

Vedat Yorucu  
Özay Mehmet

# The Southern Energy Corridor: Turkey's Role in European Energy Security

# **Lecture Notes in Energy**

Volume 60

Lecture Notes in Energy (LNE) is a series that reports on new developments in the study of energy: from science and engineering to the analysis of energy policy. The series' scope includes but is not limited to, renewable and green energy, nuclear, fossil fuels and carbon capture, energy systems, energy storage and harvesting, batteries and fuel cells, power systems, energy efficiency, energy in buildings, energy policy, as well as energy-related topics in economics, management and transportation. Books published in LNE are original and timely and bridge between advanced textbooks and the forefront of research. Readers of LNE include postgraduate students and non-specialist researchers wishing to gain an accessible introduction to a field of research as well as professionals and researchers with a need for an up-to-date reference book on a well-defined topic. The series publishes single and multi-authored volumes as well as advanced textbooks.

More information about this series at <http://www.springer.com/series/8874>

Vedat Yorucu · Özey Mehmet

# The Southern Energy Corridor: Turkey's Role in European Energy Security

Vedat Yorucu  
Department of Economics  
Eastern Mediterranean University  
Famagusta, via Mersin 10 Turkey  
Cyprus

Özay Mehmet  
Norman Paterson School of International  
Affairs  
Carleton University  
Ottawa, ON  
Canada

ISSN 2195-1284

ISSN 2195-1292 (electronic)

Lecture Notes in Energy

ISBN 978-3-319-63635-1

ISBN 978-3-319-63636-8 (eBook)

<https://doi.org/10.1007/978-3-319-63636-8>

Library of Congress Control Number: 2017953791

© Springer International Publishing AG 2018

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature

The registered company is Springer International Publishing AG

The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

# Preface

As authors of this monograph, we state up front that we are of Turkish Cypriot origin, both academic economists educated in the British and Canadian tradition of free exchange of ideas. Coming as we do from the divided island of Cyprus, we are fully aware of the strong feelings on ethnic conflict. And, arguably nothing can be more controversial than writing on hydrocarbons and energy security. Cyprus problem, Turkey–EU relations, and conflicts in the Middle East, Cold War and East-West tensions .... these are all part and parcel of what we write.

We hope, indeed pray, that we have been balanced and objective in our presentation of issues and controversies surrounding the theme of the monograph, viz. *The Role of Turkey in European Energy Security*. If we have erred, it is primarily from our conviction—which lead to the writing of this monograph in the first place—that modern Turkey is grossly under-rated in Europe and the West generally. As the principal successor state to the Ottoman Empire, it is understandable that most European images of anything Turkish are still shaped by the legacies of that Empire. But that is outdated and needs updating.

In our post-Brexit world, with a protectionist US President in the White House, Europe needs new friends and partners. New energy sources are essential to secure its energy future. Turkey itself is an energy-hungry emerging market economy. By geography, it sits on the strategic location linking the Caspian, Middle East and Eastern Mediterranean hydrocarbon fields that provide the vital resource for the Southern Energy Corridor, the principal alternative supply to traditional fossil-fuel supply via the Northern Corridor connecting Russia to European markets via Ukraine.

We believe Turkey and Europe are destined to become energy partners in the near future, with the completion of such pipelines as the TANAP/TAP and the Turkish Stream 2. Turkey is also the logical and rational choice for delivering, at lowest unit cost, Middle East and East Mediterranean hydrocarbons, once wars and conflicts give way to peace. Given peace, energy cooperation regionally as well as between Turkey and European Union will emerge naturally out of market forces, conferring win-win outcomes for producers and consumers as well as for transit countries like Turkey.

This monograph will have been worthwhile if it can promote a better understanding, on the part of potential readers, of the geopolitics and the market forces relating to the development of the Southern Energy Corridor.

Famagusta, Cyprus  
Ottawa, Canada

Vedat Yorucu  
Özay Mehmet

# Acknowledgements

Over the last two decades, the authors have collaborated on numerous research projects, writing and publishing several academic papers in scholarly journals. Almost all of these are cited in the monograph along with other related literature. We want to thank the journals and their academic peers who, anonymously, have facilitated our publications. We are grateful to, and acknowledge the kindness, of several publishers and authors who gave us written permission to use copy-righted material. These are appropriately cited in the text. We wish to thank our many colleagues and friends who, in various ways, have contributed to our research and work.

