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OF THE MIDDLE EAST
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Liberalisation of
Natural Gas Markets
Potential and Challenges
of Integrating Turkey
into the EU market
Onur Demir
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To Türkan …

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Abbreviations

Units

bcm	billion cubic metres
bcm/y	billion cubic metres per year
GJ	gigajoule
GWh	gigawatt hour
kb/d	thousand barrels per day
km	kilometre
kWh	kilowatt hour
m^2	square metre
mi^2	square miles
m^3	cubic metre
mcm	million cubic metres
MMBtu	million British thermal units
Mtoe	million tonnes of oil equivalent
Mt	million tonnes
MW	megawatt
MWe	megawatt electric
MWt	megawatt thermal
tcf	trillion cubic feet
tcm	trillion cubic metres
toe	tonne of oil equivalent
TRY	Turkish lira
TWh	terawatt hour
US$	United States dollar

Others

ACER	Agency for the Cooperation of Energy Regulators
AKP	Justice and Development Party (Ak Party)
AT	Austria
BA	Bilateral Agreements
BE	Belgium
BEUC	European Consumer Organisation
BG	Bulgaria
BGC	British Gas Corporation
BIST	Borsa Istanbul
BNC	BOTAŞ Network Code
BO	Build-Operate
BOT	Build-Operate-Transfer
BOTAŞ	Petroleum Pipeline Company
BP	British Petroleum
BUPPs	Basic Principles and Procedures of Use
CAM	Capacity Allocation Mechanisms
CAPEX	Capital Expenditure
CBA	Cost-Benefit Analysis
CBRT	Central Bank of Republic of Turkey
CCF	Consumer Connection Fee
CEER	Council of European Energy Regulators
CESS-NGS	Commission for Enduring and Supervising Security of Natural Gas Supply
CIEP	Clingendael International Energy Programme
CMP	Congestion Management Procedure
CNG	Compressed Natural Gas
CWDM	Capacity-Weighted Distance Methodology
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
DM	Daily Metered
DSO	Distribution System Operator
EBB	Electronic Bulletin Board
EC	European Commission
ECA	European Court of Auditors
EE	Estonia

E/E	Entry/Exit
EEA	European Economic Area
EED	Energy Efficiency Directive
EFTA	European Free Trade Association
EIA	Energy Information Administration
EL	Greece
EML	Electricity Market Law
EMRA	Energy Market Regulatory Authority of Turkey
ERGEG	European Regulators Group for Electricity and Gas
ENTSO-G	European Network of Transmission System Operators for Gas
ENTSO-E	European Network of Transmission System Operators for Electricity
E&P	Exploration and Production
EPIAŞ	Energy Markets Business Corporation
ES	Spain
EU	European Union
EUAŞ	Turkish Electricity Generation Joint-Stock Company
FDI	Foreign Direct Investment
FG	Framework Guidelines
FI	Finland
FR	France
GDP	Gross Domestic Production
GECF	Gas Exporting Countries Forum
GFPPs	Gas-Fired Power Plants
GGPOS	Guidelines of Good Practice for Open Seasons
GOG	Gas-on-Gas
HR	Croatia
HU	Hungary
IAEA	International Atomic Energy Agency
ICT	Information and Communication Technologies
IE	Ireland
IEA	International Energy Agency
IEM	Internal Energy Market
IGU	International Gas Union
ILQD	Import License Qualification Document
IMF	International Monetary Fund
ISO	Independent System Operator
IT	Italy

ITO	Independent Transmission Operator
IP	Interconnection Point
JVs	Joint Ventures
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LT	Lithuania
LU	Luxembourg
LV	Latvia
MAC	Maximum Allocable Capacity
MENR	Ministry of Energy and Natural Resources
MoU	Memorandum of Understanding
MSs	Member States
Mtoe	Million tonnes of oil equivalent
NBP	National Balancing Point
NC	Network Code
NDM	Non-daily Metered
NGML	Natural Gas Market Law
NIGEC	National Iranian Gas Export Company
NL	The Netherlands
NOPP	Network Operation Principles and Procedures
NRA	National Regulatory Authority
nTPA	Negotiated Third-Party Access
OECD	Organisation for Economic Co-operation and Development
OIES	Oxford Institute for Energy Studies
OIZ	Organised Industrial Zone
OPE	Oil Priced Escalation
OPEC	Organisation of Petroleum Exporting Countries
OPEX	Operating Expenditure
OTC	Over-the-Counter
OWGM	Organised Wholesale Natural Gas Market
PCF	Participant Consent Form
PCR	Price-Cap Regulation
PIS	Participant Information Sheet
PT	Portugal
PPS	Purchasing Power Standard
P2G	Power-to-Gas
RAB	Regulated Asset Base
RB	Regulatory Body
RES	Renewable Energy Source

RO	Romania
ROR	Rate of Return
RPI	Retail Price Index
RRA	Residual Reset Amount
RSI	Residual Supply Index
rTPA	Regulated Third-Party Access
SCPs	Standard Capacity Products
SE	Sweden
SI	Slovenia
SK	Slovakia
SOCAR	State Oil Company of Azerbaijan Republic
SoS	Security of Supply
STCs	Standard Transportation Contracts
STSPs	Short-Term Standardised Products
TANAP	Trans-Anatolian Natural Gas Pipeline
TAP	Trans-Adriatic Pipeline
TEIAŞ	Turkish Electricity Transmission Corporation
TETAŞ	Electricity Trading and Contracting Company
TMSF	Savings Deposit Insurance Fund
ToP	Take-or-Pay
TPA	Third-Party Access
TPAO	Turkish Petroleum Corporation
TP	Transfer Point
TPES	Total Primary Energy Supply
TQN	Transportation Quantity Notification
TSO	Transmission System Operator
TURKSTAT	Turkish Statistical Institute (also TUIK)
TYND	Ten-Year Network Development
UAE	United Arab Emirates
UDN	National Balancing Point
UGS	Underground Storage
UIOLI	Use-It-Or-Lose-It
UIOSI	Use-It-Or-Sell-It
UK	The United Kingdom
UN	The United Nations
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission For Europe
US	The United States
USDC	Unit Service and Depreciation Charge

USSR	Union of Soviet Socialist Republics
UTC	Universal Time Coordinated
VAT	Value Added Tax
VoLL	Value of Lost Load
VP/VTP	Virtual (Trading) Point
WDI	World Development Indicators
WDO	Within-Day Obligations
WTO	World Trade Organisation

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PART I

Setting the Scene

CHAPTER 1

Introduction: Natural Gas Reforms and Motivations

1.1 Introduction

Natural gas is a strategic sector for the Republic of Turkey (hereafter referred to as Turkey) given its direct and indirect impact on economic/social development and growth, and its control that has been mandated by the state for decades is shifting. Provided that liberalisation is the reverse process of protectionism (Hillman 2004) and mostly accompanied by liberal legislation, the reformative transformation of the Turkish gas market, with the onset of the Natural Gas Market Law (hereafter referred to as the 2001 Law or the NGML 2001), has been ongoing. Nevertheless, a number of challenges still remain unaddressed, although considerable efforts have been put in, in the industry by the government. Thus, the main rationale for undertaking this book is to examine the liberalisation process within the Turkish natural gas industry and to understand the limitations and key challenges the country has encountered in its transition from monopolistic to (semi)-liberalised gas market in the context of the European Union (EU).

Despite the complexity of the "liberalisation" and "competition" concepts in the energy sectors—which are composed of different elements, with every stage having its own intrinsic characteristics and consequences—they are believed to provide Turkey with access to the EU's single energy market. This book is an attempt to analyse the Turkish natural gas industry and the chronological implementations of gas market reforms which have involved numerous stages to set up a competitive well-functioning sector

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with increased third-party participation and minimal government interference in all segments of the industry.

This book has two targets: firstly, it discusses natural gas market liberalisation in the context of the EU, providing a balanced discussion of the role of the EU energy directives; secondly, after addressing what the instruments of the EU gas regulations are trying to achieve, it takes the liberalisation debate a step further and attempts to draw some parallels between the developments in the European and the Turkish gas markets.

1.2 Natural Gas Reforms and Motivations

Since the late 1970s, a number of academic, financial, governmental and international institutions have been trying to better understand the factors which impact energy industries and challenges that they still confront today. Fundamentally, the core pillars of the energy sector constitute well-balanced systems in order to deliver secure and sustainable energy supplies at affordable prices. Energy is one of the most essential commodities that enable economic growth, social well-being and prosperity, and it is an imperative driving force behind essential investments and infrastructure developments worldwide. With this in mind, governments of both developed and developing countries strive to identify innovative developments to meet the requirements of their energy securities and efficiencies. Following the historical demonstrations of how volatility in energy prices and cuts in production/imports can impact major macroeconomic variables, for example, the 1973–1974 Oil Embargo[1] imposed by Arab members of the Organisation of the Petroleum Exporting Countries (OPEC) against the US and its allies, a large body of research has been conducted to investigate the relationship between energy and economic development (e.g. Kraft and Kraft 1978; Contanza 1980; Hamilton 1983; Mork 1989; Hoa 1993; Cheng 1996, 1997; Glasure and Lee 1997; Asafu-Adjaye 2000; Stern 2004; Zachariadis 2007; Apergis and Payne 2010)[2].

[1] The 1973–1974 Oil Embargo was imposed by Arab members of the OPEC against the US, and later extended to the Netherlands, Portugal and South Africa in response to the US decision to resupply the Israeli military during the Arab-Israeli War in 1973, and was lifted in March 1974. For detailed information: http://history.state.gov/milestones/1969-1976/oil-embargo.

[2] For further reading, see: Nachane et al. 1988; Yu and Choi 1985; Masih and Masih 1996; Sarı 2003; Stern and Cleveland 2004; Ayres and Warr 2009.

Given the inextricable link between energy and socio-economic developments, both developed and developing countries aim to liberalise their energy markets and substitute costly and environmentally unfriendly fossil fuel sources (e.g. coal, oil) with natural gas and renewable energy resources. Also as the energy output coming from renewable energy sources (RES) suffers from intermittency given that RES-based (electricity) generation heavily relies on weather/seasonal conditions, natural gas has by far been one of the most popular fossil fuels in the energy mix. In order to reduce greenhouse emissions and other intrinsically related kinds of pollution, to mitigate global warming and to reduce external reliance on energy supplies, countries have established ambitious reform programmes to set up fully fledged energy markets. In his seminal book, *Competition in Energy Markets: Law and Regulation in the European Union*, Peter Duncanson Cameron (2007, 33) defines liberalisation "as a process of market opening which at a minimum removes legal barriers to trade but in the EU context involves creation of an industrial structure in which competitive forces can work and a competitive ethos can be stimulated" and provides the definition of competition in the words of a leading competition lawyer, the late Daniel Goyder, as follows:

> Competition is basically the relationship between a number of undertakings which sell goods or services of the same kind at the same time to an identifiable group of customers. Each undertaking having made a commercial decision to place its goods and services on the market, utilising its production and distribution facilities, will by that act necessarily bring itself into a relationship of potential contention and rivalry with the other undertakings in the same geographic market. (Goyder (2003) in Cameron (2007, 5))

Cameron examined the relationship between governments and electricity/gas markets which had undergone a dramatic change and distinguished three broad stages in the evolution of these relationships. Firstly, the intervention stage began with the creation of state-owned monopoly suppliers. This occurred due to the reconstruction and expansion after the Second World War, followed by the second stage, a period of uncertainty, during which the relationship was exposed to critical reassessment following the energy crises of the 1970s. In 1985, it entered a third stage, globalisation, resulting in the loosened of ties between governments and their energy companies via commercialisation or privatisation or both (ibid., 12–15). The drivers behind natural gas reform programmes have been widely

divergent not only between developed and developing countries, but also between those who produce and/or export natural gas and those who do not.

In developing countries, for instance, the primary objective of the reforms has been to purportedly achieve economic efficiency by introducing competition into segments where it is most feasible[3]. This is supported by the reviews of the Organisation for Economic Co-operation and Development (OECD) on regulatory reform,[4] according to which countries that take advantage of a crisis to engage in comprehensive regulatory reform fare better, and greater competition and openness increase their ability to recover more quickly from crises as well as increasing potential long-term growth (OECD 2010, 3). According to reform proponents, opening a market to competition would not only mean all competitors would have access to the market but it would also serve as an opportunity for countries (not least with underdeveloped infrastructure) to get those ameliorated by private firms which would not be possible as quickly by monopolistic national champions otherwise. In line with the corporatisation of state-owned enterprises, competitiveness of private firms in terms of price and service quality is also envisaged to provide more productivity and dynamic efficiency. Utilising market price signals and consumer choice as significant tools to match supply and demand, obliging private firms to achieve production efficiencies and ruling out the possibility of realising extra profit at the expense of consumers, resulting in end users reaping the benefits from the competition in the market, have been the other motivations for reforms in the developing world (Bernstein 1988; Sullivan 1990; Schram 1993; Bhattacharyya 1995; Dunkerley 1995; Caruso and Chen 1997; Arun and Nixson 1998; El-Banbi 1998; Stevens 1998; Rosellón and Halpern 2001; Vogelsang 1999; World Bank 2000; Zarrili 2003; Gabriele 2004; and Kessides 2004).

Like many other developing countries, Turkey has also learnt lessons from the implications of restructuring a reform programme—supported

[3] Keeping in mind their vast population, most of which have poor or no access to energy resources, and very few existing export-oriented economic activities such as production/transportation of agricultural and mining commodities which cannot function without a reliable industrially generated energy supply (Gabriele 2004).

[4] Referring to the action of improving both the stock and the flow of regulations, by reforming regulations that raise unnecessary obstacles to competition, innovation, growth and market (trade) openness, while ensuring that regulations efficiently serve important social objectives. See OECD (2010, 3).

by the International Monetary Fund (IMF)—to attenuate the severe economic crises encountered in 1999 and 2001. The government used the crises to give the country's liberalisation process a concise direction and highlighted that privatisation in the energy sector was crucial both to realise receipts through transfer of operating right contracts and to foster investment and efficiency in the sector. Accordingly, legal amendments would be passed by the parliament to define energy as a sector subject to the Turkish commercial code as a prior action[5]. Indeed, since 2002 the rise of Turkey in the global arena led by successful economic reforms and the political stability instilled by successive governments led by President Recep Tayyip Erdoğan's Justice and Development Party (AKP) have been evident. The country's first and only NGML, which came into force in 2001, has achieved most of the hallmarks of a liberalised market integrating the EU's energy reforms framework into Turkey's legislation, although the full implementation still remains unaccomplished.

In developed countries, motivations for reform are argued to hinge mainly upon the creation of vibrant competitive and well-functioning markets into which new players enter barrier-free. In other words, liberalisation is expected to encourage private participation, limit extensive market power of national champions, realise non-discriminatory access to common facilities, expand customer choice, encourage interregional (or cross-border) natural gas trade, and increase transportation capacity (Juris 1998; Cavaliere 2007; Melling 2010; Joskow 2005; Saluz 2011; UNECE 2012; Panebianco 2013; Stern and Rogers 2014; Corsini et al. 2014). The reforms are by and large expected to ameliorate the poor performance of state-run natural gas operators (e.g. unreliable supply, inability to meet the investment and maintenance costs of natural gas industry against accruing demands) as outlined by the United States International Trade Commission (USITC 2001). According to the Commission, the liberalisation reforms are also expected to provide new market access opportunities to private firms, allowing them to invest abroad in natural gas transmission, distribution and marketing sectors, with an aim to foster growth of international trade in services. However, Cameron (2007, 4) criticises assumptions based on such a positive vision of liberalisation, especially that which the European energy markets were introduced to. The author primarily argued that despite the high expectations that (particularly industrial) energy consumers would benefit from a greater choice of suppliers and possibly from

[5] For details, see https://www.imf.org/external/np/loi/1999/120999.htm.

lower prices, by the end of the first decade of "managed liberalisation" in the EU, they were left with a number of issues to address, including consumer prices that appeared to be volatile and lacking in transparency; gas markets that remained segmented into national compartments; a marked absence of new entrants; continuously growing dependence on non-EU imports of gas for power generation; and, worse still, a new set of problems to deal with, such as large investments being required to modernise and expand the ageing network infrastructures.

