the world economic system, as events affecting energy security in one part of the globe could threaten countries far removed from potential conflicts (Gaddis 2006).

Later, the terrorist attack on September 11, 2001, collapsed not only the prices of oil but also caused Afghanistan and the second Iraq wars. The conflicts between to the major oil-producing countries in the Middle East have been continuing since then. The US-Iran conflict and the wars in Syria and Ukraine are some of such conflicts. On the other hand, the discoveries of natural gas in such regions as the Eastern Mediterranean and the development new unconventional hydrocarbon (shale gas and shale oil) production techniques have started a revolutionary era starting 2007, especially in the US. The shift in the world economy that is increasingly powered by natural gas has significant effects on global energy geopolitics. Competition for their control and access to natural gas resources, their export routes, and market characteristics began setting the international relations agenda. With the participation of new regional players in a multi-polar world, some rule setting countries started to shape the international politics, while others remained only as rule followers. The new situation also revealed continuous formation of coalitions around specific political and economic principles and interests (International Gas Union 2012).

Since geostrategy cannot be separated from the economy, a new concept called "geo-economics" has been introduced recently (Luttwak 1990). It is defined as the combination of economic and geographic factors relating to international. The multi-polar world order of complex energy interests and energy security, regional wars, the greed of big energy corporations and growing nationalism will make the future research on geo-economics even more interesting.

1.5 Energy Economics, Finance, and Geostrategy: Issues Covered in This Book

The chapters of this book are organized into three parts, namely energy economy, finance, and geostrategy. All of the articles, which have undergone a blind double peer-review process, contain contemporary and original views on several energy issues. The first two chapters of the book are intended to introduce the book to the readers and give a brief idea about the chapters in the book. Chapter 2, which is entitled "Geostrategic Considerations on Energy" emphasizes the foreign policy guided local, regional, or global factors of energy. The author of this chapter, Rafet Akgünay, addressed the geostrategic ramifications of essential events and threats that are closely linked to major oil and gas resources.

1.6 Energy Economy

There are two chapters on energy economics issues in one developed and one developing country in this part of the book. The Chap. 3, which is written by Reinier Verhoog and Matthies Finger entitled "System Dynamics Simulation to Explore the Impact of Low European Electricity Prices on Swiss Generation Capacity Investments." The authors analyze the implications of low energy prices of European electricity markets in the last decade on the Swiss electricity market, which is facing the additional challenge of phasing out nuclear power plants and market liberalization. The authors utilize the system dynamics to a model and simulate the long-term impacts on investments in new generation capacity, security of supply and future electricity prices. The application of Monte Carlo Simulation Model indicates that the current low electricity prices are likely to persist for another decade. A possible response to the low prices is an underinvestment in generation capacity, with the risk of an energy crisis and price spikes as it coincides with the decommissioning of nuclear power plants. Finally, they observe a shift towards renewable energy sources and natural gas-fired power plants, resulting in more volatile electricity prices. These findings are similar to earlier studies of the liberalized German and Belgian electricity markets, which are also facing the challenges of a nuclear phase-out under depressed European prices.

The second chapter (Chap. 4) of this part focuses on Turkey which has a newly developed energy market. In this chapter entitled "An Investigation of the Turkish Natural Gas Distribution Market," Okan Yardımcı and Mehmet Baha Karan investigate the effectiveness of regulation in the Turkish natural gas distribution sector by examining various implementations of the board and the efficiency, productivity and service quality analysis of the distribution companies. They concluded that some of the regulations did not produce sufficient results in the Turkish gas market by comparing the private and state-owned companies according to their performances and R&D expenditures. Finally, the authors underline that the regulations to encourage sector development and cost reduction through R&D have not been properly implemented, i.e., a partially regulation failure in the Turkish energy market.

1.7 Finance

The finance section consists of four chapters. The first chapter (Chap. 5), which is written by Özgür Arslan-Ayaydin, James Thewissen and Wouther Torsin explore the economic consequences of rapidly growing green economy investments in recent years. More specifically, the effect of the corporate research in green energy on the corporate performance is investigated in this chapter entitled "The Crowding-Out Effect of Green Energy Innovation." Using the data related 130,000 patents granted by 212 U.S. firms between 1975 and 2006, they tested and compared the impact of green and non-green energy innovation on firms' financial performance and value. The results show that while innovation increases firm performance and value, the innovation in green energy has a significant and negative impact on future operating performance and reduces firm value. They have also concluded that the investments in green energy crowd out more profitable non-green projects, thereby reducing their value and performance.