In particular, we thank Prof. Ercan Uygur, the president of the Turkish Economics Association who, not only took a personal interest in our work, but invited us to several academic conferences where we first tested our hypotheses and presented our findings. When Özay was Dean, Faculty of Business and Economics, at the same University, he received much help from Eralp Bektaş, Caner Barın, Bilge Öney, Yılmaz Çolak, Ahmet Yörükoğlu and Serhan Çiftçioğlu. In Canada, he wishes to express his thanks to his academic friends, in particular Dane Rowland, Martin Rudner and Tareq Ismael. Both the authors wish to thank their friends Radar Resat, Ergün Olgun and Rafet Akgünay for their encouragement throughout this project.

Vedat would like to give special thanks to former ambassador of Turkey in Nicosia, Mr. Halil İbrahim Akça for his support to arrange meetings in İstanbul at IGDAS (İstanbul Natural Gas Public Company) to precede the research about onshore prefeasibility study of Natural Gas network and distribution systems. The Ph.D. research assistant Mrs. Hatice Imamoğlu at Eastern Mediterranean University also deserves special thanks for conducting such an important and valuable research at IGDAS both for South and the North of Cyprus. The former CEO of IGDAS, Mr. Veysel Türkel was very generous with his assistance and technical expertise. The former Rector of College of Europe (Europa College—Brugge Campus) Prof. Dr. Paul Demaret kindly provided hospitality and help in research conducted at the Europa College in 2013 and 2014. Also, it is a pleasure to thank the Coordinator



of the Europa College Prof. Dr. Eric De Souza and the Chair of Department of Economics Prof. Dr. Phedon Nicolaides for all the help and support they provided during the visit with the EU Scholarship programme. Noel Van de Cappelle, the father in law of Vedat, also deserves special thanks for all the technical support he provided with his patience and courage. Much gratitude also goes to the administration of Eastern Mediterranean University which provided support during the preparation of the book.

A word of thanks is in order for our editors at Springer, in particular Amudha for all the editing and technical work. Last but not least, it is our pleasure to thank our loved ones. Our dear wives, (Karen and Saskia) and all our children (Sean, Erin, Aidan, Stefaan, Suzanne), for their moral support and patience in allowing us to devote unlimited research time, at the expense of family time. Without their understanding, this work would never have been completed.

Needless to say, all errors belong to us as authors.

Vedat Yorucu  
Özay Mehmet

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Europe and Modern Energy Security	1
1.2	Turkey, The Vital Link	2
1.3	Regional Energy Model	2
1.4	Regional Cooperation: The Old Great Game in a New Setting	3
1.5	Global Energy Shift	5
1.6	The Emergence of the Southern Energy Corridor	6
1.7	Hydrocarbons in the ‘Feed Region’ of the Turkish Energy Corridor	7
1.8	EU Idealism, European Values and National Energy Policy Divergences	7
1.9	Comparative Cost of Alternative Routes	9
1.10	Outline of the Monograph	9
	References	10
 <b>Part I Definitions, Norms and Models</b>		
<b>2</b>	<b>Europe’s Energy Security and the Southern Energy Corridor</b>	<b>15</b>
2.1	What Is Energy Security?	15
2.2	What Is Energy Corridor?	16
2.3	Law of the Sea and EEZ	17
2.4	What Is Reasonable? The Case of North Sea Oil	20
2.5	What Is an Energy Hub? Can Ceyhan Be a Hub?	21
	References	24
<b>3</b>	<b>Diversifying European Energy: Challenges of Securing Supply</b>	<b>25</b>
3.1	Introduction	25
3.2	Risk Levels of Alternative Supply Sources	26
3.3	Three Pillars of EU Energy Policy	27

3.4	Future Gas Supply Potential to EU-27 . . . . .	27
3.5	Caspian Sea Basin . . . . .	29
3.6	Constructing the Southern Corridor: From NABUCCO to TANAP/TAP . . . . .	31
3.7	Infrastructural Investment in the Southern Energy Corridor . . . .	32
3.8	Pricing of Internationally Traded Natural Gas. . . . .	34
3.9	Gas Pricing. . . . .	35
3.10	Shale Gas Revolution and LNG Trade . . . . .	37
3.11	The Dynamics of the Northern Supplies . . . . .	40
3.12	Domestic Market or Export? . . . . .	41
	References. . . . .	42