In countries with abundant natural gas endowments, however, liberalisation reforms have generally been centred around gas prices (oil-linked regulated prices vs. market-based prices), structure of the export/import contracts (long-term take-or-pay contracts vs. spot contracts), and cultivating the involvement of the private sector in the upstream gas sectors (exploration and production [E&P] activities) in order to acquire the innovative technology and efficiency the sector requires (Zamani 2007; Adeniji 2013; Henderson 2013; Krane and Wright 2014; IEA 2014; Duncan 2015; Stevens 2015; Farchy 2016; EIA 2017). These countries rely heavily on the revenues that come from the sales of natural gas, and the funds generated play a lifesaving role in sustaining the economic contribution of exports to the countries' budget revenues. Russia, the world's biggest reserve holder and second largest gas producer after the United States (the US) (BP 2018), for example, has been long striving to increase domestic gas prices since the 2000s. This is not only in order to balance the low domestic prices with its inexorably high export prices in Europe or to economically justify the new expensive and mega projects but also to meet the entry requirements for the World Trade Organisation, according to which the subsidised prices provided to the industrial sector are considered as a threat to, inter alia, the optimal use of Russia's hydrocarbon resources and energy efficiency measures (Henderson 2012).

Similarly, Darbouche (2013) discusses the natural gas transition of the energy-rich Arab region[6] and calls the region a place of "easy gas" in addition to being the least economically integrated natural gas market in the world. He lists the immediate drivers for gas reforms in these countries as follows: (1) the realisation of price reforms in order to overhaul the policies formed during the 1970s and 1980s which no longer suit the current

[6]The region comprises 22 Arab League members, namely, Qatar, Saudi Arabia, the UAE, Yemen, Morocco, Algeria, Iraq, Mauritania, Tunisia, Libya, Egypt, Oman, Bahrain, Kuwait, Jordan, Lebanon, Palestine, Syria, Sudan, Comoros, Somalia and Djibouti.

socio-economic circumstances and yet underlie an immense domestic gas demand; (2) shifts in upstream gas policy to bring the attention of foreign investors to their decreasing gas production sectors due to insufficient investment/waning mature reserves; (3) development of poorly traded regional gas and the enhanced role of regional companies to replace the unfulfilled potential of the industry with the deregulated business model allowing neighbours to import gas relatively cheaply.

1.3 Objectives and Scope

Following the 1994 ruling of the European Court of Justice, which recognised electricity as a commodity "like any other" rather than a public service within the (European) Community, the situation of natural gas became evident to follow the same route (Yafimava 2013). In view of this, the European Commission (EC) adopted three natural gas directives in 1998, 2003 and 2009 to put in place the regulatory regimes needed to integrate and harmonise the somewhat heterogeneous legislation of the (now) 28 member states (MSs). Given the wide divergence in the size/shape of economies, development levels and regulatory frameworks, the drive and attempts of the EC to liberalise European markets has faced strong opposition and resistance from its dissenters, although Turkey implements the directives to meet the liberalisation levels of the more advanced countries on a volunteer basis.

Turkey is not a full member of the EU but its official candidacy was announced at the Helsinki Summit on 10–11 December 1999 (EC 2001) and the accession negotiations were launched between Turkey and the EU in October 2005. Despite the fact that Turkey as a candidate is not obliged to follow the EU laws as yet, the national legislations have been established in line with much of the EU legislation since the 1990s. The liberalisation of energy markets, on the other hand, has been evident in the government policies and progress reports for a long time whilst relations with international institutions have given the process a concise direction and helped to gain momentum. In this vein, to harmonise the Turkish legislation with the EU's energy acquis, the first law enacted was—the Electricity Market Law (EML) No. 4628—followed by the NGML No. 4646 in 2001. Despite having better success in the electricity market liberalisation, a detailed analysis of the Turkish natural gas market reveals that the country is still far from having a fully liberalised and fully competitive market.

Given the legislative initiatives of liberalisation that have introduced a degree of complexity to the market, which has contrarily been characterised by the state monopoly and a very strong government presence for almost eight decades, and following 18 years of legal transformation with limited evidence of impact on competition overall, this book is concerned with critically analysing the evolution of the Turkish gas market liberalisation process within the EU framework. The book is inspired by the recent attempts of the Turkish government to eradicate the deficiencies in the enforcement of the NGML. Given Turkey's willingness to be part of the EU's internal gas market, which requires a high degree of harmonisation, it provides a comprehensive examination of the EU legal framework based on three major gas directives and relevant regulations, and how they are implemented within the Turkish gas market. The core legal rules and principles of the EU energy legislation are looked at within four (mandatory) regulatory instruments, namely, establishment of an independent regulatory authority, market opening, unbundling and third-party access. The focus of this analysis is to identify what elements in the design of the liberal gas market have already been adopted in the Turkish gas industry and what frameworks should be developed to lead to a barrier-free trading environment for national and international market participants. Thus, to explore how consistent the country's natural gas market reforms are with the EU principles concerning liberalisation and how competition is expected to promote, inter alia, the effective capacity allocation mechanisms, capacity management procedures, optimal balancing and transmission tariff structures in midstream parts of the gas value chain, the book seeks to address two questions:

1. What are the characteristics of the legal framework that has been created to ensure natural gas market liberalisation in Turkey and how effective is it?
2. What are the major obstacles encountered by Turkey so far during its reform process, and how should Turkey's progress towards liberalisation and competition proceed?

The data used and presented in this research covers a period starting from 2001 to 2018. The year 2001 is chosen as the commencing date for the data coverage as it represents the outset of the Turkish gas market reforms, and 2018 is the final year as that was the year till which the data was available at the time of writing.

1.4 Approach and Data Sources

The methodology of this book follows both a descriptive and an exploratory path. As a forerunner to exploratory research (Saunders, Lewis and Thornhill 2012), the descriptive part of the book begins with a presentation of the liberalisation phenomenon in detail (Chap. 3). Furthermore, although the liberalisation reforms first entered the agenda of the EU as softly prescribed market design suggestions which eventually became mandatory regulatory instruments for the MSs, there is, needless to say, a considerable level of ambiguity concerning how countries employ and implement these instruments to meet the provisions and what obstacles they encounter during this process given the characteristics of varying national gas markets (e.g. market size/structure, existing network and import structure). In this context, exploratory research provides this study with the necessary tools to revise the idiosyncratic facts of the Turkish natural gas market, to discover the already-existing evidence and, moreover, to make analytical sense of it (Chaps. 4 and 5).

This book uses three different data collection techniques. Whilst documentation and archival records are foregrounded in the study as primary methods, (semi-structured) interviews are used to further conceptualise and deepen the understanding of the Turkish case, providing significant insights into key interviewees' views and opinions related to particular occurrences with the help of primary methods providing the context for interpretation. In essence, documents might take the form of an electronic file or text, and both formats are utilised here. For the Turkish case study, the running records such as actuarial records, political and judicial records in addition to annual reports and sector evaluation studies are collected chiefly from the Ministry of Energy and Natural Resources (MENR), Energy Market Regulatory Authority (EMRA), Turkish Petroleum Corporation (TPAO), Petroleum Pipeline Corporation (BOTAŞ), OECD Annual Reports by Country, International Gas Union (IGU) and the US Energy Information Administration (EIA) Country Analysis. Other administrative documents (as internal records and progress reports) are collected from Kibar Energy, Shell and Bosphorus Gaz, whilst *Argus Media, Bloomberg News, Financial Times, LNG World News, Reuters, Caspian Forum, Gas Matters Monthly* and *Platts European Gas Reports* have provided the news clippings and various relevant articles. A few seminal PhD theses pertinent to the research have also been consulted as a

major lens through which the liberalisation efforts of various countries and the obstacles have been effectively portrayed.

Sharing an excessive similarity with the documentation method, archival records expose perhaps more quantitative and precise data. The cross-sectional data set collected are gathered predominantly from multiple secondary data sources, and for Chap. 3 observations for European MSs determined by their prominence in the sector and data availability are provided. In addition to the Turkish Statistical Institute (TURKSTAT or TUIK), which has provided the most relevant case study specifics, the regional statistics are derived from the British Petroleum (BP) Statistical Reviews, Eurostat and the International Energy Agency (IEA) as the main source.

Interviews as the third and distinctive part of the primary data collection technique of this book are utilised to effectively and swiftly gain a more in-depth understanding of an individual's beliefs, lived experiences and the meaning they make of that experience (Seidman 2013), and perhaps more importantly to be able to engage in dialogue with participants (Simons 2009). In doing so, a number of semi-structured interviews were conducted with interviewees including policymakers from EMRA and members of private gas companies that have been allowed into the sector since 2005. Members of BOTAŞ were contacted to be interviewed but due to legal constraints, interviewing BOTAŞ staff is subject to ministerial permission. Thus, they rejected the invitation to (officially) be part of this study. However, some questions were asked to both current and ex BOTAŞ staff, and their answers are provided in Chap. 6.

1.5 Organisation of the Book

This book aims to critically analyse Turkey's natural gas liberalisation process, and it constitutes seven chapters under three parts:

Chapter 1 explores and establishes the natural gas liberalisation measures in the context of European gas market reform. In order to design a benchmark to represent the range of laws commonly adopted by the EU MSs and to measure the performance of Turkey accordingly, the first part of chapter provides background information about what liberalisation is and what the underlying reasons are for divergent expectations and approaches towards the liberalisation reform undertakings both in developed and developing countries. The following sections respectively present

the approach and data sources, and objectives and scope. The last section presents the organisation of the book.

Chapter 2 presents the literature review and positions the research within a body of relevant literature. It provides a mixture of theoretical, institutional and empirical considerations of the issues regarding natural monopoly, regulation, deregulation and liberalisation in network industries. The second part of the chapter provides discussions about the price regulations, and the third part weighs up the institutional feasibility of competitive reforms for naturally monopolistic industries through franchise biddings, yardstick competition and contestability. The last part concludes the chapter with a review of various commonly used pricing structures (e.g. oil-linked, marked-based and hub-based prices) leading to the elucidation of the European gas hubs.

Chapter 3 focuses on natural gas market reforms at an international level. It provides a review of the European policies and a broad spectrum of literature pertinent to the EU's main energy directives with an emphasis on the mandatory instruments that all members are obliged to adopt starting from 1998.

Chapters 4 and 5 constitute two case studies regarding the natural gas industry of Turkey, and whilst the former gives the market outlook, the concept of recent trends and supply-demand equilibrium, the latter introduces a full examination of the legislative/regulatory market environment of the country. The chapters as a whole are intended to consolidate the theoretical discussions of Chap. 2 and deepen the understanding of how the EU legal framework—in terms of gas market liberalisation—has been adopted in Turkey.

Chapter 6 continues to discuss the issues raised in *Chaps. 4 and 5* in a more critical manner. It represents a critical analysis of the major obstacles encountered by Turkey so far during its reform process and addresses how Turkey's progress towards liberalisation and competition should proceed. The chapter utilises distinctive part of the primary data collection techniques—interviews—and provides an in-depth understanding of the key stakeholders' views and opinions of Turkey's liberalisation experience.

Chapter 7 provides the final remarks and a set of policy recommendations.

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CHAPTER 2

Liberalisation and Competition: Theoretical Backgrounds and Institutional Analysis

2.1 Introduction

This chapter of the book presents a mixture of theoretical, institutional and empirical consideration of issues regarding natural monopoly, regulation, deregulation and liberalisation in network industries. Natural monopoly theory, public choice theory and economic theory of regulation are specifically focused on since utilities in Turkey, such as the natural gas industry, are mostly state owned and prone to natural monopolies. Since "natural gas market reforms" may be regarded as a form of regulation (or a change in regulation) implemented as a result of a political decision, public choice theory and economic theory of regulation span the spectrum of rational behaviour in energy markets.

It begins with presentation of an institutional analysis that delves into the concept of natural monopoly from the traditional regulatory perspective which is then contrasted with the economic theory of regulation and public choice theory. Whilst public choice theory sheds light on the scope of rational behaviour in political mechanisms, the economic theory of regulation uses rationality to understand politics and also focuses on the shortcomings of the contention that regulation is for public benefit. It is followed by a review of the literature on price regulation which captures the fragmented state of different pricing mechanisms used to regulate industries globally.

In the subsequent part, the institutional analysis is extended by distinguishing several new regulatory agendas and theoretical alternatives to

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weigh up the institutional feasibility of competition reforms for naturally monopolistic industries. The first application is the franchise bidding auctions via competition for market approach which has various impacts on the economic and political stakeholders. This is particularly relevant for countries like Turkey wherein the distribution of natural gas is completely based on such a system. Other applications that were investigated are vertical separation, yardstick competition and contestable markets which require more analysis of the industry, and recurring redefinitions of property rights are more distinctive throughout.

Finally the chapter is concluded with a review of various pricing structures such as oil-linked prices and marked-based prices. Since the globalisation of markets and the technological progress, which plays a key role in the cost curves, has enabled many countries to re-examine the characteristic forms of natural monopoly regulation and undermined the economic rationale of monopoly retention, profound transformation of the regulation of network industries has grown in importance. Whilst the potential benefits and deficiencies of competitive reforms on pricing mechanisms are elucidated, explanations on European gas hubs and hub-based prices are also covered.

2.2 Theoretical Backgrounds and Institutional Analysis

2.2.1 Public Choice Theory

Since the late 1940s, there have been considerable discussions regarding the potential uses of public resources and powers to improve the economic status of economic groups (e.g. industries and occupations) in the literature of both the science of politics and the science of economics. Although these fields are under the umbrella of social sciences, the types of questions they ask and the methodologies they employ distinguish them. Political science has inherently examined the behaviour of humans on the public stage and posited that politicians pursue the public interest, whilst economics assumes that all men in the marketplace are motivated vastly by self-interest with a logic unique behaviour (Mueller 2003). An economic study of nonmarket decision-making behaviour via the utilisation of the rational choice postulate, public choice, was launched by Duncan Black's paper on the rationale of group decision-making in 1948. Black demonstrated that if voter preferences are single-peaked over a single-dimensional

issue space, a unique equilibrium exists in the motion most preferred by the median voter (Black 1948). This result, according to the founding father of public choice, was the political science counterpart of competitive market equilibrium in his own discipline of economics (Rowley 2004).

Public choice theory, the subject matter of which includes the theory of the state, voting rules, voter behaviour, party politics, bureaucracy and so on, postulates human beings as utility (wealth) maximisers and characterises governments as a mechanism utilised by rational, self-seeking individuals to redistribute wealth within society (Downs 1957; Rowley 2004; Mueller 2003). A number of approaches have so far been proposed within public choice to address a wide range of issues each applicable to different situations and each having its own concept of what comprises a solution. However, there remains a dichotomy amongst the perspectives, which ultimately generated three schools of thought (i.e. Rochester, Chicago and Virginia).