The Chap. 6 entitled "Analysing the Relationship Among Oil Prices and Basic Petrochemical Feedstock" is written by Elkhan Hasonov and Mubariz Hasonov. They analyzed the relationship between crude oil prices and prices of primary petrochemical feedstock. The authors underline that the study fills a significant gap in the empirical literature and claims that the results of this study have some policy implications. In particular, they find that prices of essential petrochemicals do not move one for one with oil prices. This finding implies that oil price fluctuations are not fully transmitted to prices of industrial products, and hence oil price changes will have only limited effects on the economy. Furthermore, their result also implies that oil companies and oil-exporting countries may use petrochemical goods as hedging instruments against oil price falls.

The authors of Chap. 7, Mehmet Baha Karan, Aydın Ulucan and Arif Özden, use operating research methodology for the financial analysis on the pipeline investments in the Southern Europe, more particularly East Mediterranean area. In the chapter entitled "Ranking of Natural Gas Transmission Projects at the South-eastern Corridor: A Multi-Criteria Approach on the Countries of the Region" Turkey's available and potential gas transmission and LNG projects are ranked by using a multi-criteria decision-making technique called ELECTRE. The study reveals that the Israel-Turkey Offshore project is the most suitable one among other alternatives. In the second stage of the analysis, the same methodology is re-employed on Israel and found a similar result. Even considering other scenarios, the study has shown that the Israel-Turkey Offshore Pipeline Project is a priority for both countries as the interests of the two countries overlap.

The last chapter (Chap. 8) of the finance section is written by Nermin Yaşar and Erdinç Telatar. This chapter entitled "The Relationship Between Foreign Direct Investment and CO_2 Emissions Across a Panel of Countries" analyzes the relationship between foreign direct investment inflows and pollution emissions for 139 countries from 1970 to 2015. The countries are classified into four groups based on the World Bank income ranking. The primary motivation of this study is to analyze, whether the causal relationship differs between different income groups

of countries. For this purpose, panel ARDL boundary approach and Granger causality test were used. The results of the study indicate that the causal relationship between FDI and CO_2 emissions differs depending on which income group the country belongs to. The authors conclude that, while there is no statistically significant short-run causality relationship running from FDI to CO_2 emission for high income, upper middle income, and low-income group countries, the pollution haven hypothesis is supported for lower middle-income group countries.

1.8 Geostrategy

The third part of the book is devoted to the geostrategy of energy and consists of five chapters. The high number of chapters in this part indicates the importance given to the concept of geostrategy in the book. Most of the chapters of this part discuss the geostrategy of oil and gas sectors that have been keeping the top place in all energy arguments during the last century. Chapter 9 entitled "Geostrategic Challenges in the Oil and Gas Sectors" identifies the significant geostrategic challenges that have emerged during the last two decades and assesses their implications for the global oil and gas sectors. The authors of the chapter, Volkan Ş. Ediger and İstemi Berk, identify mainly two significant challenges facing the oil and gas industry: energy substitution and resource scarcity. They estimate that the substitution of coal and renewables threatens to reduce oil and gas demand and resource scarcity will promote the development of unconventional hydrocarbon resources such as shale oil and gas and heavy oil. Moreover, the national oil companies (NOCs) are expected to continue dominating the industry and due to the increasing intervention of the corresponding governments, the next decades could experience a rise in state capitalism not only in significant oil and gas producing countries but also in the global energy business.

The authors of Chap. 10 investigate the geostrategy from the point of view of the European Union (EU). The chapter entitled "Geostrategy of the European Union in Energy", which is prepared by André Dorsman, Andries Nentjes, and Petr Polak claim that climate change forces the EU to reduce the use of fossil fuel, but the use of fossil fuel is vital for the security of supply. Underlying this dilemma for the EU policy, they advise that Europe must constantly speak with one voice to denounce onerous long-term contracts for gas imports from Russia and to gain a stronger bargaining position. As part of its diversification strategy, Europe must also invest in an Iran-Europe Pipeline to bring gas to Europe from Central Asia and Iran.