## **Part II Turkish Dual Role in Energy**

<b>4</b>	<b>Turkey as a Hub in the Southern Energy Corridor . . . . .</b>	<b>47</b>
4.1	Introduction . . . . .	47
4.2	How Much Gas? . . . . .	47
4.3	From NABUCCO to TANAP/TAP. . . . .	49
4.4	Greater Caspian Gas Reserves . . . . .	52
4.5	Cost Advantage of TANAP . . . . .	52
4.6	Iran Gas . . . . .	53
4.7	Turkish–Russian Pipelines . . . . .	56
4.8	Eastern Mediterranean Sources . . . . .	60
4.9	Middle East and Arab Sources and Pipelines . . . . .	64
4.10	Iraq and Iran Gas . . . . .	66
	References. . . . .	67
<b>5</b>	<b>Turkish Energy Market: Transformation, Privatization and Diversification . . . . .</b>	<b>69</b>
5.1	Introduction . . . . .	69
5.2	Electricity Consumption and Output . . . . .	70
5.3	A Brief Historical Background: Shifting from Oil to Gas. . . . .	70
5.4	Principal Characteristics of the Turkish Natural Gas Market. . . .	71
5.5	Privatization and Natural Gas Infrastructure in Turkey . . . . .	72
5.6	Gas Marketing and Distribution . . . . .	74
5.7	The LNG Market . . . . .	75
5.8	A Pricing Model of Turkish Gas Demand . . . . .	75
5.9	Gas Deliveries in the Pipeline. . . . .	79
5.10	Hydrocarbon Exploration . . . . .	80
5.11	Alternative Energy . . . . .	81
5.12	Wind Energy . . . . .	81
5.13	Solar Energy. . . . .	81
5.14	Geothermal Energy. . . . .	81

5.15	Biofuel Energy . . . . .	82
5.16	Nuclear Energy . . . . .	82
	References. . . . .	82

### **Part III New Hydrocarbon Reserves in the Levant and the Greater Caspian Basin: Curse or Blessing?**

<b>6</b>	<b>Hydrocarbon Discoveries in the Eastern Mediterranean . . . . .</b>	<b>87</b>
6.1	Introduction . . . . .	87
6.2	Israel's Gas Developments . . . . .	88
6.3	Israel—Russia Possible Cooperation. . . . .	88
6.4	The Egyptian Zohr Gas Field . . . . .	89
6.5	The Cypriot Gas Quandary. . . . .	90
6.6	Geopolitics of New Drilling in Disputed Waters . . . . .	92
6.7	Marketing and Russian Competition. . . . .	94
6.8	Feasibility Study of Cyprus Onshore Gas Transmission Network and Distribution System. . . . .	97
6.9	Diversification Options: Political Disputes in Natural Gas Rich Regions off-Shore Natural Gas in Israel and Cyprus. . . . .	98
6.10	Other Hydrocarbon Prospects of the Levant . . . . .	100
	References. . . . .	101
<b>7</b>	<b>Energy Actors in the Eastern Mediterranean: Maps and Rivalries . . . . .</b>	<b>103</b>
7.1	Introduction . . . . .	103
7.2	Energy Actors in the Eastern Mediterranean. . . . .	104
7.3	The Cyprus Conundrum: Conflicting Maps and Claims Galore! . . . . .	104
7.4	Israel—Turkey . . . . .	110
7.5	The Fragile Arab Gas Pipeline . . . . .	113
7.6	The Lebanese Dilemma . . . . .	114
7.7	The Syrian Civil War: A Conspiracy of Competing Pipelines? . . . . .	115
7.8	Underground Energy Market . . . . .	117
	References. . . . .	118
<b>8</b>	<b>Towards a Regional Energy Model . . . . .</b>	<b>119</b>
8.1	Introduction . . . . .	119
8.2	Towards a Regional Energy Model . . . . .	119
8.3	The Turkish Energy Export Terminal at Ceyhan . . . . .	120
8.4	Existing Pipelines to Ceyhan . . . . .	120
8.5	The BTC Pipeline: A Private—Public Sector Success . . . . .	122
8.6	Kirkuk—Ceyhan (KC) Pipeline: The Kurdish Quest for a Place in the Sun. . . . .	124
8.7	The Black Sea Pipelines: The Russian Shift Towards Turkey . . . . .	126