Amongst the early practitioners of the discipline such as Kenneth J. Arrow and Anthony Downs—the former essentially challenged Black's theoretical view on political stability by offering an assertion that political markets are inherently unstable, whilst the latter elaborated on the insight of Black and propelled the foundations of the theory forward, paving the way for its application in every aspect of the political market (Arrow 1950, 1951; Downs 1957)—James M. Buchanan and Gordon Tullock made a distinct contribution to the literature. In their seminal work, *The Calculus of Consent*, Buchanan and Tullock (1962) distinguished themselves from other contributors not only by their emphasis on the methodological individualism, which represents an attempt to reduce all issues of political organisation to the individual's confrontation with alternatives and his choice among them, but also by their defiance against the new welfare economics of Paul A. Samuelson (1947) and K. J. Arrow (1950) that fundamentally encouraged the government intervention in free markets by reference to the prevalent market failure[1] (Buchanan and Tullock 1962; Rowley and Schneider 2004).

In similar fashion, Mancur Olson's book *The Logic of Collective Action* uniquely challenged the benign view of traditional political science upon interest groups. It brought about the behaviour of interest groups from

[1] According to Meadway (2013), market failures can occur on either or both sides of the market due to imperfect competition amongst suppliers, badly informed market participants and the unintentional consequences of market operations.

the perspective of rational choice theory into the focal point within public choice literature (Rowley and Schneider 2004). For Olson (1965), interest groups were not simply the information supplier to political markets but also had salient advantages over political groups in the race for political gains; smaller groups were seemingly more effective in securing differential gains than the large groups. In other words, policymakers towards particular sectors or about particular public goods will face strong pressure from well-organised special interest groups in the form of irresistible incentives being offered to them.

Similar notion holds sway in Shughart's (2004) study, in which he considers many policy decisions as rational political responses (i.e. favoured treatment including rights to charge prices in excess of costs, erection of market entry barriers and proscription of business practices/contractual agreements) to the demands of well-organised pressure groups in return for votes, campaign contributions and the like. Thus, he concludes: "As a result, the benefits of regulation are now seen to accrue chiefly, not to the public at large, but to politically well-organised pressure groups" (ibid., 279). These reciprocal benefits provided then reflect the broader question of how the redistribution policies supplying these benefits affect others. According to Thorbecke (2004, 304), they are harmed either unwittingly or because they cannot muster sufficient votes or contributions to resist the transfers. So in his description, "[p]ublic choice theory posits that the actors in the political arena seek to maximise utility just as consumers do in the economic arena."

2.2.2 Theory of Natural Monopoly

According to Viscusi, Harrington and Vernon (2005) the characterisation of public choice theory, in essence, is attributed to the concept of natural monopoly (Erdoğdu 2013). Whilst the primordial use of the term "natural monopoly," which was carefully distinguished from artificial monopoly, goes back to the 1800s' classic economists, for example, Malthus (1815) and Bastitat (1850), the definition of "natural monopoly concept" was provided by John S. Mill in 1848, in his own words, "All the natural monopolies (meaning thereby those which are created by circumstances, and not by law) which produce or aggravate the disparities in the remuneration of different kinds of labour, operate similarly between different employments of capital. If a business can only be advantageously carried on by a large capital, this in most countries limits so narrowly the class of

persons who can enter into the employment, that they are enabled to keep their rate of profit above the general level. A trade may also, from the nature of the case, be confined to so few hands, that profits may admit of being kept up by a combination among the dealers" (Mill 1848, II.15.9).

Traditionally, natural monopolies were deemed to be caused by government interventions via franchises, protectionism and other means due to the large-scale production and economies of scale (DiLorenzo 1996). Following the rudiments of large-scale production notion, Wells (1889) argued that the world solicits cheaply produced commodities in abundance and this was only feasible through the employment of great capital on an extensive scale. The assumption of the concentration of great capital was bound to a specific set of conditions by Gunton (1888) as to whether or not it tended to build up monopolies, destroy the competition and increase the prices. He encapsulated the imperfections of the arbitrary monopoly (especially government monopoly) and insisted that they were not only the herald of irresponsibility, incompetency and waste but also the reason for the high prices for inferior products. For him, the governments are disinterested developers of improved methods of service in order to maintain the maximum number of employees and rather eager commanders of political allegiance via inclination of industrial favours.

According to Duffy (2005), there were two important implications of declining average costs. Firstly, all production should be undertaken by one large firm, enabling the firm to realise economies of scale by avoiding wasteful duplication of fixed costs and hence spreading them over more units of production. This would be more efficient than having multiple small firms do so. The second implication he highlighted was the impossibility of achieving a market price at marginal cost, the classic imperative of perfectly competitive markets, as a long-run equilibrium without any governmental subsidy. He justifies this with the perception that if the market price of the goods was driven to marginal cost, it would not be possible for potential producers to recover their fixed costs and that would thwart them from entering the industry in the first place. Alchian and Allen (1964) interpreted the issue similarly with the view that, given the impossibility of more than one firm being profitable, two was too many. In other words, one of the two firms could always expand in order to reduce costs and the selling price; therefore, the elimination of the other firm would be inevitable even before taking into account the wasted resources as a result of too many attempting to share the industry. To the contrary, if there was one incumbent firm, then that would be able to set prices above free entry costs for a long time.

Although natural monopoly proponents may seem to be potentially accurate in arguing that the necessity of government intervention persists insofar as the failures of the markets remain (e.g. inefficiency and fluctuating prices due to competition), according to the economists of the 1960s and 1970s such as Harold Demsetz, George J. Stigler and Richard A. Posner, these studies were unable to cover the relationships between expanded roles for governments and their potential impacts on entry barriers and social costs. Demsetz (1968), Stigler (1968) and Posner (1975) did not acknowledge the fact that the natural monopolies were beneficial. Since the publication of his 1968 study "Why Regulate Utilities," Demsetz has continued to argue against the assertion that the existence of scale of economies in the production of the service was relative to a determination of the number of rival bidders.

His main criticism of the theory of natural monopoly was to be devoid of a logical base for monopoly prices and the nonexistence of clear evidence proving the cost of colluding (of potential bidding rivals) in the public utility industries to be markedly lower than it was for other industries for which unregulated market competitions worked smoothly. Others argued along similar lines; for example, Posner (1975) assumed that competition to obtain a monopoly results in the transformation of expected monopoly profits into social costs and the public regulation was a larger source of social costs than private monopoly. In that study, he highlighted the precise equality of the expected profit of being a monopolist to the cost of obtaining a monopoly status without any intra-marginal monopolies in most sectors. He subsequently drew attention to the existence of some circumstances that the observed monopoly profits in an industry could have underestimated the social costs of monopoly in the same sector. This means that even when monopoly profits in an industry are zero, it can still cause very high social costs due to the expensive nature of facilitating the enforcement of anti-monopoly measures by authorities or consumers themselves to reduce those profits (Posner 1975).

According to Chang (1997), natural monopolies suffer from the potential consequences of non-competitive market environments such as "deadweight welfare loss" as a result of allocative inefficiency, productivity inefficiency and dynamic inefficiency due to lack of competitive pressures, high likelihood of predatory pricing or pre-emptive investments, and other wasteful behaviour which leads to the exploitation of consumers and of input suppliers by the dominant firms. Lande (1982, 73–78) describes allocative inefficiency thus: "Because a monopolist produces less than

would be produced under competitive conditions, some resources that would otherwise have been used to make the monopoly product will instead be used for other purposes, ones that consumers value demonstrably less. This misallocation of resources results in diminished satisfaction of society's wants, and thus, in terms of what society values, a reduction of society's total wealth. This effect is termed "allocative inefficiency."" According to Abel et al. (Abel et al. 1989, 1), dynamic efficiency is "a central issue in analyses of economic growth, the effects of fiscal policies, and the pricing of capital assets. In a celebrated article, Peter Diamond (1965) shows that a competitive economy can reach a steady state in which there is unambiguously too much capital. In situations where the population growth rate exceeds the steady state marginal product of capital, or equivalently the economy is consistently investing more than it is earning in profit, the economy is said to be dynamically inefficient."

It is also due to the difficulties natural monopoly poses in terms of enjoyment of the cost benefits of single firm production that two traditional approaches have been adopted by many countries to tackle this. The first one is used by governments to protect the natural monopoly themselves predominantly via nationalisation. The typically quoted example of the supply mode of utilities (e.g. electricity, gas, telecommunications and water) in the United Kingdom (UK) during the pre-1980s could be seen as a classic illustration of this. In such a situation, governments decide to operate the services at a price equal to marginal cost and provide a lump-sum subsidy to keep the company in operation since allowing neither a natural monopolist to set the monopoly price nor the natural monopoly to sell at the efficient price would be desirable or feasible due to the Pareto inefficiency[2] and negative profits, respectively (Kim and Horn 1999).

2.2.3 Economic Theory of Regulation

Regulatory measures based on traditional rationales of natural monopoly have been the catalysts of a number of approaches by economists during the last four decades and still perpetually necessitate due attention when

[2] Pareto efficiency is named after the nineteenth-century economist and sociologist Vilfredo Pareto, who was first to examine the implications of the idea that Pareto improvement exists when there is a way to make some people better off without making anybody else worse off (Varian 1990). The author argues that if an allocation allows for a Pareto improvement, it is called Pareto inefficient.

reforming the existing regulatory regimes. Within this context, Noll (1989) stated that economics research on regulation has three main themes. The first one focuses on market failures and the corrective actions that government can undertake to ameliorate them, whilst the second examines the effects of regulatory policies and asks whether government intervention is efficient or more efficient than doing nothing. The third investigates the political causes of regulatory policy. According to Blaug (1993), Hennipman (1992) and Den Hertog (1999), there is a categorical distinction between positive and normative theories of economic regulation: whilst the positive theory investigates the economic explanation of the regulation and its consequences, the normative theory searches for the most efficient regulation type.

In answer to why regulation of markets is needed and what should be regulated, two theories of regulation have been proposed to explain the pattern of government intervention in the markets, namely, taxes and subsidies, explicit legislative and administrative controls over rates, entry and other facets of economic activity. Firs is the public interest theory, the essence of which is that regulation is supplied as a government response to public demand for the correction of the inefficient or inequitable market practices in industries where the likelihood of monopoly is greatest (Posner 1974). Second is the economic theory of regulation (also known as the Stigler-Peltzman theory of economic regulation (Mueller 2003, 347)), which proposes that regulation is directed by the exchange for political support chiefly for the attainment of re-election of the politicians who set up income transfers in favour of the industries.

It is clear that the economic theory of regulation does not give support to the argument that there should be correction of market failures, but rather concentrates on honouring the demands for regulation by different branches of industry. In its broadest interpretation, the theory stresses the influential power of interest groups in the political decision-making process where the contribution to re-election is provided through vote supply, campaign contributions, chairing fundraising committees and the offer of employment to party members (Den Hertog 1999).

The "Welfare Economics," founded by Arthur Cecil Pigou in 1920, has been one of the microeconomic foundations for the theory of rational pricing and brought to bear on the effects of government regulation in a wide range of industries. He justifies state interference in markets where self-interest, acting through justifies state interference in markets where self-interest, acting through simple competition fails to make the national

dividend as large as it might have been otherwise. According to his conventional wisdom, the right amount of resources would not have been turned into industries without the governmental operations in the industries through fiscal devices such as levying taxes (or penal legislation in extreme cases) or offering subsidies (Pigou 1932).

Assumptions based on such a perspective regarding welfare and the government intervention into the private economy received early criticism from the "institutionalist" economist Ronald Coase (1937), who questioned why the allocation of resources was not done directly by the price mechanism. This was followed by another interrogation of the divergent treatment of governments and other bodies with regulatory powers in terms of exchange transactions on the market and the same transactions organised within the firm. Two decades later, in a similar vein, he summarised the inessentiality of government intervention to resolve the externality problems and offered a plausible and empirically relevant alternative to government action in externality issues given the fact that all solutions had costs and the costs of handling the problems via governmental regulation were frequently heavy (Coase 1960). According to him, the Pareto-optimal resolutions of externality problems could be, and often were, worked out between the affected parties without the help of the government (Mueller 2003). Glachant and Perez (2008, 7) argued that Coase's work also suggests that the existence of negative externalities in production or consumption gives rise to failure in the system of market prices.

Stigler and Friedland (1962) examined the empirical support for two predictions, namely, whether the purpose of the public regulation of prices to curtail the exercise of monopoly power and to eliminate certain forms of price discrimination holds true for electricity prices across the US (in both regulated and unregulated) between 1912 and 1937. Their cross-sectional regression results presented no statistical evidence of influence in state regulation in the average level of rates. They also showed that the recognition of the greater potential of political popularity for low rates for the marginal consumers was not the case in the US during the said period since a significant difference between the ratios of monthly bills in regulated states from unregulated states was only found in one out of four comparisons. This relationship remained after controlling the effectuality of regulation in the comparative charges to domestic and industrial electricity users. Again, no detectable effect on the reduction of price discrimination was found as industrial consumers, contrary to what is expected, continued to pay higher prices independently of the regulatory nature of

the states. The reasons for the ineffectiveness of the regulation in the electrical utilities of the US, according to Stigler and Friedland, were: (1) due to the confrontation of the competition of other utility systems, an individual utility system was not possessed of any large amount of long-run monopoly power, and (2) the incapability of regulatory bodies to force the utility to operate at a specified combination of output, price and costs. This significant study paved the way for Stigler to lay the foundations of economic theory of regulation and for Sam Peltzman to reformulate the theory for a more general framework for the prospective contingencies, a decade later.

Regulation, in Stigler (1971), was taken to mean the employment of a state's power to prohibit or compel, to take or give money, for the distribution of threat to industries in the society. Stigler's formulation of the economic theory of regulation, although having been acknowledged as an early foundation of the main theory, criticised two popular thoughts on regulation: (1) regulation is for public benefit and (2) rationality cannot be used to understand politics (Erdoğdu 2013, 9). Stigler described the channels of political decision-making as "filtered and gross" unless they were able to discover or act on everybody's negligible preferences for, say, Policy A over Policy B (Stigler 1971, 12). Therefore, although political decisions must be frequent and global from his point of view, the voter's expenditure to learn the merits of individual policy proposals (and to express his preference) was determined by expected costs and returns just as that in the private marketplace, and hence many decisions were unwittingly affected by uninformed voters (ibid., 11). This assumption was coupled with the causes and consequences of antitrust. As Henderson (1995, 62) argued from the public choice perspective that "consumers never asked for an Interstate Commerce Commission to prevent new truckers from entering the business. Nor had consumers been heard from when the federal government set up milk marketing boards to restrict the supply of milk and drive up the price," and it was major players (truckers and milk producers) who sought to limit the competition in the first place. These exemplifications consequently paved the way for antitrust laws. Shugart (2004) provides excellent discussions on this topic. In his own words:

> The economic theory of regulation generally and antitrust in particular looks behind the stated intentions of the proponents of government intervention into the private economy to uncover hidden agendas of wealth

> redistribution. The theory's main thrust is that the formulation and enforcement of public policies toward business has, in fact, tended to protect politically powerful constituencies at the sacrifice of competition and economic efficiency. (Shugart 2004, 279)

Following in the footsteps of Stigler's theoretical foundation, Sam Peltzman's reformulation of the economic theory of regulation was a more general one. Peltzman (1976) modelled regulation in which every identifiable group contains winners and losers in terms of attainment of the political power relationships. Being depicted as self-seeking, rational political actors, regulators were only attempting to maximise political support ensuring reappointment or another index of job security. The pursuit of the regulators' self-interest is however constrained, and Peltzman derives an equilibrium in which the utility maximising politician allocates benefits across groups (producers and consumers) optimally in line with the usual marginal costs. That is, all groups will share in the rents at the regulator's disposal and as long as some consumers can offer some votes or money for a small departure from the cartel equilibrium, pure producer protection would not be the dominant political strategy of the regulator by and large (Peltzman 1976; Peltzman et al. 1989).