Chapter 11 is entitled "Geostrategic Importance of Energy Transit and a New Transit Regime under the International Energy Charter". Volkan Özdemir, the author of the chapter, focuses on the geostrategic importance of energy transit and the possibility of a new regime under the International Energy Charter. He argues that although EU market has developed their energy regulations and solved energy transportation issues, there is still lack of an energy transit regulation in broader Eurasia. He concludes an international form of transit regime for all countries and reveals that the new regional energy transit community will not only regulate the

energy trade and transit among the parties to the declaration but also potentially contribute to the political stability in Eurasia as a multilateral binding legal regime that is the basis of any geostrategic calculations.

The exploration activities of offshore gas potential in the Levant Region, ongoing and planned field development and production activities, the possibilities of amount and export destinations, the options for export infrastructures, and the effect of recent discoveries in Egypt on the Levant region are discussed in Chap. 12, which is entitled "Geostrategic Importance of East Mediterranean Gas Discoveries." Sohbet Karpuz, the author of the chapter, gives an overview of the potential impact of all issues on the conflict-laden geopolitical landscape of the region regarding adding a new dimension to the power balance and forewarns the market players. He emphasizes that unless developed for the benefit of all, those resources may fuel confrontations, add frictions and anxieties to an already volatile region, and will shrink the room optimism for finding another common ground.

Vera Bekker and Bartjan Pennink are the authors of the last chapter (Chap. 13) of the book. The chapter is on "The Natural Resource Curse: A Country Case Study: Tanzania." The authors aim to uncover factors that can help developing countries with significant amounts of natural resources in avoiding the so-called "natural resource curse." Posing local economic development and innovation as sources of national economic growth (the antithesis of the natural resource curse), the paper involves semi-structured interviews with various local stakeholders on the topic of recent natural gas findings in Tanzania. They reveal that the government, knowledge and education, local participation, revenues, transparency, legal issues, and finance and capital can be seen as crucial for a successful exploitation and for creating opportunities for the local actor by applying a multi-criterion analysis.

1.9 Conclusions

This book combines the research articles on energy, economics, finance, and geostrategy to provide readers with information on the complex structure of international energy markets through some selected topics. The chapters in the book show not only the multi-dimensional structure of present day's energy markets but also the close relation of energy, economics, finance, and geostrategy in energy markets. All chapters analyze the most popular energy topics of the current world, which are discussed by market players and academicians. Priority of energy security in decision-making processes in energy markets is emphasized in almost all chapters.

This book investigates policies and market structures not only of traditional energy sources such as petroleum and natural gas but also of renewables. Although the Middle East and Eurasia regions are the focus of the book, Tanzania is presented as a case study from Africa. We hope that this book will give readers a variety of inspiration and contribute to the conduct of new research.

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Geostrategic Considerations on Energy

2

Rafet Akgünay

Abstract

After the Cold War was over during the last decade of the twentieth century, there was a brief period during which there were hopes for a better future in the world. Various organizations and several countries replaced the term of "threat assessment" with "risk analysis." Alas, it was not very long before this concept became outmoded in a relatively brief period. Risks, such as terrorism, proliferation of mass destruction weapons and their delivery means, extremism, trans-national illegal arms, narcotic and people trafficking, uncontrollable refugee crisis have led to a dangerous uncertainty in international relations. On top of all these, growing number and magnitude of unstable areas especially in the Middle East has become a major concern for the global community. This concern is exacerbated by the mere fact that almost all these alarming events take place in and around the areas of hydrocarbon-based energy sources as well as their transportation routes.

Developments such as the emergence of new overpopulated urban centers in Asia and of the concerns about climate change are also the agenda items that are closely related to the energy issues and these issues are closely followed by the world public opinion.

It is the intention of this paper, to address the geostrategic ramifications of these unfolding events and threats that are closely linked to major hydrocarbon based energy sources. After all energy and energy security have always been an important issue in world politics since the industrial revolution.

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Energy and geostrategy · Geopolitics of energy · Energy security · Oil and gas pipelines · Maritime routes

2.1 Introduction

Energy is defined as the ability or capacity to do work, and command of energy is setting the outer limits of what can be accomplished by communities, nations, or any social entity (Weissenbacher 2012). It has always been crucial for the human development all throughout the history. In the traditional world major energy sources were based on animal power, fertilizer, wood, charcoal, water and wind. These sources were rather abundant and taken for granted. However, even in the traditional era, energy was the main ingredient of economy and they had always been closely related with technology. This relation became more apparent after the industrial revolution, which necessitated energy resources with higher calorific value, such as coal and oil.