8.8	Caspian Basin: TANAP/TAP Replaces NABUCCO . . . . .	128
8.9	The Cypriot Gas Fields: Pipedreams or Pipelines? . . . . .	130
8.10	The Arab Gas Pipeline . . . . .	131
8.11	The Israel–Turkey Pipeline: Another Potential of Private-Sector Success . . . . .	132
8.12	EU’s Role in the Southern Energy Corridor (SEC). . . . .	133
8.13	Some Conclusions: How Feasible Is a Regional Energy Model? . . . . .	133
	References. . . . .	134

## **Part IV Prospects and Conclusion**

<b>9</b>	<b>Turkey–EU: Energy Partners or Enemies Forever?</b> . . . . .	137
9.1	Introduction . . . . .	137
9.2	A Troubled Relationship. . . . .	137
9.3	The Cyprus Impasse and European Extreme Populism. . . . .	138
9.4	Crisis Management. . . . .	139
9.5	Permanent Enemies? . . . . .	140
9.6	Turkey–EU as Energy Partners. . . . .	141
	References. . . . .	142
<b>10</b>	<b>A Summing up</b> . . . . .	143
10.1	Brief Summary . . . . .	143
10.2	European Energy via the SEC: A Regional Energy Model. . . . .	144
10.3	Geopolitics of Energy Sources . . . . .	145
10.4	The Ball is in European Court . . . . .	145

# Abbreviations

bcm	Billion cubic metre
BP	British Petroleum Company
EEZ	Exclusive Economic Zone
KRG	Kurdistan Regional Government
KRI	Kurdistan Regional Administration
MBTU	Millions of British Thermal Unit
mcm	Millions of cubic metre
SEC	Southern Energy Corridor
TANAP	Trans Anatolian Pipeline
TAP	Trans Adriatic Pipeline
tcm	Trillions of cubic metre
UNCLOS	UN Convention on the Law of the Sea—1982

# List of Figures

Fig. 1.1	Volume growth by fuel (Mtoe per annum) . . . . .	5
Fig. 2.1	Boat loading at Ceyhan Terminal . . . . .	22
Fig. 4.1	Trans anatolian natural gas transmission network (TANAP) . . .	51
Fig. 4.2	The projected route of TAP linked to TANAP . . . . .	57
Fig. 4.3	Turk stream and the abandoned South stream projects . . . . .	58
Fig. 5.1	Real exchange rates and taxes cause changes in household gas prices in Turkey. . . . .	78
Fig. 7.1	Map of Cyprus and its disputed waters . . . . .	105
Fig. 7.2	EEZ and continental shelf borders in eastern Mediterranean (claimed by Turkey based on median line principle of the UNCLOS, 1982) . . . . .	107
Fig. 7.3	Hydrocarbons in troubled waters: Cypriot and Israeli gas fields . . . . .	111
Fig. 7.4	Map of Arab gas pipeline . . . . .	114
Fig. 7.5	Northern gas fields of Qatar. . . . .	116
Fig. 8.1	Port of Ceyhan, the emerging regional energy hub . . . . .	121
Fig. 8.2	Map of Baku–Tbilisi–Ceyhan pipeline. . . . .	123
Fig. 8.3	Kirkuk–Ceyhan (KC) oil pipeline . . . . .	125
Fig. 8.4	Turk stream connection points in Russian and Turkish Borders of Black Sea. . . . .	127
Fig. 8.5	TANAP/TAP has replaced NABUCCO, the megaproject that was earlier the preferred route for Southern gas pipeline. . . . .	129

# List of Tables

Table 1.1	EU natural gas net imports to 2030 . . . . .	4
Table 1.2	Natural gas supplies to Europe . . . . .	4
Table 1.3	Hydrocarbon reserves in the Turkish energy corridor ‘Feed Region’ . . . . .	7
Table 2.1	Volume of offshore gas in Eastern Mediterranean . . . . .	23
Table 3.1	Caspian Basin/Iraq Gas Corridor source fields . . . . .	29
Table 4.1	Projected gas deliveries through major Turkish Pipelines By 2020 (bcm) . . . . .	48
Table 4.2	TANAP versus East med pipeline . . . . .	53
Table 4.3	Southern gas corridor: estimates of reserves and fields . . . . .	55
Table 5.1	Key natural gas data for Turkey . . . . .	73
Table 7.1	Eastern Mediterranean natural gas reserves as a proportion of EU annual demand . . . . .	109
Table 7.2	Hydrocarbon reserves in the South Pars–North Dome field . . . .	116
Table 8.1	Investment cost and net revenue of three alternative export options for Cypriot gas . . . . .	130