Another major contribution to theoretical development of the economic theory of regulation came from Gary S. Becker. Having built on the Peltzman's analysis, Becker (1983) presented a theory of competition amongst pressure groups for political influence. According to his formulation, political equilibrium was built upon the efficiency of each group in producing pressure, the effect of additional pressure on their influence, the size of different groups, and the deadweight cost of taxes and subsidies. Policies that raise efficiency were shown to win out in the competition for influence since they produce gains instead of deadweight cost and let the benefiting group have the intrinsic advantage in comparison to the harmed one (ibid.; Rowley and Schneider 2004).

As summarised above, the theory of natural monopoly underlines that a natural monopoly exists when production with relatively high fixed costs causes long-run average total costs to decline as output expands, and thus a single firm can produce total business output much cheaper than two or more firms due to the economies of scale. On the contrary, the literature regarding the theory of public choice and economic theory of regulation has made its mark on academic research by experimenting with the introduction of rational actor models into the study of politics. These theories

fundamentally emphasise that individuals, whether voters, politicians or regulators, will facilitate political mechanisms in accordance with their own self-interest since it is electoral votes that count in the political process.

The cost for the electorates to get information on alternatives or get a thorough understanding of any courses of political action determines their role in political behaviour. Regulators similarly are self-seeking political actors whose decisions may not always be free from bias. One of the reasons why regulation as a whole may be biased in favour of particular groups (mainly producers) is because of the undeniable influence of well-organised, compact interest or pressure groups. Although the political payoff of regulation is directly linked to wealth distribution and thus the deadweight loss yielding policies are naturally prone to being shunned, the neutrality of regulation during the course of lessening or eliminating the inefficiencies engendered by the market failure is yet to be justified.

2.2.4 An Analysis: Regulation or Deregulation?

In the last two decades, globalisation of markets and technological progress, which have played a key role in the cost curves, have enabled many countries to re-examine the characteristic forms of natural monopoly regulation and undermined the economic rationale of monopoly retention. Given its vulnerable nature to serious market failure complications, the regulation of network industries has also undergone profound transformation. To elaborate, the operational framework in which the economics of regulation governs network industries has faced three major changes: (1) a decrease in information costs brought about by new information and communication technologies (ICT); (2) the knowledge required to understand the issues surrounding innovation is inseparably imbedded in its functioning; and (3) modularity in the production and usage process of network industries (Glachant 2009).

Alongside other conditions, the inevitability of natural monopoly and focus on regulation were traditionally underpinned by the market failure argument which was asserted to cause threat to opportunities for trade and to have ramifications as externalities. The wealth of information and monitoring tools provided by ICT these days, however, offers various remedies for so-called failures of traditional markets. The cost of collecting and processing real-time information on injections and withdrawals of power in the electricity industry, for example, was once deemed to be the main hurdle in the creation of open wholesale markets, but today the share

of daily power exchanges and wholesale electricity prices amongst European countries like Belgium, France, Germany and the Netherlands are just common practice thanks to the proliferation of ICT on informational potential and facilitation on monitoring complex operations (Glachant 2009; Wilson 2002).

In practical terms, the concentration of regulatory policy focusing on natural monopoly has palpably shifted with the evolution of an information society which operates on creating knowledge and propels growth by innovation. According to Joskow (1998), many infrastructure services that are vertically integrated and often state owned have now been shown to be no longer monopolistic entities, though the accession to a bottleneck monopoly or certain essential facilities is still needed to make competition in these supply segments feasible. In light of the embrace of the competitive model, Glachant (2009) examined the modifications affecting the essence of regulatory activity in network industries and classified the remaking of regulation into categories. His research found that there was a renewed interest in allocating the monopoly's fixed cost amongst various actors and users. As long as network infrastructures remained integrated in ownership and in the management of the production, a provision for integrated competition could frame two simultaneous activities. In one activity, the producers of the basic service consumed by the final user would make the decision to invest in the network (both in capacity and in technology choice) and the future consequences. Adversely, in the second activity, should the network infrastructures remain monopolies but be separated from the basic service through "unbundling," it is the infrastructure manager who would make investment decisions anticipating the future activities of producers and the behaviour of final consumers (Leautier and Thelen 2008 cited in Glachant 2009, 4).

Alternative theories have been proposed for the last 45 years in identifying new regulatory policies accompanying deregulation, also known in some contexts as restructuring (Cudahy 2009), privatisation and expansion of other means of competition into the domain of monopolistic entities. For Paul Joskow, "competition" and "restructuring" were umbrella terms for a variety of means for achieving economic goals. To achieve it, the characterisation of what public policy goals are for each infrastructure sector, given its current and envisioned levels of performance under prevailing institutional arrangements, must be well defined. The benefits that competition was expected to generate included improving the ability of sectors to mobilise adequate financial resources to support the required

sector investments and to increase sector productivity by reducing operating costs as well as bringing prices in line with costs to provide consumers with good price signals. It was also envisioned that it would adjust the prices charged for sector services, hence making them compatible with the introduction of competition into the competitive segments (tariff rebalancing) where prices and entry were to be deregulated and competition govern the allocation of resources (Joskow 1998).

Den Hertog (2010) drew on the economic theories of regulation to evaluate whether the theories were able to account for deregulation and privatisation and, if so, to what extent. Within this context, the main causes of deregulation were initially due to the relative political power of pressure groups as a result of more efficient combating of free-riding, an increased influential use of media and special entrepreneurship, or alternatively when these effective groups decided that they could better promote their economic interest in unregulated markets such as by self-regulation. Another element that could result in deregulation was the decreasing profits and increasing deadweight cost. The exercise of price fixing or the introduction of entry restrictions, especially in industries such as airlines or freight, could potentially pave the way for competition to take place in other dimensions of the product.

The traditional view of economic theories of regulation is that regulation tackles market failures and externalities. Interpreted in this way, according to Glaeser and Shleifer (2003), the theory is unable to explain, however, why neither contract nor tort law could successfully address these problems in the first place. They developed a new theory of law enforcement in which private litigation, government regulation, a combination of the two, or doing nothing was considered as an alternative institutional arrangement to secure property rights, and the evidence from their study appeared to show that whatever law enforcement strategy the society chooses, private individuals will seek to subvert its working to benefit themselves. The model the authors used proved that regulation had been an incrementally efficient strategy of law enforcement in the US between 1887 and 1917 but that was not to say that regulation was by and large an efficient solution to the problem of market failure due to its vulnerability to subversion by special interests groups and bureaucrats. Hence, they concluded that establishing law and order was an economic problem of its own and doing nothing had been the most efficient response to market failure in many circumstances (ibid.).

An important contribution to the opposing literature which addresses the alleged disadvantages of deregulation like predatory pricing, fluctuating and discriminatory prices, insufficient service, incremental absence of safety, job insecurity and redundancy for large groups of employees is "The Coming Demise of Deregulation" by Richard D. Cudahy. He, in his former work in 1993, adversely exemplified the unattractive legacies of deregulation specifically in the airline industry (i.e. the bankruptcies of some airlines and other unpleasant consequences). The fiasco of the Californian experiment of electricity deregulation just a few years later not only vindicated Cudahy's early argumentation, meaning he was righteously validated in his later study, but it also furnished the other critics of deregulation with ample ammunition (Cudahy 1993, 2009).

Apart from its theoretical merits which are widely discussed by scholars, the main reasoning behind the deregulation of electricity industry has been to produce cheaper electricity power via competition and to provide a choice of electricity suppliers for end users. For the California debacle however, due to lack of slackening in the price of electricity which instead went up to record highs (nearly US$30 per megawatt hour in April 2000, more than US$100 by June, and it rose to between US$250 and US$450 by November that year), the legislature failed to foresee the potential problems that could arise if utilities were faced with rising wholesale prices and an inability to pass the increase along to consumers. Instead, it became about outrunning supply with power shortages and skyrocketing wholesale prices which eventually led to rolling blackouts. Despite the continual outcries against government intervention by its apologists, the Californian example demonstrated that the public would demand mandatory measures to be taken if market outcomes became unbearable (Cudahy 2002).

2.2.5 Privatisation and Subsidies

As highlighted in the previous section, alternative theories have been proposed over the years to identify new regulatory policies accompanying deregulation, privatisation and expansion of other means of competition into the domain of monopolistic entities. Geographic and energy-specific perspectives of global privatisation—which deal particularly with the interdependence between liberalisation of energy markets and privatisation of their utilities, whether or not privatisation reveals similar patterns or a specific step sequence when executed in different countries, and whether it is a cure or indeed a disease in economic terms—have all served to form

the outline of privatisation literature that is surveyed by organisations like EIA (1996) and scholars like Antonio Estache (2002) and Matthias Heddenhausen (2007).

EIA (1996, v) defined privatisation as "any movement toward a market-driven economy or any movement that diminishes public ownership and control and increases private ownership and control," and argued that better understanding of the economic rationale underlying the privatisation of state-owned energy resources would imply having a better grasp of what objectives could be achieved and how countries—regardless of development level—could benefit from it. According to the same report (p. 4), the objectives nations wished to achieve through the shift in ownership/control from public to private hands included: (1) raising revenue for the state; (2) raising investment capital for the industry or company being privatised; (3) reducing the government's role in the economy; (4) promoting wider shared ownership; (5) increasing efficiency; (6) introducing greater competition; and (7) exposing firms to market discipline.

In the case of Argentina, during the 1990s, Estache (2002) found that Argentina's drive for a wide-ranging privatisation programme covering its utilities and transport services was mainly fiscal, as the government was no longer able to afford subsidising those services or invest further to ensure their proper operation. He assessed the privatised sector's performance from different economical dimensions (e.g. economic efficiency in terms of productivity, technical/cost and allocative efficiency; service delivery that meets distributional fairness promised by the government through its laws/decrees; and achievement of financial viability). The results revealed systematic efficiency increases across the board and that some (private) operators did better than others. The report also highlighted that the operational shock given to the sector through restructuring in order to promote competition and flows of investment brought by private operators could not be associated with the worsening economic performance of the sectors as approximated by various efficiency measures. This, in his view, would make the case for reform and privatisation a cure rather than a disease for Argentina, although the success of other measures was highly dependent on strong regulatory oversight (Estache 2002, 11).

Bodislav (2015, 15) analysed the case of Great Britain and argued that should the impact of privatisation on welfare be seen as an economic milestone, the absolute value of prices and the developed trend could be seen as inconclusive. When considered under the difficult conditions of the 1970s–1980s with high inflation rates, the large-scale privatisation was

seen as a success through its allocation efficiency, although prices had an ascending trend and after the privatisation process their slope decreased. However, not all the evidence in the privatisation debate should be viewed from an economic angle. Indeed, concentrating solely on its economical merits has received criticism. Paul Starr's "The Limits of Privatisation" is an important contribution to the contrary literature. It attacks the concept that we should reduce our choices to a basic public-private dichotomy and states that "no single remedy is appropriate to the vastly different problems that distinguish collecting taxes from collecting trash, running schools from running railroads, managing prisons from managing shipyards. (…) We have a more extensive repertoire of intermediate options in organisational forms and modes of ownership, control, and finance. The illusory appeal of privatisation is to provide a single solution for many complex problems. But if the idea of privatisation has any merit, it is to force us to rediscover the rationale of the public services we need and to remind us, if we had forgotten, that the public-private mix ought not to be considered settled for all time" (Starr 1987, 125).

According to the EIA, another form of privatisation is the removal of subsidies. It discussed that the removal of subsidies for European coal operations ultimately paved the way for the constriction of Europe's coal mining industry and encouraged a large shift in coal investment from European mines to mines in the US, Australia and Latin America (EIA 1996, 6). Gil-Molto, Poyago-Theotoky and Zikos (2010, 2) discussed production-related inefficiencies and the role of output subsidies in correcting them. They stated that "privatising a public firm, in the absence of subsidies, improves social welfare under a number of different assumptions. However, if firms' outputs are subsidised privatisation does not improve welfare." In the absence of subsidies, "output levels are suboptimal (as the private firm produces too little) and the distribution of costs across firms is inefficient (as the public firm tends to produce more but at a higher marginal cost than a private firm)" (ibid.).

2.3 Price Regulations

Since the theory of deregulation had gradually lost support worldwide, a regulatory reform movement to fix both market and government failures became popular in the 1990s (Ida 2004). As an alternative to nationalisation, the second practice being used by governments to handle the inevitable impact of monopolisation is to allow private enterprises to operate in

the market and to regulate the private monopolists through the imposition of adequate price and entry regulation and/or quality standards (Ogus 1994). A large body of literature exists indicating that the structure of regulatory mechanisms is a key determinant of the level of incentives given to regulated firms to run their services more efficiently (supply-side efficiency) and also to the consumers to make their utilisation decisions efficiently (demand-side efficiency). The achievement of these and the other goals of the regulator, such as rent and capital extraction as well as ensuring income redistribution void of external public finance instruments, would be fairly straightforward if they had totally exogenous information about the firms' overall production and cost patterns. Due to the inevitable exposure to asymmetry of information at the expense of the regulator, and the additional concerns of interest groups against a regulatory procedure closed to public scrutiny and judicial review, the design of regulatory mechanisms holds a vital importance for all the parties (Laffont and Tirole 1993; Joskow 1998). There are two main regulatory mechanisms known globally, namely cost-plus and incentive-based mechanisms.

2.3.1 Cost-Plus Regulation

In essence, the cost-plus pricing strategy—also known as profit or cost-of-service regulation—requires submission of a bill with a breakdown to show the regulated firm's operating expenses and capital costs inclusive of an after-tax return on its investment, which either equals or exceeds the cost of capital (the "plus"). The submitted cost is then passed on the prices that consumers are obliged to pay. The lack of rigorous measures, unless taken by the regulator, to minimise the asymmetry of information about the firms' cost opportunities, managerial effort and associated costs means the pure cost-plus regulation (regardless of its perfect cost accounting or auditing tools) has been considered as an emboldening task for regulated firms not to minimise costs. That is, far too high audited prices will be passed on to consumers contradicting the mechanism's very own goals of rent extraction and supply-side efficiency (Joskow 1998). Silve and Saguan (2011) discussed that any natural gas retail tariff regulation must aim to fulfil at least four market functions. It should allow regulated companies to recover theirs costs but also preclude them from capturing an inordinate regulatory rent. It should also send good price signals to both supply and demand sides, and appropriately allocate risks between them.