Oil and coalfields are concentrated in some regions and countries. As a result, geopolitics of energy has become a major issue both for producing and consuming countries since unlike the traditional energy sources, coal and oil are exhaustible in nature. Being the main ingredients of the modern technology they are of utmost importance for global prosperity and naturally for security (Rodrigue et al. 2017). According to the recent figures, oil provides 34% coal provides 24% and natural gas 21% of world's primary energy needs. Nuclear, hydro and other sources provide the remaining 21%. (Hopkins 2014). Wars were fought, domestic and international instabilities occurred due to the difference between the demand and supply of fossil fuels. Thus energy has acquired a political aspect in international relations making the energy and energy security more visible and moving them to the center of international relations. In this regard, this paper offers a very brief theoretical perspective and definitions on the related concepts such as security, geopolitics, threat and risk, followed by discussion on hydrocarbon related issues.

All countries whether industrialized or not need reliable energy supply in order to have sustainable development. According to the U.S. Energy Information Agency (EIA) net imports (imports minus exports) of petroleum of the U.S. from foreign countries in 2016 were equal to about 25% of U.S. petroleum consumption. Likewise, most of the other industrialized countries in Europe as well as the newly emerging industrial powerhouses like China and India depend on foreign hydrocarbon resources. Given the fact that dependence on these resources is not limited to only industrialized world one can easily conclude that the energy security and politics is not confined to a certain region or certain countries—whether they are exporting or importing. What is more, despite the disagreement between the economists many geologists firmly believe that oil production has reached at its peak and will soon sharply decline (Cudahy and Richard 2008). These uncertainities about the future of oil production, has led to a global tendency to treat energy

insufficiency as a national security problem. After the oil crisis of the 1970s and especially in the new security environment of post 9/11, energy politics and energy security—with its various aspects—has become even more crucial in international politics.

As an outcome, certain principles have started shaping the energy security policies especially of the energy thirsty countries including several European countries. Among these principles diversification is one of the most, if not the most prominent one. This principle covers the diversification of the sources, supply routes and the infrastructure.

Eastern Mediterranean, located at the crossroads of Europe, Asia and Africa, lies in the heart of major oil and gas fields. It is also a historical maritime route, which nearly a third of world trade passes through, including 30% of the world's oil and two-thirds of the European energy supplies (Schivardi 2016). However, this area is a volatile part of the world with several conflicts including frozen ones, threatening the energy security as well.

With this perspective, it can be argued that the Mediterranean Sea, especially the Eastern Mediterranean is an area, which needs special attention as it is done in this paper. Due to its dynamic and multi-disciplinary nature, the topic holds implications for the literature in terms of geopolitics and security. Moreover, the changes in the energy paradigm create new risks and opportunities for the global actors as well. Therefore, the topic also offers policy makers, industry actors and the public agents a new perspective in tackling the issues.

With this perspective, this article adapts the concepts of energy geopolitics and security in response to the evolving issues of energy resources. More specifically, the article aims to bring forward the development in the energy resources, the rising energy oriented risks and threats on energy security and geostrategy, and the geopolitics of hydrocarbon energy resources especially within the Eastern Mediterranean region. In consideration that energy geopolitics, energy security and geostrategy are all a part of a dynamic process, which has ongoing impacts on regional politics, the article intends to offer a stronger perspective in approaching these questions.

In this respect, the article is organized as follows. Section 2.2 offers various related contemporary definitions by firstly, reviewing the literature on security and energy security, and secondly, positioning the article in terms of the literature on geopolitics. Section 2.3 offers a conceptual and historical discussion on the risk and threats associated with hydrocarbon resources, setting the scene for the main argument that, together with the security problems related to hydrocarbons and the rapidly growing need for oil and gas, the dependency on these resources is significantly growing. Section 2.4 briefly discusses the hydrocarbon issue and the Eastern Mediterranean in an historical perspective. Finally, main argument is summarized in Sect. 2.5.

2.2 Contemporary Definitions of Energy Security

The concept of security is on the permanent agenda of the policy makers and the scholars of modern international relations. However, there is no consensus on the exact definition of this concept. In traditional terms, security has been closely related with the use of military power. This notion, though, has been changed by the emergence of new dimensions in the strategic environment. Today, any reference to the concept of "security" generally follows rather a holistic approach and includes other factors, such as environmental, economic and welfare issues. Thus, security can be defined as defensive (in relations to a threat) or offensive (optimizing of profits in relations with other actors) point of view.