According to OECD (Organisation for Economic Co-operation and Development; 2010, 5) definition, the cost-plus regulation begins with the costs incurred by the supplier of property or services in a controlled transaction for property transferred or services provided to an associated enterprise. An appropriate markup (determined by reference to the markup earned by suppliers in comparable uncontrolled transactions), the report continues, is then added to these costs to make an appropriate profit in light of the functions performed and the market conditions. Such arm's-length markup may be determined by reference to the markup that the same supplier earns in comparable uncontrolled transactions (an "internal comparable"), or by reference to the markup that would have been earned in comparable transactions by an independent enterprise ("external comparable"). In general, the markup in a cost-plus method is computed after direct and indirect costs of production/supply (although before operating expenses of the enterprise such as overhead expenses). It is argued that cost-plus regulation is most useful where (1) goods are sold by a manufacturer that does not contribute valuable unique intangible assets or assume unusual risks in the controlled transaction, such as may be the case under a contract or toll manufacturing arrangement; or (2) the controlled transaction is the provision of services for which the provider does not contribute any valuable unique intangible assets or assume unusual risks (ibid.). From the perspective of Kiss et al. (2006, 48), firms are compensated for all costs incurred during the project when cost-based regulation is applied, and as they cannot end up with negative profits, it is an irrefutable offer for them. They argue that, however, the firms will not be able to keep cost savings since price will always be set equal to incurred cost at the end, and motivations for them to act productively efficient will be removed because of that (ibid.).

2.3.2 Incentive Regulation

Kiss et al. (2006, 47) define incentive regulation as giving regulated firms partial freedom in setting their own tariff structure and rewarding/penalising them for better- or worse-than-expected economic performance. This, they argue, aims to align the utilities' motives with the regulator's in order to utilise the superior information of firms to enhance the total benefits that come from the market. There are two main types of incentive regulation, namely, price-cap and rate of return.

2.3.2.1 Price-Cap Regulation

Under a fixed-price regulatory mechanism, the prices are not tied directly to the regulated firm's cost or profits, but rather defined by the regulator for specific services then formulated for future adjustments. The UK instituted another version of fixed-cost regulation, price-cap regulation (PCR), according to which utility prices were adjusted on a predetermined frequency according to a formula RPI – X, where RPI and X stand for retail price index and expected annual productivity growth, respectively, in the early 1980s. The main focus of PCR is to promote managerial efforts and investment with decreasing operating costs. But, arguably, because of the lengthy period between the formal price reviews which is four to five years, it has been singled out for criticism for enabling firms to reap excess profits during this period (Den Hertog 2010; Newbery 1997).

Elliot (2006) and Sappington (2005) drew attention to the difficulty under PRC to actually observe whether the regulated company decreases the costs at the expense of quality, level of maintenance, reliability and frequency. To prevent this, the regulators may occasionally add an extra factor in the formulae to motivate the managers to reach certain quality levels and connive in increasing prices if those levels are reached, although once anticipated by firms, this may yield a reluctance to minimise the costs otherwise. By and large, price-cap regulation seems to best suit promoting the cost efficiency of firms; however, if attracting more investment to the network sector is the main objective, then cost-plus regulation may be a better option as investors are prevalently known to be motivated by profits rather than by prices (Den Hertog 2010).

Foreman-Peck and Millward (1994) show earlier evidence of this, and it seems consistent with the above conclusion. Analysis of both public- and state-owned British infrastructural industries from a structural, managerial and performance point of view between 1820 and 1990 presented that early attempts to regulate prices were not effective in the UK. Having 14 market players in London by 1850 soon proved that the quality suffered greatly with such a competitive market and precipitated municipal ownership which looked more attractive in keeping prices at a reasonable level and decrease local taxes, which eventually led to the nationalisation of all public utilities in Britain (Gourvish 1995).

2.3.2.2 Rate of Return Regulation

At the other extreme of the spectrum for regulatory mechanisms lies the US version of cost-plus regulation, rate of return (ROR). The ROR

appears to be comparatively stable since it requires fair and reasonable prices from investors in exchange for a fair rate of return (Newbery 2001). It is however widely argued that because regulators would not risk the firms going bankrupt, they would gradually set the rate of return higher instead of lower. Although some might not consider this a direct catalyst for efficient productivity since it would encourage over-capitalisation by firms (say, favouring capital-intensive production technologies), it is presumed to be a profitable contributor to dynamic efficiencies should those technologies contain innovations (Den Hertog 2010). This complements the study of Greenstein, McMaster and Spiller (1995), which argued that due to the vagueness of ROR, which provides the regulator potent discretionary powers, there will remain an issue with commitment in regulatory institutions. So, whilst ROR might reduce incentives to cut costs, it may take incentive reductions further to introduce modern, capital-intensive technologies.

In summary, there are two main regulations instituted to thwart monopolistic infrastructure firms from over-charging, and although it has been shown that both regulatory mechanisms influence the infrastructure sectors differently, the quest for more superior alternatives to PCR and ROR regulations will probably continue. The constraints of each option notwithstanding, governments and regulatory agencies can quantify how the choice of regulatory regime might impact prices and the allocation of risks in the relative sector. Given the above-mentioned causes, however, neither PCR nor ROR regulation is often able to avoid the inevitable trade-offs between greater incentives for cost reduction and greater rent transfer to consumers.

2.4 Institutional Transformations: Competition in and for Market?

It is widely noted above that there has always been great concern when it comes to transferring public monopolies into private monopolies. Regardless of the distinct differentials between privatisation and liberalisation policies in terms of what they offer, whether or not either of these will actually take place and to what extent they are realisable at the outset crucially depends on the appropriateness of the governance structure in relation to the particular industry or country characteristics involved. By and large, network industries are integrated sectors of production, distribution

and retail where the distributional part (i.e. pipes, wires, railways etc.) has network characteristics. Whilst varying in size, these networks, if the market demand is adequate, could be supported or several substitutes would be made available via the introduction of competitive mechanisms ensured with a general antitrust enforcement in place (Parker 1999; Levy and Spiller 1996; Den Hertog 2010). On some occasions, however, if competition between networks or a substitute is not possible—given the market demand and technological eligibility—an alternative arrangement "Competition for Market" can be adopted simply by keeping the existing monopolistic structure and finding private firms to run the services rather than the state (Kim and Horn 1999; Den Hertog 2010).

Also, in many circumstances due to the economies of scale, firms are obliged to charge the same price to all customers and that price is sought to maximise economic efficiency as measured by the standard concept of consumer plus producer surplus. Whilst this maximum surplus can be generated in the market, a pricing policy that leads to the allocation of resources is termed the "first-best price." However, the regulator may attempt to, without price discrimination or external subsidies to the firm, direct the firm to set a price voiding a deficit and maximising net economic benefit whilst allowing the firm to remain viable. Since profits are negative at first-best price, a net benefit loss (deadweight loss) for the firm is expected. Then there is the creation of the breakeven-constrained optimum, second-best price. Given the difficulty to achieve first-best prices without government intervention (i.e. external subsidy to the firm) and the costly nature of government intervention, the quest for an alternative approach to achieve an economic performance near second-best prices without government intervention has been embarked on (Braeutigam 1989).

2.4.1 Competition for Market: Franchise Biddings

Founded by Sir Edwin Chadwick as early as 1859 and later promoted by Demsetz (1968), franchise bidding (or so-called Chadwick-Demsetz auction) as an alternative to regulation is one of the commonly used forms of competition for market. Franchise bidding has experienced a surge of expansion worldwide, with more than 100 years of experimenting in letting water concessions in both France and Spain as well as more recent initiatives in China, Mexico and Hungary. In essence, franchising constitutes a system in which a strategic alliance is built up between the

parties by conferring rights of a production of one or more services/products to a sole firm or a combination of firms for a scheduled period of time. It can be deemed as a fundamental strategy for introducing competition, at least partially, into the markets where competition within the market is not possible or desirable. These characteristics, hence, do make public utilities especially infrastructure services with unfavourable natural monopoly conduct the most suitable candidates for the adoption of franchising (Dnes 1995).

Chadwick (1859) designated competition for the field (market) as an administrative principle which meant that the whole field of service should be put up for competition on behalf of the public with a sole condition on which efficiency and utmost cheapness could be economically administrated with full securities towards the public for the performance of the requisite service during a specified period of time. The competition for the right to be the natural monopolist could, in this way, be an adequate substitute. A further proposal from Demsetz (1968) for the monopoly franchise contracts was, in essence, competitive bidding to take place between a government authority (franchisor) and the supplier (franchisee). Monopoly franchises could be auctioned off to the bidder offering the best price-quality package to consumers.

With Demsetz's system, the (seller) rivals did not have to share the market or production of goods; thus the likelihood of competition in the bidding causing an uptrend in per-unit production costs was envisioned to be rather small. Though franchising authorities, dependent of the country and sector, may reserve the right to add additional normative criteria to the bidding process, competition via bidding usually ensures minimum selling prices since it is expected that the winning franchisee will lower bid prices to the equivalent of the unit costs of production unlike the prices that are set simply by bureaucrats in non-competitive markets. Demsetz's proposal is also appealing as it advocates competition in the industries where substantial economies of scale prevail, and it is free from the usual regulatory apparatus and regulation-related incentives for firms, which can cause them to behave in an economically inefficient manner (Demsetz 1968; Braeutigam 1989; Dnes 1995; Joskow 2006).

Demsetz's competition proposal could be implemented in multifarious circumstances. These include a relatively simple environmental application of, say, local collection of refuse in which the municipality authority need not own the facilities used by the refuse collector company, or auctions for taxi licence plates, to a more complicated scenario of the right to operate

a cable television franchise or natural gas distribution wherein the government may own the facility but auctions off the right to operate the system (Williamson 1976; Braeutigam 1989).

At first glance, franchising in network industries seems to provide attractive efficiency properties that, for example, PCR could not achieve due to the information advantage of the firm over regulator. Thus, the firm could always gain a rent from the informational asymmetry. The benchmark model of Harstad and Crew (1999), which tried to provide insight into the design of franchise bidding practices, and address a gap in the literature, provided stronger arguments in support of franchise bidding in comparison to other alternatives inclusive of ROR and PCR. Addressing the deficit issue, to begin with, bidding offers good efficiency benefits in relation to unregulated monopoly, ROR or PCR as there will exist several avenues to acquire the funds needed to cover such a deficit (e.g. changes in the baseline rules, taxes imposed on the utility, on customers or the bidders themselves). A franchise fee would shift the equilibrium bid function up and, hence, lead to higher prices in the production market. A two-part tariff inclusive of a licence fee to be charged to the prospective customers over the contract period which is fixed by and payable to the regulator would raise revenue by impacting demand only via income effects as well as leaving the consumers still better off versus other regulatory regimes.

Like other regulation modes, franchise bidding is also contingent upon regulatory commitments and there is no way of avoiding this commitment in regulation. Since the other regulation models throughout which the regulators' commitments would most likely be cornered by manipulative pressure from the monopolist for more favourable terms, the only countervailing source of pressure would then be the consumers who are typically less organised. Franchise bidding is however able to offset the pressure of the incumbent on the regulator by entrants who will be subject to the incumbency gains at contract renewal intervals (Harstad and Crew 1999). Also the benefits franchise bidding brings into the governmental domains compared to traditional ROR regulation are evident as the governments no longer need to obtain information on costs and demand to achieve optimal pricing. The existence of a regulatory agency is no longer a needed establishment and cost inefficiencies stemming from regulation are not present (Den Hertog 2010). Correspondingly, franchising schemes also may avoid pitfalls associated with traditional regulation of such industries or with their nationalisation.

Where competition cannot be introduced in the market, as tends to be the case for water supply for example, it should at least be introduced for the market. Properly structured tenders or auctions will allow the government to extract part of the monopoly rents for the benefit of the treasury (Braeutigam 1989; Dnes 1995; Guislain 1997; Kim and Horn 1999). Although it is also argued that governments also extract part of the monopoly rents for the benefit of the consumers, it is not quite clear in the literature how the consumers in this deal are benefited unless the extracted revenues are used to somehow subsidise consumers (or at least some) from those monopoly prices.

Benefits notwithstanding, franchising is not free of flaws especially when collusive bidding and the opportunistic behaviour of a single firm (e.g. getting insider information via bribing officials) enjoying strategic advantages from franchise competition exist. Subject to level-playing field condition in which all buyers are allowed access to the same technology, and thus the market would be characterised by bilateral negotiations between buyers and sellers, Demsetz tries to refute the theory that collusion (or a merger of buyers) would be prohibitively costly as long as bidding rivals colluded successfully regardless of their number, and the supply elasticity of bidders and the costs of colluding are measured empirically. According to Klemperer (2001), however, if the bidders have a tacit agreement to divide up the market at a very favourable price for themselves, especially if they are few in number and in close interaction with one another via frequent contracts, by each bidding aggressively for quantities, then its collusive share can easily deter other bidders from bidding for more. Similarly, certain advantages of the current franchisee (i.e. readily made necessary capital investment, better knowledge in technology and better information on market demand) can disincline other firms to compete with the incumbent realising the trivial chance of winning the competition (Viscusi et al. 2005).

Another problem Demsetz's competition proposal does not address successfully (like traditional regulation does) is how governments should set and monitor the quality standards since there is a possibility of a short-term strategy adaptation by the franchisee to provide the lowest-quality service after winning the right to serve. Given the incompleteness of contracts and the limitations of the contract terms which in itself is equally difficult to specify in the first place due to the difficulty in determining the characteristics of the product or service (i.e. price and quality of service) at the formation stage which are subject to adjustment based on changing

market conditions, there exist contingencies that are unknown and unknowable at the outset of the franchise establishment. The challenges in writing such a comprehensive contract that contains mechanisms which can be adjusted to future occurrences without significantly undermining the original terms of the contract award go without saying. As the crux of the context of the Demsetz proposal suggests, a firm that wins the bidding today may attempt renegotiating its contract tomorrow, leaving the government authority (franchisor) with relatively costly alternatives to force compliance, renegotiate or file a new bidding process for another franchisee after a firm decides to go that route (Goldberg 1976; Braeutigam 1989).

Some of the difficulties like accountancy ambiguities and the possibility of the franchisee exploiting the accounting data with a threat of bankruptcy in order to disincline the franchising agency from failing him, which infects the renegotiation process, can be mitigated by introducing extensive monitoring and accounting control techniques by the franchisor. Then a quasi-regulatory relationship between the parties would be ensued (Williamson 1976).

Demsetz's proposal of franchise bidding also gives rise to conflict when the enterprise provides more than one service to its customers. In the single product environment where a uniform price prevails, the winner may have been selected on the tariff basis that the firm agrees to charge to customers and that tariff would be the second best since it would leave the firm with only normal profits. The generalisation of this selection criterion in the case of multiple products however raises issues. In this case, the bidding may lead to a number of different undominated bids, and the Demsetz proposal does not offer any explicit basis for choice amongst these un-dominated prices even though some of which may be rather inefficient relative to others (Braeutigam 1989).

Despite safeguards built into the agreement, should the assets need to be transferred at the contract renewal interval, the problem of significant sunk costs may arise. Since these assets have to be valued before the handover, the question of how to do so holds key importance. One way is letting the new bidders bid a value for the assets for which they need to have information on future prices given exogenously by a "regulator" since there is no market setting price(s), or, alternatively, having provided the assets valuation, letting the forthcoming bidder offer the lowest price to consumers combined with a systematic strategy to incentivise the incumbent to invest and efficiently operate the system along the way. The gap

between the replacement valuations under both circumstances seems likely to determine the size of sunk costs (Helm 2003).

One might thus ask what the real focus of franchise auctions is. The key purpose is to allocate existing capacity and to encourage new investments in the industry. Having the property rights well defined means that the bidders know what they are buying and the relative government authority gets an indication of potential franchisees' willingness to pay for a particular network utilisation (Erdoğdu 2009). The probability of virtual network trading also exposes future price identification and a grand mechanism to be used for investment determination if governments are serious about benefiting from auctions thoroughly. This is altogether a demanding task and it requires a series of structural measures as well as well-set links between the bidding process, the futures market and the revenues from the auctions. To do so, auctions should firstly comprise of competition with many buyers and sellers, and a liquid transparent futures market should be present. The information auctions create is not valueless given that they provide a method of testing the network operator's plans, whether or not there are suppliers avid and able to pay for new capacity or simply allocating the existing capacity (Helm 2003). Auctions as part of the planning process also raise the issue that a certain degree of regulation is required from both sides, for example, the investor's dependence on regulatory protection to finance their functions and the auctions' requirement of regulators to determine the property rights and the preclusion of market power abuse. Whether these costs are worth the anticipated benefits is, however, an empirical question (Erdoğdu 2009).

As noted above, franchise biddings take on added complexity when the services to be auctioned off get multiplied and are more sophisticated. Franchising vertically integrated public utilities is one of them. One presumable way to lessen these complexities is to separate different functions of the integrated utility into, for example, production, transmission, distribution and retail, or building, operating and transfer of the infrastructure. The identification of merits and vices of vertical separation compared to franchising and regulation has however been a contentious issue in the literature. Unbundling of vertically integrated public utilities is often advocated in network industries with respect to the manifold advantages it offers compared to both franchising and regulation. Scholars such as Crew, Kleindorfer and Sumpter (2005); Jenkinson and Mayer (1996); and Newbery (2002) summarised that the separation would first of all allow the identification of the parts of the industry to be subjected to franchising

or to regulation when competition amongst multiple networks was not available. With this, competition could augment in other stages and franchise contracts would be less complicated as well as increasing the number of applicants, *ceteris paribus*. Also touched upon is that if the network could not be separated from the production or marketing stages due to its bottleneck facility, the position of the incumbent to abuse its ownership of the network or strategic practices to thwart competition via, say, raising rival's costs or price squeezes could be again derailed by separation (Den Hertog 2010).

2.4.1.1 Vertical Separation (Unbundling) as a Solution?

According to Mulder, Shestalova and Lijesen (2005), vertical separation strongly increases the independence of the network management and fosters the network companies' focus on their main activities by encouraging innovations and investments in the grid. They argue that it would also enable the regulators to acquire much accurate information for the determination of appropriate access charges and generate a clear distinction between the role of government and activities of third parties in liberalised industries.

Others, however, do not share the notion that unbundling is always beneficial. The model has been challenged on the grounds that the coordination between activities in different stages which were normally executed by internal managerial command and control methods will now have to be replaced by means of contracts which are grueling to write and enforce. The loss of economies of scale and scope of integration vanish integrated firms from the adjacent or downstream market (unless allowed to), thus decreasing competition and devaluing the incentives to invest in case operating costs rise or all revenues generated from those investments cannot be appropriated. Finally, there is the risk created by separation paving the way to the double marginalisation problem as highlighted by Den Hertog (2010), and Mizutani and Uranishi (2012).

Countries handle vertical separation in various ways for different industries. Compared to other network industries, the railway industry seems to so far reap the greatest benefits from the vertical separation of railway operations from infrastructure management. A comparative analysis of 15 EU member states (MSs) with respect to competition level in the rail freight markets executed by Drew and Nash (2011) indicated more competition in countries with vertically separated railways than in those of integrated. In Sweden and the Netherlands the evidence suggested that

vertical separation improved performance, reliability, capacity and exposed reduction in delays, unlike in Italy, wherein the new entrants still identify barriers obstructing access to the network in addition to ongoing integration issues.

The experience of EU members in power industries does, however, provide little evidence of the impact of separation. Overall imperfections in the transposition of the electricity and gas directives into national laws to create a level playing field for market opening has meant that a number of members have failed to finalise the unbundling provisions. It does not mean to say that network operators necessarily comply with the provisions even if they are fully adapted, or incentives for preferential treatment within vertically integrated operators do not still remain. It appears that national regulators cannot yet verify to a satisfactory degree whether separation provisions are respected in practice, due to lack of resources and adequate power. The incumbent suppliers thus continue to view their networks as strategic assets, which serve their commercial interests (Lowe et al. 2007).

2.4.2 Competition in the Market

2.4.2.1 Yardstick Competition

As articulated above, in franchised monopolies regulators try to bring the firms' prices for providing a service in line with the costs at each point in time (cost-of-service regulation) by allowing high-enough prices to induce firms to supply and simultaneously avoiding welfare losses from monopoly pricing. This scheme however is not considered to confer a huge advantage on addressing the problem of efficient cost reduction by the regulated firm. This being the case, Shleifer (1985) postulated a *benchmarking* or *yardstick competition* to provide regulators with a cost comparison across similar firms to set the prices accordingly. This scheme might be useful to introduce competition into certain industries which usually get organised regionally due to the impossibility of vertical separation.

The essential idea of yardstick competition is to separate the industry horizontally (regionally) instead and compare the average cost of firms by regions taking into account individual factors (i.e. population density, ratio of business versus residential consumers, environmental factors, etc.). This way, the regulator sets the price of a firm's product equal to the average costs of all firms in a certain region (excluding the average costs of that

particular firm) and could ideally use this for tougher performance targets or tariff adjustments at the time of a regulatory review. Although yardstick competition as such is expected to motivate the utmost cost efficiency amongst firms according to its advocates, the difficulties to find comparable firms in differing market conditions and to get a sufficient number to do so may be regarded as its Achilles heel. Extending the horizontal separation of the industry too far would also hold a risk of diseconomies of scale and scope (Foster 1992; Ogus 1994; Kim and Horn 1999; Den Hertog 2010).

2.4.2.2 Contestable Markets

The final model used to introduce competition into monopolistic industries is via the facilitation of contestability. Put forth by Baumol, Panzar and Willig (1982), and Baumol (1982, 3) *contestable markets* might be described as an industry into which entry is free and exit from which is costless, and most of the benefits of perfect competition may be attained regardless of the market share of the incumbent and without government intervention. The key aspect of contestable markets is to give the incumbent monopolists and oligopolists effective incentives to behave virtuously by offering the consumers the benefits which competition would otherwise bring.

Bailey and Baumol (1984) further argued that although contestability analysis defined an entry barrier as something which provides incumbent firms sufficient protection from entry and continuity of obtaining above-normal profits, perfect contestability guaranteed the absence of excess profits, inefficiencies and cross subsidies even in the presence of scale economies. In other words, scale economies were not considered as a source of undesirable performance or a form of entry barrier in contestable markets. The degree of contestability of a market can be measured by the share of the investment that is composed of sunk capital, and the industries with extensive sunk costs (i.e. the railway industry) are considered unlikely to be contestable in comparison to that of other industries where the capital is highly mobile (Teece 1995; Kim and Horn 1999).

This interpretation is supported by several empirical analyses which showed the relationship between sunk costs and the degree of contestability of the airline industry. Subscribing to George Stigler's view of the nature of entry barriers, namely that economies of scale, per se, pose no threat to market efficiency since they do not necessarily cause barriers to entry, the empirical study of Bailey and Panzar (1981) examined the relevance of the theory to city-pair airline markets in the US between 1978 and 1980. They

argued that the airline capital costs, albeit substantial, were not sunk costs as the major portion of it (i.e. aircraft) could be recovered from any particular market at almost no cost, and such factor mobility made potential entry and exit to these industries easy. That is, most airline markets were readily contested and entry of airlines at airports was relatively fluid. Despite various market imperfections (i.e. slot and fuel allocations, market power exercised by airport authorities due to noise and environmental constraints), there existed 143 cases of new entry by the local carriers into hub airports in 1979 against that of 100 entries by trunk carriers in 1978. Similar results occurred for the pricing behaviour of locals as it was expected to be different in short-haul markets where they faced actual trunk competition than it was in competition absent short-haul markets. Indeed, in markets below 400 miles, the presence of a trunk carrier meant fares were 15.9% lower than they were in a monopoly market of similar length.

2.5 Pricing Structures in Liberalised Energy Markets

2.5.1 Oil-Linked Prices Versus Market-Based Prices

The gas market is vital to a country's energy needs and is a matter of economic development, national security and environmental impact. An efficient, successful liberalisation would be expected to transform the gas industries, bring the prices in line with costs and lower import bills. The wholesale gas prices have been long linked and indexed to the price of oil with the initiation of the Netherlands in the early 1960s (Kingma, Lijesen and Mulder 2002). Being specified on long-term take-or-pay (ToP) contracts, subject to international arbitration with enforceable price clause for gas imports also, the oil-linked prices have been based on the value of gas to the customer rather than the cost of production.

Having relatively low costs of production and development given its vast onshore discoveries, such value-based pricing in the Dutch context posed a contradiction to the system used in continental OECD Europe especially in the UK. Instead of cost-plus pricing, the Netherlands opted for a market-value principle in which the negotiations for gas prices based on the weighted average value of the gas in competition with other fuels (e.g. oil products) adjusted to allow for transportation and storage costs.

Whilst this paved the way for Shell, Exxon and the Dutch government to earn higher revenues, the state monopoly British Gas Corporation (BGC) and diverse field producers adopted various other pricing forms in the 1970s (Stern 2012; Stern and Rogers 2014). Unlike the Dutch experience, costly British offshore discoveries left the producers with a high rate of return after taking into account the high seasonal "'swing' factor"[3] which necessitated production facilities and transportation infrastructure to be sized for flows higher than average offtakes. This consequently saved Britain from building seasonal storage facilities during the development stage of its natural gas industry, and the contracts signed between field producers and the BGC included an initial price with provisions for indexation related to cost inflation rather than to competing fuels. Overall, the cost-plus mechanism helped gradual displacement of oil products in sectors and increase the market share of gas in Britain and throughout Europe at that time (Stern 2012; Stern and Rogers 2014).

Although for some the rationale for retaining oil-linked prices via long-term ToP commitments is still strong given its merit of consumer switch between burning gas and oil products, it does not however make much commercial sense in light of the recent developments in gas markets. Stern and Rogers (2011) discussed that the conditions in the gas market should set price levels rather than oil since the supply/demand dynamics of each were essentially divergent and the emergence of modern gas-burning equipment in which the use of oil products no longer meant a substantial gain of efficiency. Even though it was practically very difficult to make fundamental changes to the price formulae on long-term contracts more often than permitted by the three-year review and it was still considered acceptable by European countries, Stern and Rogers further argued that the globalisation of gas markets, namely sharp movements in demand, supply and other types of gas and prices becoming available elsewhere in other parts of the world especially after 2008, exacerbated the problems of reliance on rigid oil-linked price formulae in the continent. These very reasons gave new impetus to the emerging European hubs to provide the best indicator of a market price, which was not hitherto reflected in long-term contracts.

[3] According to Bekkering et al. (2015, 349), seasonal swing factor is defined by the maximum hourly gas demand divided by the minimum hourly gas demand in a year.

2.5.2 *European Gas Hubs and Hub-Based Pricing*

The study by Patrick Heather of continental European gas hubs and whether or not they were fit for purpose lies squarely along the borderline between the readiness of the hubs to offer a market-price mechanism for gas trading and the changes needed to be made to make those hubs credible, for example, price creation, discovery and reference points. Heather (2012) divided the hubs into three categories and provides a definition for "trading hubs" as those which were transparent, mature within certain levels, based on virtual trading points with easy access to the legions of participants to trade, and are already being used for the financial risk management of gas. In similar fashion, the "transit hubs" were defined as those which were actual transit locations (or physical points) with a primary role to facilitate the transit of large quantities of gas for onward transportation as well as giving market participants a platform to trade. Lastly, "transition hubs" were defined by Heather as virtual trading points which are not as mature as trading hubs, albeit presenting signs of progress towards becoming a marker price for their respective national markets by attracting a substantial volume of gas year on year (ibid.).

As one of the pioneers of liberalisation of energy markets, the creation of Britain's National Balancing Point (NBP) in 1996, followed by the Dutch Title Transfer Facility (TTF) in 2003 gave rise to a dramatic increase in the volumes of hub-traded gas (gas-on-gas competition (GOG)) within Europe which rose from 15% in 2005 to 53% in 2013. In addition, the avalanche of spot-priced liquefied natural gas (LNG) overflowing from the UK into northwest Europe has acted as a catalyst for the rise of Continental European hubs especially between 2005 and 2013, whereas the traded gas volume at NBP in 2010 was larger than all of the Continental European hubs put together. In terms of wholesale price formation mechanism, Northwest Europe saw the sharpest change reducing the market share of oil-linked prices from 72% in 2005 to 20% in 2013, whilst the Netherlands has managed to realise a complete displacement of oil-linked prices putting the trading on a 100% GOG competition basis. The GOG competition is however not one homogenous category consisting solely of a trading mechanism and there also exist, inter alia, bilateral agreements and spot LNG imports (IGU 2014). Contrary to the change in price transformation for North American and European trading markets which have so far been eye-catching, although not necessarily uniform across the regions (the Northwest of Europe is to materialise the most remarkable change in

the whole of Europe, for example), the experience of the rest of the world has given a different picture in terms of other market activities. Australia, Russia and Argentina are exemplary in their transformation of price mechanisms away from regulated to market pricing in which there is no hub trading but instead multiple buyers and sellers entering into bilateral agreements. To touch upon oil-linked price-complacent countries at the other end of the spectrum, China's increasing pipeline gas imports from Turkmenistan together with intra-regional trade of the former Soviet Union of which the pricing mechanism switched from bilateral monopoly to oil-linked prices are just a few to mention (IGU 2013).

Although the merits of hub-based (or market) pricing throughout Europe leave a positive impression overall, it should not come as a surprise that hub-based prices do not always result in decreasing prices. Wieczorkiewicz (2014) discusses this very issue and highlights the likelihood of hub prices surpassing oil-linked prices in periods of high demands given its supply-demand equilibrium nature. Even though storage sites could be referable as a rescuer under such circumstances, their capital-intensive and prohibitively costly characteristics may not always allow the situation to be saved instantaneously. The study equally stresses the impact of the supply factor on market prices, according to which the import reliance of the EU markets combined with their waning domestic output could diminish the ability of the EU to offset potential supply-demand shocks. In line with this, Stern and Rogers (2011) draw attention to the fallacy of equating market-based prices with low prices basing their facts on the studies of Rogers (2010) and Honore (2011), which both projected a tightening of the European system and oversupply of gas as opposed to transportation capacity to deliver gas to Europe to come to an end by 2014.

This kind of sanguine approach to the competitiveness of European energy industries in globalising markets will be entrenched by building a single market for gas and electricity to increase economic efficiency and lower the costs for the end consumers is difficult to reconcile with the assumption that moving to hub-based pricing might actually hold the possibility of manipulation and volatility. In their seminal work, Neumann, Siliverstovs and von Hirschhausen (2006) used time-varying coefficient estimation models applying the Kalman filter to examine the existence of price convergence between different hubs in Europe. Their findings revealed that an almost-perfect price convergence existed between the UK and Belgium following the construction of a pipeline between the two

locations. The study by the University of Groningen investigated price movements on six major North West European hubs (NPB, TTF, ZEE, NCG, Gaspool, PEG), using econometric techniques between 2007 and 2010, and found a strong statistical correlation that the hubs in said region form one integrated market for natural gas in which the prices were never expected to drift too far apart (Harmsen and Jepma 2011). The study defines this result as "striking" since there were numerous reasons which could have thwarted this expedient market integration with the most salient one being the lack of arbitrage opportunities between hubs as a result of pipeline capacity constraints. Again, ICIS-Heren's (2010) data showed robust correlation in season-ahead prices between four main European hubs (NBP, TTF, ZEE and NCG) which gradually retarded towards month and day-ahead prices across the hubs. Hence, the suggestion of Stern and Rogers (2011) for market manipulation of individual hubs, if it is indeed happening, was to maintain a contract price based on month-ahead prices (or an average of day-ahead prices over a monthly period) for a hub or an average of hubs as robust as possible against such suspicions. Also, due to the additional participant liquidity gains of hubs, the scope for manipulation by any single player would be diminished.