Whereas energy security can be defined as a condition in which a nation and all (or most) of its citizens and industries have access to adequate energy resources at reasonable prices for the foreseeable future, free from serious risks of major disruption of service (Hancher and Janssen 2004). This definition is in line with the International Energy Agency (IEA)'s approach which highlights two important components: "the *uninterrupted* availability of energy sources" and at an "*affordable* price". To be more precise, from the perspective of energy security, there might be different kinds of interruption of energy resources such as weather conditions, technical difficulties, malfunctioning of the facilities with long or short-term consequences. The IEA asserts that the long-term energy security mainly deals with timely investments to supply energy in line with economic developments and sustainable environmental needs. Short-term energy security, on the other hand, focuses on the ability of the energy system to react promptly to sudden changes within the supply-demand balance (International Energy Agency). In an inclusive manner, Hernandez defines energy security "as the sufficient and continuous supply of the energy necessary for carrying on the life and activities of the nations, both individual and collective." (Hernandez 2014, p. 46)

As these approaches indicate, energy security is closely related to high dependence on energy imports for the energy importing countries. When addressing the availability and accessibility of energy, several other factors, such as research, development, political instability in producing countries, as well as during the transportation, distribution or marketing phases should be taken into consideration. Physical protection of the facilities in the consumption networks has also been taken into consideration (Gençtürk 2012).

Lack of energy security is thus linked to the negative economic and social impacts of either access to adequate physical availability of energy, at reasonable and competitive prices for the foreseeable future, free from serious risks of major disruption of service (Hancher and Janssen 2004).

In short, the term energy security is a multi-dimensional and interdisciplinary notion covering a wide spectrum requiring strategic concepts and holistic means especially in dealing with fragile states, arising from various causes, such as, natural disasters, terrorism, poor regularity designs, lack of investments, or *geopolitical instability* (Redgwell 2004).

Cohen approaches the concept of geopolitics as the analysis of the interaction between, on the one hand, geographical settings and perspectives and, on the other, political processes. According to him, the settings are composed of geographical features and patterns and the multilayered regions that they form. As a result of this approach, "the political processes include forces that operate at the international level and those on the domestic scene that influence international behavior. Both geographical settings and political processes are dynamic, each influences and is influenced by the other" (Cohen 2003).

Geopolitical interests should, therefore, be strategically managed and this strategic management leads us to geostrategy (Brzezinski 1998). Hernandez (2014) reminds that whereas the concept of geostrategy was traditionally exclusively related to the military field, it has now evolved into a more comprehensive concept. As a result, it has nowadays a much broader dimension and it intends to study large topics such as military, economic, and political on a global scale, and not just in relation to geography. In other words, its contemporary definition covers more aspects than just its physical one. Consequently, when the geostrategic dimension of energy is referred at, it is directly related to geopolitics. These two concepts mutually influence each other. Geopolitical instability, thus, is a derivative of several concerns combined, including the global threat of terrorism targeting oil and gas industry. In this sense, physical security of the energy resources is an important element that carries priority for all the countries.

In the world today, hydrocarbons have the highest proportion both in energy production and consumption. However, these resources are rapidly being exhausted. Political and academic circles are currently discussing and searching other options available to meet the future energy demand. Since the renewable energy, especially sun and wind power, are basically obtained from resources available domestically, technological developments may provide new opportunities for fossil fuel importing countries. As far as the geopolitical environment is concerned, opportunities presented by technological developments in the production of the renewable energy area are opt to be limited. In case of a major shift from fossil fuels to renewable energy resources, the players will change and the technologically more advanced countries will start dominating the market. Competition among them and dependency of the technologically less developed countries to the foreign source may create new problems. What is more, renewable energy production will continue to use the similar, if not the same energy networks infrastructure.

Therefore, it can easily be said that although, renewable energy resources will definitely help in building a healthier and a greener environment, at the geostrategic level, it is not a panacea for the problem. Foremost, however, it should be noted that energy security is primarily an essential component for fossil fuels since the renewable energy is basically obtained from resources available domestically. As an outcome of this fact, geopolitical dimension of energy security has to be taken into consideration. Hydrocarbons constitute the major input of modern technology. Alas, neither the production fields of hydrocarbons nor the consumption centers are distributed evenly. As a result of their uneven distribution in the world, they have to be transported over long distances primarily through pipelines or by tankers.

Pipelines crossing various countries or tankers traveling in high seas for long distances require close cooperation among the countries in order to secure world-wide trade in energy goods, to avoid short-term supply interruptions and to encourage quality of services as well as technological innovations.