In support of the manipulation contention, the Algerian energy minister's call for united gas supply action especially from Russia and Qatar to reduce production in order to boost gas prices (due to the oversupply in European markets) and plans to speak out in the Gas Exporting Countries Forum (GECF) in Oran, Algeria, in 2009 is notable (Hoyos 2010). Although there were no written documents or a persuasive plan received at the April GECF meeting in 2009, some associate the reduction in Russian and Algerian deliveries in the second half of 2010 with the plea of Algeria to peg the gas prices at around US$13–14 per million British thermal units (MMBtu), which was around US$3.4 per MMBtu in the most liquid market of the world, the US. A similar issue was brought to the attention of the market experts in the same year when Qatar decreased its LNG exports purportedly by technical issues with half of its LNG trains. It was speculated that the world's biggest LNG producer Qatar was intentionally withholding gas from the market to support prices (Stern and Rogers 2011). On the same oversupply and weak gas demand basis in summer 2010, Qatar also took advantage of the low charges to store LNG and parked at least eight tankers off Fujairah of which the vessels had a combined capacity of 1.8 mcm (more than a monthly supply of the UK). This once again led to a further speculation that Qatar was using them for

floating storage and this was entangled with the very watchful eyes of the US firms (Sethuraman 2010). Generally speaking, long-term contracts make short-term seller manipulation of prices or volumes constrained, but given the global transition towards market prices, the likelihood of gas-OPEC (Organisation of Petroleum Exporting Countries) type of organisations being founded and of members to act in unison becomes more feasible than ever (Stern and Rogers 2011).

The prices at NBP reached the highest level of US$14/MMBtu in the 2005–2006 period due mainly to the loss of the key Rough storage facility during the winter months and the lack of sufficient import flows coming from Continental Europe via the Bacton Zeebrugge Interconnector pipeline in response to high British prices following the constrained storage operations by public service obligations and lack of short-term transportation capacity availability (Foss 2011; Stern and Rogers 2014). With the onset of higher Norwegian imports in 2007, the prices decreased around US$3–4/MMBtu but rose again nearly to its 2006 level in the pre-crisis period of 2008. The US Henry Hub prices followed a fluctuating course trending upwards in the early 2000s and mid-2005. This was due to diminishing domestic output, which occasionally led to inter-fuel competition between gas and fuel-oil in power generation (when the prices of oil and oil products were high) and temporary shutdown of offshore production caused by Hurricane Katrina, whereas the emergence of shale gas production post-2006 counterbalanced the upward trend in prices and brought them to around US$13/MMBtu by mid-2008 and firmly in the US$3–5 range since early 2010 (Foss 2011; Stern and Rogers 2014).

The evidence concerning how well competition is serving the interests of households and small firms is expected to be generally positive as long as consumers are fully aware of their options and the benefits that they can reap from switching between alternative suppliers. However, the picture which emerges from the actual experience of different countries, as discussed below, is somewhat confusing. To elaborate, the British domestic gas and electricity markets have been open to retail competition for 16 years and it has been 12 years since price controls were removed. At privatisation, 14 regional monopoly suppliers were created, 5 large of which, EDF Energy, E.ON, RWE npower, ScottishPower and Scottish and Southern Energy, have evolved through consolidations and acquisitions (Ofgem 2013). However, the rate of switching amidst British consumers has hitherto been as low as 38%, and more interestingly, 37% of electricity users are still supplied by their regional incumbents, whilst Centrica, for

example, has continued to supply the same gas customers (40%) for more than 15 years since the market was liberalised. Thanks to the extensive publicity and media interest surrounding the recent price increases, this has reflected a remarkable spike in switching in the November-December 2013 period (the highest levels for five years), although it markedly decreased again by January 2014 (Ofgem 2014).

A partial counterbalance to this outlook can be found in Spain wherein the recently restructured retail gas market is robustly competitive, with 17 marketers actively trading, although the lion's share of the retail market (90%) is held by four major companies, Repsol YPF-Gas Natural-Union Fenosa, Iberdrola, Endesa and Naturgas. Italian consumers (households) on the regulated retail market pay €4.25/m^3 more than those in the free market in comparison to industrial users and power generators who pay €7.39/m^3 and €6.87/m3 more, respectively (UNECE 2012). French customers are offered two types of contracts under cost-based regulated tariff and market prices. Due to the unwillingness of the incumbent supplier to claw back the market changing prices frequently resulted in 13% of connections to be realised at market prices and a 6% switch rate from incumbent to alternative suppliers in the first half of 2009. Lastly, as of 2012, 21 US states and District of Columbia have allowed residential and small consumers to switch from their traditional utility supplier to other providers and the participation level spanned from 0 to 100% with an active 4 to 14 marketers between the states. The 2012 UNECE report showed that although 82% of customers were eligible for switch, barely 13.5% of them exercised the option.

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CHAPTER 3

Natural Gas Market Liberalisation in the Context of the EU

3.1 Introduction

In line with the growth assumption in world gross domestic product (GDP), the New Policies Scenario of the International Energy Agency (IEA) envisages an increment of 1.7 billion in population by 2040 translating into an ever-increasing energy demand (more than a quarter) for energy sources. Unlike as recently as 2000 during which Europe and North America accounted for more than 40% of global energy demand, we now have a completely reversed situation that all demand growth comes from developing countries led by India (IEA 2018, 1). The consensus in favour of keeping the EU's competitive advantage amongst other growing economies around the globe has been the basis for creating a fully functioning and competitive internal gas (and electricity) market via which the EU can ideally create an adequate framework for securing supplies, add an extra 0.6%–0.8% to its GDP by 2020, create employment and downscale inflation as the European Commission (EC 2013) argued. For this, reformative transformation of the EU gas market with the onset of consecutive energy directives since 1998 has been ongoing and the EU has already managed to outline for its members the permissible ownership changes (not least for vertically integrated natural monopolies), industry restructurings and non-discriminatory access of third parties to gas networks.

This chapter begins with a discussion of natural gas market liberalisation in the context of the EU and provides the role of first, second and

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third energy directives in it. It presents the EU's three energy directives with the focus on the mandatory instruments (namely, energy regulatory authority, unbundling, market opening and third-party access [TPA]) with the aim to depict the European regulatory framework and to address what the instruments of the EU gas regulations have tried to achieve with a hope, in turn, to draw some parallels between the developments in the EU and Turkey. Section 3.3 provides the results of the analysis and concludes the chapter.

3.2 Natural Gas Liberalisation in the Context of the European Union

According to Cameron (2007), there are a number of prerequisites for the introduction of liberalisation and competition into gas markets which include changes in the legal and institutional framework of regulation in order to ensure non-discriminatory access by third parties, industry restructuring and ownership changes especially where the industry has been vertically integrated or highly concentrated horizontally. The EU started the process of transforming the gas market structures with its First Energy Directive (Dir. 1998/30/EC) in 1998, which concerned common rules for the internal market in natural gas. This continued with the Second Energy Directive (Dir. 2003/55/EC), Regulation 1775/2005, and the Third (and final) Energy Package of 13 July 2009, which is a combination of five legislative texts comprising two directives and three regulations. Directive 2009/73/EC concerning common rules for the internal market in natural gas; Directive 2009/72/EC concerning common rules for the internal market in electricity; Regulation (EC) No. 713/2009 establishing an Agency for the Cooperation of Energy Regulators (ACER); Regulation (EC) No. 714/2009 on conditions for access to the network for cross-border exchanges in electricity; and Regulation (EC) No. 715/2009 on conditions for access to the natural gas transmission networks (CEER 2011a, 6).

In a nutshell, the First Directive introduced the concept of competition and common rules, based on non-discriminatory rights to build new gas infrastructure facilities, fair and transparent access to the gas transportation and storage systems, and the unbundling of internal accounts, to govern the EU gas markets (USITC 2001). A series of benchmarking and EC Inform-Energy reports showed that liberalisation faced significant

opposition across Europe (e.g. Germany, France, Luxembourg). Competition performance was disappointing and issues such as barriers to cross-border trade, the impact of derogations due to take-or-pay commitments on the introduction of effective third-party access with lacking relevant insights or propositions were alarming (Haase 2008).

The Second Directive came into effect on 26 June 2003 in a context that displayed an arguably faster and more complete liberalisation of gas sector for the EU. The radical shifts it envisaged were in areas such as market functioning, non-discriminatory transmission and distribution tariffs, and the rights of small and vulnerable customers. However, the impact of the Second Directive upon the functioning of the European gas markets especially in terms of market opening, removing barriers to free competition and to new entrants remained limited too. As a result of this, the EC launched the "DG Competition Report on Energy Sector Inquiry" in January 2007, a seminal paper focused on identifying areas where competition lacked (of functioning) and called for urgent action for the liberalisation to yield useful results in the public interest instead of describing how well the liberalisation process had grown in both breadth and depth across Europe.

Indeed, contributions to the inquiry constituted the foundations of the Third Package which has aimed to address the issues faced by the EU gas markets, namely, (1) market concentration/market power; (2) vertical foreclosure (chiefly inadequate unbundling of network and supply); (3) lack of market integration and lack of regulatory oversight for cross-border issues; (4) lack of transparency; (5) price formation; (6) downstream markets; (7) balancing markets; and (8) liquefied natural gas (LNG) (EC Competition DG 2007) (Fig. 3.1).

The following sections address a number of areas that are expected to provide precursory foundations for the examination of the Turkish natural gas market and the Turkish Natural Gas Market Law (NGML) No. 4646 in Chaps. 4 and 5. The first aspect to be examined is what the mandatory instruments of the EU natural gas regulations are and what they try to achieve by attempting to diminish the enormity of divergences in gas trade patterns of member states (MSs), access to transport capacities, tariff structures and the use of long-distance networks following the comments and proposals of the Council of European Energy Regulators (CEER) and the ACER.

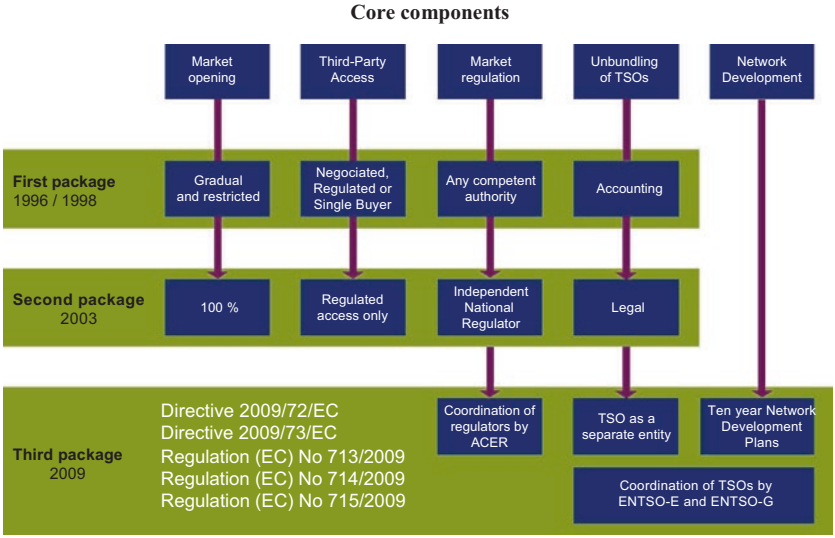


Fig. 3.1 Development of the three energy packages. Source: ECA (2015, 12)

3.2.1 Regulatory Regimes: The EU Natural Gas Directives and Mandatory Instruments

3.2.1.1 National Energy Regulatory Authority

There was no mention of establishing separate and independent national regulatory authorities (NRAs) in the First Directive apart from providing MSs with some guidance to designate a competent authority in order to settle disputes concerning negotiations and refusal of access to the national gas network. The main criteria the dispute settlement authority needed to fulfil in terms of cross-border disputes was to consult with other competent authorities concerned with the system elsewhere and settle the dispute together according to the directive's other provisions (Dir. 1998/30/EC, Art. 21(2,3)). The Second Directive on the other hand specifically required MSs to establish one or more competent bodies with the function of regulatory authorities (Dir. 2003/55/EC, Art. 25(1)). Although determination of the functions, competencies and administrative power of these authorities were at the discretion of the MSs (at least the same minimum set of competences were expected to be shared in all MSs), the utmost importance was given to the independence of these authorities

from the interests of the gas industry. The directive did not require, however, a complete separation of the regulators from the existing government structures and so the relevant ministries were given the right to accept or reject the regulators' decisions with the exception of making amendments on them (EC 2004a).

Whilst the Second Directive added more duties to the regulators' core responsibilities (e.g. licensing market activities, fixing and approving tariffs for network and balancing services), their lack of authority to ensure non-discrimination, effective competition and the efficient functioning of markets was a matter of particular concern. Hence, the regulators were provided with an extensive and overt role to monitor (and intervene when necessary):

- the rules on the management and allocation of interconnection capacity
- the mechanisms to deal with congested capacity within the national system
- the time taken by transmission and distribution undertakings to make connections and repairs
- the publication of appropriate information by transmission and distribution system operators (TSOs and DSOs) concerning interconnectors
- the effective unbundling of accounts to avoid cross-subsidies and the unbundling compliance programme
- the connection of new producers
- the access conditions to storage, line-pack and other ancillary services
- the overall compliance of TSOs and DSOs with the directive
- the level of transparency and competition (Dir. 2003/55/EC, Art. 25(3,4); EC 2004a, 2)

In the Third Directive, the lack of independence for regulators from governments and their insufficient powers and discretion are highlighted, and alternative proposals have been developed to provide further strengthening of the national regulators' impartiality and harmonisation of powers by granting them extra:

- power to issue binding decisions in relation to natural gas undertakings and to impose effective, proportionate and dissuasive penalties on natural gas undertakings which fail to comply with their obligations

- power to decide, irrespective of the application of competition rules, on appropriate measures ensuring customer benefits through the promotion of effective competition necessary for the proper functioning of the internal market in natural gas
- rights to establish gas-release programmes to promote effective competition and proper functioning of gas markets
- power to contribute to ensuring high standards of public service in compliance with market opening, to the protection of vulnerable customers and to the full effectiveness of consumer protection measures (OJ L211, 94)

Most important of all, what the Third Package tries to ensure is that the national role of energy regulators are taken to the EU level. For this, both the CEER and the ACER have been created overtaking the European Regulators Group for Electricity and Gas (ERGEG), which was an advisory group set up by the Commission Decision on 11 November 2003 to consolidate a single EU gas and electricity market and to monitor the implementation of the good practice of gas storage system operators (ERGEG 2005, 2). Predictably, the foundation of ACER has also been significant because it has approved the regulatory inertia and validated the fact that NRAs were not able to sufficiently cope with the tasks of regulation outside their national zones let alone at the EU level. Thus, the ACER has been fully equipped with special expertise on technical issues to deal with cross-border disputes when an agreement on how to regulate cross-border energy infrastructure cannot be reached by national regulators.