As a matter of fact, the main crude oil reserves are largely found in the Middle East especially in and around the Gulf area. USA, Canada, Russian Federation and other former USSR countries, China, Northern Africa, African countries neighboring Gulf of Guinea, Brazil and Venezuela are the other main producing countries. According to the United States Central Intelligence Agency 2015 figures among the "Total Petroleum And Other Liquids Production" of the top 20 producer countries seven are Middle East and North African countries, namely Saudi Arabia, Iraq, Iran, United Arab Emirates, Kuwait, Qatar, Algeria, Oman. These countries are also among the top 20 producers. Apparently this listing has not changed in 2016 (CEO World Magazine). Azerbaijan should also be added to this list since, the official Azeri figures show that this country is heavily dependent on its exports through Mediterranean. State Oil Company of Azerbaijan announced that "14,707,802 tons of oil were exported from Ceyhan in January–July" of 2017 through BTC Pipeline (State Oil Company of Azerbaijan Republic).

According to the Institute for the Analysis of Global Security, while OPEC countries produce about 40% of the world's oil, they hold 80% of proven global reserves, and 85% of these reserves are in the Middle East. Actually, it is a sad fact of life that many of the world's leading oil producing countries are politically unstable and most of them are members of the Organization of the Petroleum Exporting Countries (OPEC).

Energy security is not a new concept. It has particularly been a major preoccupation for many countries especially since the oil crisis of the 1970s. The geopolitical tensions of 1973 and 1979 in the Middle East had been an eye opener for several circles to show how delicate and important that the energy security was. In both cases, what was at stake was the supply security. Developments following the Arab-Israeli War of 1973 and the Iranian revolution of 1979 showed that international or domestic disturbances might have a negative effect on not only the security of production but also prices, leading to turmoil in global economy. During those years, corresponding to the Cold War era, the main focus of concern was rather military in nature. Interruption of the flow of energy was primarily confined to the wars involving oil fields, geopolitical tactics and unlikely possibility of threats on tankers by submarines. In other words, energy security including transit security had been seen from the perspective of East-West security strategic equation.

With this perspective, in consideration of the developments in the energy resources and their relation with geopolitics and security, this article approaches the issue in line with Brzezinski (1998) and Hernandez (2014). Clearly, the developments create opportunities as well as risks and threats. Therefore in discussing such a matter, the necessity of acting strategically and the multi-dimension (military, economic, political) impacts of the developments must lie at the center of the discussion.

2.3 The Developments, Risks and Threats on Energy Security and Geostrategy During the Post-Cold War Era

2.3.1 Conceptual Discussion

The end of the Cold War raised new hopes and expectations in the world in general. The term "threat" was replaced by the term "risk". In this respect, the best example would be to review the "Alliance's New Strategic Concept of 1991" adopted by the Heads of State and Governments of the NATO Countries (The Alliance's New Strategic Concept of 1991). In this document, NATO officially set aside the term "threat" replacing it with a much-diluted concept of "risk".

According to Williams (2016), although the understanding and explanation of it has changed over the years, risk is a term that has been used for centuries. Today, when used colloquially, it may refer to danger or peril or even used as a synonym for threat. However, he argues where as "risk is an equation or estimation of the odds that danger will be realized or that a given course of action may have an adverse effect", threat relies on three different components. These components may be presented as an "actor" posing an actual or perceived threat; "capability" to follow through on the threat and finally to have "power" to employ this capability. "Threat thus requires an actor who expresses intention and has the ability to do harm" in other words the ability to inflict intentional damage (power). Clearly, both risk and threat are dependent on perception and for the purpose of this article it should be well specified.

Accordingly, the international organizations such as the North Atlantic Treaty Organization (NATO), European Union (EU) and the United Nation (UN) approach risk as "...the expected losses (lives lost, persons injured, damage to property and disruption of economic activity) due to a particular phenomenon—a function of the probability of particular occurrences and the losses each would cause..." and threat as "...(1) The sum of the potential strength, capabilities, and intentions of any enemy which can limit or negate mission accomplishment or reduce force, system or equipment effectiveness. (2) A menacing indication of danger to a nation's military forces, industrial base, territory, possessions or population. Such a threat generally arises from an adversary nation's military power as manifested by technological capability, military budget, military industrial production capacity, military alliances and the maintenance of conventional and strategic forces at levels beyond that required for legitimate defense. (3) A menacing indication of imminent danger to friendly forces. Such a threat generally arises from the employment of an adversary's offensive or defensive forces in an area of military operations (NATO-EU-UN Glossary).

Perhaps in a rather simpler way, differences are made between the risks that could materialize against our interests, and, threats directed to these interests, with an evident intention to damage them (Zaragoza 2016). In the "Alliance's New Strategic Concept of 1991" of the North Atlantic Treaty Organization (NATO) risk is defined as the "build-up of military power and the proliferation of weapons technologies in the Southern Mediterranean and Middle East, including weapons of mass destruction

and ballistic missiles capable of reaching the territory of some member states of the Alliance. Among other risks of a wider nature, disruption of the flow of vital resources and actions of terrorism and sabotage" were also mentioned.

After the Cold War was over during the last decade of the twentieth century, the western world started to discuss concepts like "peace dividend" and the "end of history". Replacing risks with threats and focusing on new concepts reflected the emerging optimism in the world which did not last long and the west and the rest started coping with the new realities not long after the collapse of the Soviet Union. The NATO Strategic Concept which was adopted in 1999, mentions that some countries in or around the Euro-Atlantic area face serious economic, social and political difficulties, ethnic and religious rivalries, territorial disputes, inadequate or failed efforts at reform, the abuse of human rights and the dissolution of the states.

2.3.2 Historical Discussion: The Energy Security of Hydrocarbon Resources

These issues mentioned in the NATO's Strategic Concept are valid for the energy security as well. In previous decades growing import dependency on hydrocarbons was the primary concern in the energy security studies. Besides shortages due to the scarcity of fossil fuels were discussed yet another topic but not at the same level as the import dependency. Both of these subjects are related to supply security. Risks that were brought to the agenda in the 1990s, such as the proliferation of mass destruction weapons and their delivery means, extremism, international or transnational terrorism, piracy and political instability, climate change, energy infrastructure, failing states, mass migration and refugee crisis are among the main considerations related, among others, to energy security and have gradually become part of the daily routine, right after the Cold War ended and especially after 9/11 terrorist attacks in the United States.

This issue has continued to be tackled in the new versions of the NATO's Strategic Concepts. The current concept dated 2010 asserts, "All countries are increasingly reliant on the vital communication, transport and transit routes on which international trade, energy security and prosperity depend. They require greater international efforts to ensure their resilience against attack or disruption." (The Alliance's New Strategic Concept of 2010.)

This document also claims that many countries including most of the NATO allies will become more dependent on foreign energy suppliers and in some cases, on foreign energy supply and distribution networks for their energy needs. As a larger share of world consumption is transported across the globe, energy supplies are increasingly exposed to disruption.

International Energy Agency forecasts, that in 2016, worldwide average demand of oil and liquid fuels increased to nearly 96 million barrels per day and it foresees demand crossing the 100 million barrels per day threshold towards the end of its 5-year outlook period. The same international body expects that by the year 2015, non-OECD Asia will remain the major source of oil demand growth, with volumes

increasing from 23.7 million barrels per day in 2015 to 28.9 million barrels per day in 2021, though the rate of growth is affected by reductions in subsidies and efforts to tackle pollution. China will be central to demand growth, partly because of the underlying rise of oil demand but also due to its build-up of strategic reserves that will reach at least 500 million barrels by 2020. This trend for China is set to continue to 2040, as oil demand from the transportation sector is growing strongly there as well as in other non-OECD countries such as India (International Energy Agency).

2.3.2.1 Terrorist Threats

Parallel to the rising importance of the of the global energy resources, the threats possessed against the natural resources have also risen in four major areas. Firstly, the piracy and terrorist threats targeting hydrocarbon resources have significantly risen. Secondly, pipelines passing through conflict zones also constitute a problem regarding the secure transmission of oil and gas from the production fields to the markets. Thirdly, with the adoption of technological sophisticated facilities cyber-attacks have also become an area of threat. Finally, other risks or threats related especially to the sea-lanes of communication also dominate the global agenda.

Firstly, the disruption of oil or gas flows as well as the piracy and terrorist threats targeting hydrocarbon sectors have risen sharply recently. According to the University of Maryland's Global Terrorism Database, as cited by Tyagi (2016), in 2013, 600 out of 2600 total terror attacks targeted oil and gas sectors, the majority of them having concentrated in the Middle East and North Africa. Based on the same data, Tyagi points out that in 2003 roughly 25% of terrorist attacks were aimed at the energy sector. Between 2003 and 2007, this figure has jumped to 30% and 35% respectively (Tyagi 2016).

The Energy Infrastructure Attack Database (EIAD) shows that, during the first decade of the twenty-first century there were, on average, nearly 400 annual attacks carried out by armed non-state actors on energy infrastructure worldwide that is almost double in comparison to years prior to 1999. This data also reveals a global picture indicating that the violent non-state actors target energy infrastructures to air grievances, communicate to governments, impact state economic interests, or capture revenue in the form of hijacking, kidnapping ransoms, theft (Giroux et al. 2013). The above figures show that almost four million tons of crude oil has to be transported from producing countries to the consuming ones every day, either by means of land or sea communication routes at a time when the energy infrastructures are faced a varying level of threat from theft to sabotage worldwide.

The security of the oil and gas sources and their facilities, safe and secure transportation of crude oil, natural gas and oil derivatives to their destinations have become an important priority national security issue for many nations. In this regard, several points and areas are now considered as choke points in the open seas. Attacks appearing in the energy maritime areas are not limited to the terrorist attacks. Piracy and thefts in some parts have reached unacceptable levels.

As already mentioned, NATO's Strategic Concept which was adopted during the post-Cold War environment in 1991 mentions about the risks posed by rogue and failed states, the proliferation of weapons of mass destruction and other transnational

threats such as terrorism, ethnic or religious disputes. However the magnitude of several of these risks, especially of all kinds of terrorism was foreseen at a level of real threat. These assessments have been reformulated after 9/11 terrorist attacks.

Actually, attack on a 157,000-ton French crude oil tanker M/V Limburg in the Arabian Sea by a suicide boat in October 2002 was an eye opener. This was followed by a deadly attack, claimed by Abu Sayyaf Group, on Filipino passenger ship Super Ferry in 2004. Previously, USS Cole was the target of a terrorist attack off the coast of Yemen. Primary response to these attacks was shown at national and international level as counter terrorist operations at sea. Operation Active Endeavour, which was NATO's only article 5 operation on anti-terrorism initiated as support to the United States immediately after 9/11, to demonstrate NATO's solidarity and resolve in the fight against terrorism and to help detect and deter terrorist activity in the Mediterranean, is a good example of NATO-led engagement in the Mediterranean Sea, which was carried out from October 2001, until Operation Sea Guardian replaced it in November 2016. Operation Active Endeavour's mission was to "patrol the Mediterranean and monitor shipping to deter, defend, disrupt and protect against terrorist activity" (NATO Allied Maritime Command).

Besides terror oriented attacks, piracy and theft in several areas of the world are worth mentioning. As Hanson argues, "Although maritime piracy is a worldwide problem, there are several areas that track particularly high levels of pirate activity. These areas are the Gulf of Aden, near Somalia and the southern entrance to the Red Sea, the Gulf of Guinea, near Nigeria and the Niger River delta, the Malacca Strait between Indonesia and Malaysia, and the Indian subcontinent, particularly between India and Sri Lanka" (as cited in Sullivan 2010). According to the latest International Chamber of Commerce International Maritime Bureau (ICC IMB) piracy report, pirates and armed robbers attacked 43 ships and captured 58 seafarers in the first quarter of 2017, slightly more than the same period last year. The global report highlights persisting violence in piracy hotspots off Nigeria and around the Southern Philippines. Indonesia also reported frequent incidents. During this period, armed pirates hijacked two vessels, both off the coast of Somalia, where no merchant ship had been hijacked since May 2012. Four attempted incidents were also received. The same source cites that between 2010 and 2014 actual and attempted piracy attacks in the Southeast Asia jumped from 70 to 141 on a yearly basis. In 2016 alone, number of pirate attacks on tankers totaled 89 (ICC IMB n.d.).

Several countries or international organizations jointly acted to prevent and deter piracy in different parts of the world. One of these areas was off the Somalia Coast. Disruption of shipping in here was not only important for the main global maritime trade routes but for the ships delivering World Food Program humanitarian assistance to Somalia. A strengthened international response to piracy off Somalia came together in late 2008. NATO deployed it's first-ever counter-piracy mission, Operation Allied Provider, off the coast of Somalia in October 2008. The European Union and other countries also deployed naval ships to the region on counter-piracy missions, leading NATO to collaborate closely with partners as part of a broad coalition. NATO and EU together with some other countries deployed Counter Piracy Task Forces to the area (Knops 2012).