Drafting Framework Guidelines (FGs) in various areas for action, which are to be turned into binding EU-wide Network Codes (NCs) for the operation of cross-border gas pipelines, is perhaps the most striking task the ACER has been tasked with. The Codes, according to Bartok (2010, cited in Yafimava 2013, 4), include an extensive list of rules for capacity allocation and congestion management; balancing; interoperability; network connection; security and reliability; data exchange and settlement; transparency; harmonised transmission tariff structures; third-party access; trading; energy efficiency regarding gas networks; and, lastly, operational procedures in an emergency.

It is also worth noting that three European Free Trade Association (EFTA) states, Iceland, Liechtenstein and Norway, participate in the European Economic Area (EEA), which unites them with the 28 EU MSs to be governed by the same rules towards an internal market. Hence,

according to the European Council Decision 2017/783 of 25 April 2017 which concerned an amendment to Annex IV (Energy) to the EEA Agreement (Third Energy Package), EFTA Surveillance Authority was appointed to perform as an authority monitoring whether the internal market rules have been effectively implemented into domestic law of the EFTA states. The NRAs of these states may also request their decision to be reconsidered when necessary (OJ L118, 9).

As of 2018, whilst the European Council's reaffirmation regarding the "urgent need for effective and consistent implementation and applications of the provisions set out in the 3rd Energy Package by all Member States" (ECA 2015, 18) commitment still continues, the need for addressed future role and powers of the ACEER and reinforced independence of NRAs gets increasingly and crucially important. Expectedly, different countries do follow different ways to ensure that their NRAs are free from the industry they regulate and of government. However, CEER's 2016 survey showed that they were not really working hard enough for it, so still in five countries, the NRAs' regulatory decisions were subject to outside (e.g. governmental, parliamentary or ministerial) scrutiny; in 11 countries, government approval of the NRA budget was required or the government caps the budget through the regulatory fee; in a number of countries, there were other restrictions on the NRA's budget through other mechanisms (e.g. ex post cuts, overall restrictions in law); some NRAs were subject to headcount caps, and the government is heavily involved in NRA staff recruitment and wages; and all of the respondent NRAs had conflict of interest provisions for heads or board members (CEER 2016a, 6).

The Third Gas Directive has already sent a signal of an absolute impartiality for NRAs to the MSs and required them to "guarantee the independence of the regulatory authority and […] ensure that it exercises its powers impartially and transparently" (Dir. 2009/73/EC Art 39(4)). And to ensure that the independence is properly protected, it imposes all MSs to allow "the NRAs to take autonomous decisions independently from any political body, and has separate annual budget allocations with autonomy to the implementation of which"; to get "the members of the board of the regulatory authority or, in the absence of a board, the regulatory authority's top management […] appointed for a fixed term of five up to seven years, renewable once"; and to ensure "an appropriate rotation scheme for the board or the top management. […] the members of the board or, in the absence of a board, members of the top management may be relieved from office during their term only if they no longer fulfil the

conditions set out in this Article or have been guilty of misconduct under national law" (ibid. 39(5)(a); (b)). The survey also revealed that all countries' national laws, apart from one, had an article clearly stating the regulator's independence, whilst in some legislation kept quite close to the wording in the directive. In other countries, however, the law was not quite palpable about NRAs' independence from both political and market interests. And worse still, not every national law described what "independence" actually meant, which according to the report leaves considerable leeway for interpretation as well as gaps in a number of instances and good practices among countries (ibid., 19, 24).

Whilst the survey provided rich information about the current situation of NRAs in the EU, it also proved the need for CEER to take effective actions as energy policies are not only important on the national/international level but are also important for being closely linked to other policy areas such as broader economic, climate change, industrial, innovation or labour market policies. So, measures to implement these policies do have effects on the functioning of energy markets in general (ECA 2015, 27). Therefore, to overcome the challenges energy regulators face in fulfilling their tasks and in order to have uniformity so a degree of comparability among NRAs could be established, the CEER lists its recommendations under four main areas. According to which:

1. **NRA tasks and powers**

- All MSs should fully implement the Third Package requirements.
- NRAs should be consistently given the power to issue final and binding decisions that are free from outside (ministerial) scrutiny and the relevant NRAs should be able to point out to their legislators or even the EC the contradictions inherent in the system that could jeopardise their independence.

2. **NRA resource comparisons**

- Within the EU, about 12–15 NRAs dedicate almost 50% of their resources to networks, 29% to markets and 21% to consumer work, whilst on average 78% of NRAs' resources go to national work and 22% is dedicated on international work. CEER imposes that NRA resource exercises must be carefully planned and comparability issues be taken into account. And any party that wishes to undertake an NRA resource exercise should observe the CEER Principles for regulatory performance assessment.

3. Independence

- The national law should explicitly refer to the NRA's independence from politics and from the industry. The legislator should ensure the absence of conflict in proportionate rules relating to independence of the NRA.
- Some NRAs have drawn up a code of conduct or a staff independence manual; this could be a good practice.
- When the part of the law that refers to the head or fixes the composition of the board of the NRA is changed, the current head/board should still complete their term before the changes come into force.
- The budgetary autonomy of the NRA should be safeguarded at all stages and in all types of processes.
- NRAs should be allowed to use their budget as they see fit. There should be no restrictions on the regulator's staffing policy, as long as it stays within its budget.

4. Accountability and transparency

- The ex post control of an NRA's annual accounts should be performed by an independent auditor. The government should not have a role in this process.
- NRAs should follow a clear consultation policy and this should be made transparent (CEER 2016a, 6–25).

3.2.1.2 Unbundling

As has been seen in Chap. 2, the economics of regulation literature depict the potential conflict of interest if, say, both the network owners and operators are to extract monopoly rents allowing both players to involve in generation or supply phases. As the supply chain of gas markets are potentially competitive and transmission and distribution stages are naturally monopolistic, there is always a concern that the customer might be charged any amount the monopolist wishes for network access (Cameron 2007). Thus, non-discrimination and fair tariffs being the main drivers of the EC, a solution of "unbundling or vertical separation" has been introduced via gas directives.

There are four main forms of unbundling as listed in Conte and Irlan (2005):

1. **Accounting** is the weakest form of unbundling and involves the preparation of separate accounts for different segments of the vertically integrated business[1] that may be subject to public officials' audition and scrutiny.
2. **Functional (or management)** unbundling involves the creation of separate accounts and exhibits the use of commercially sensitive information (that is transferred across business segments but is not available to the market) by the integrated business to gain competitive advantage. This, in practice, requires definition of employee roles and the creation of codes of conduct.
3. **Legal** unbundling requires individual management and decision-making structures for each segment of the business, whilst a single department can still make some broad financial decisions such as budget allocations.
4. **Ownership** unbundling translates into a complete legal and operational separation with no common ownership at all.

The First directive solely required MSs to publish the accounts of natural gas undertakings (regardless of their system of ownership or legal form) but did not shed light on the issues of legal or management unbundling which constituted mainly the subject matter of the Second Directive. The only reference was made, instead, to the separation of accounts as "integrated natural gas undertakings shall, in their internal accounting, keep separate accounts for their natural gas transmission, distribution and storage activities, and, where appropriate, consolidated accounts for non-gas activities, as they would be required to do if the activities in question were carried out by separate undertakings, with a view to avoiding discrimination, cross-subsidisation and distortion of competition. These internal accounts shall include a balance sheet and a profit and loss account for each activity" (Dir. 1998/30/EC, Art. 13(3)).

Strong provisions of the Second Directive subsequently obliged the vertical separation of DSOs and TSOs. By obliging the operators to establish a compliance programme to ensure thereby that discriminatory con-

[1] Vertically integrated undertaking means a natural gas undertaking or a group of natural gas undertakings where the same person or the same persons are entitled, directly or indirectly, to exercise control, and where the undertaking or group of undertakings perform at least one of the functions of transmission, distribution, LNG or storage, and at least one of the functions of production or supply of natural gas (Dir. 2009/73/EC, Art. 2(20)).

duct was excluded, the directive revealed three types of unbundling, namely, legal, functional and accounting (EC 2004b). The phenomenon of vertically integrated gas undertakings goes hand in hand with network businesses which are at the same time involved in generation and supply of the gas and all their network operations are done within the same legal structure. Through the legal and functional unbundling requirements, the Second Directive thus aimed to, first, separate the TSOs and DSOs from all other activities not related to transmission and distribution and, second, ensure the independence of these operators from the vertically integrated parent company. That is, whilst a separate company only concerns the network business and the management staff of that network business do not work simultaneously for the production and supply segments of the parent company, all other activities can continue to be operated in one single company. Additionally, the separation of TSOs and DSOs from each other could be materialised via unbundling of the accounts (EC 2004b).

The directive permitted, however, two exemptions to the unbundling provisions and implementation deadlines: first, to those states whose DSOs served less than 100,000 customers to be exempted from the legal and management unbundling requirements (Art. 13), and, second, to allow all members a delaying option for the implementation of legal unbundling of DSOs until 1 July 2007 (i.e. the date of full market opening) instead of 1 July 2004.

The primary goal of competition in industries like gas is to remove the incentive for vertically integrated undertakings to discriminate against competitors as regards to access to the network, commercially relevant information and investments in the network. The next question, which concerned what kind of model(s) should be adopted to provide for different degrees of structural separation of network operation from production and supply activities, was answered with the Third Directive. Repealing the Second Directive, the new directive stressed that the rules on legal and functional unbundling as provided for by its predecessor did not lead to effective unbundling of the TSOs and so the risk of discrimination in network operations prevailed (OJ L211, 94). Thus a radical change in unbundling of network businesses was introduced and re-unbundling of the TSOs and DSOs was mandated (Fig. 3.2).

In terms of unbundling for TSOs, the new directive provided three optional models each offering various degrees of structural separation of network operations from production and supply activities and one common goal to effectively remove the conflict of interests between produc-

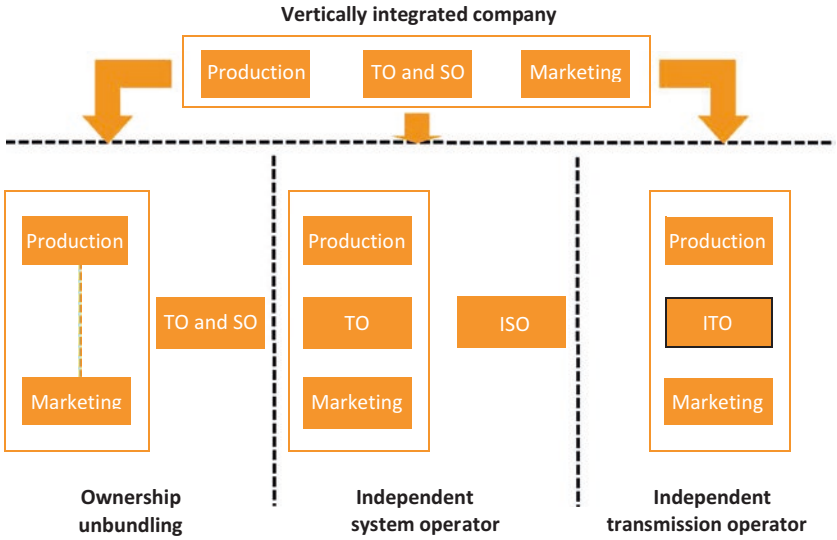


Fig. 3.2 Unbundling options under the Third Energy Package. (Source: Corbeau et al. (2012, 52))

ers, suppliers and TSOs and to create incentives for the necessary investments (EC 2010). The first model the MSs could opt for is the *ownership unbundling model* and according to which:

a. the owner of a transmission system can act as a TSO;
b. the same person cannot exercise control over a production/supply company and at the same time exercise control or any right over a transmission system, and vice versa;
c. the same person cannot appoint board members of a TSO and exercise control or any right over a production/supply company; and
d. the same person cannot be a member of the board of a TSO and of a production/supply company (Dir. 2009/73/EC Art. 9(1),(2); Bel 2011).

It is discussed in the EC (2010) report that if these rules are applied to both private and public entities, and say two separate public bodies are seen as two distinct persons, the common influence in violation of the rules of one over another would be minimised. This being the case, the report continued, two entities could be in a position to control generation

and supply activities separately from the transmission activities. Simply put, each undertaking that owns a transmission system is required to act as a TSO and will be responsible, inter alia, for granting and managing third-party access on a non-discriminatory basis to system users, collecting access charges (including congestion) and payments under the inter-TSO compensation mechanism, and maintaining and developing the network system. In terms of investments, the owner of the transmission system will be responsible for ensuring the long-term ability of the system to meet reasonable demand through investment planning (ibid.).

The second model, establishing an *independent system operator (ISO)*, is an alternative option for the MSs which do not wish to opt for the radical ownership unbundling. Whilst the transmission system remains with the vertically integrated company, technical and commercial operations of the system are performed by an ISO which, in essence, acts as a TSO and is given a strong say in investment planning (Bel 2011). The regulatory authorities undertake perhaps the most vital role as to monitor the compliance of both the ISO and the transmission system owner, who is legally and functionally unbundled, and the relations and communications between them, ensuring the collection of network access tariffs by the ISO including the remuneration for the network owner (EC 2010, 9–10).

The last available model is the *independent transmission operator (ITO)* and it requires an absolute independence from the vertically integrated company with respect to decision-making rights. Under this model, the TSO may remain part of a vertically integrated undertaking; however, a number of rules are provided in order to ensure effective unbundling. Thus the ITOs:

- must be autonomous;
- must own certain assets, the personnel and the financial resources that are necessary for fulfilling the tasks and obligations;
- must employ a sufficient number of qualified staff members to handle day-to-day core activities;
- must have effective decision-making rights, independent from any other part of the vertically integrated undertaking, with respect to assets necessary to operate, maintain and develop the transmission system;
- must have the power to raise money on the capital market; and
- are not allowed to share IT systems or equipment, physical premises and security access systems with any other part of the vertically integrated undertaking (Art. 17,18; EC 2010).

In addition to aforementioned unbundling models, there is also a specific exception (explained under Article 9(9) of the Third Directive) clarifying the legal status of TSOs which create joint ventures (JVs) and still act as TSOs in two or more MSs. Although technically no directive permits TSOs (unless certified either as OU, ISO or ITO) to take part in any joint undertakings, this exception (so-called ITO+ model) grants such TSOs to keep the ownership of their network without contravening the requirement set out in Article 9(1)(a) of the relevant directive. And only the JVs that have been formed after 3 September 2009 are entitled for certification under OU model. Finland is the only example for such JV applications and already has derogation from the directive (CEER 2016b, 22).

As of 2016, 60 gas TSOs had been certified as compliant to unbundling, and whilst 40% of them had converted to OU model, 44% had chosen ITO model, and 11% and 5% had gone for ISO and other models, respectively. Figure 3.3 exhibits that unbundling applications have so far caused non-negligible changes in the public–private ownership structure of the TSOs as well.

That is, Great Britain, Czech Republic, Latvia and Portugal had kept a full private ownership for their gas TSOs, whereas Croatia, Poland, Slovenia, Denmark and Hungary decided to keep their TSOs public. Portugal had a dramatic change for its TSO and went for a complete privatisation after the implementation of the Third Package. CEER explains the reasons for increase of the public ownership of the TSOs for both gas and electricity markets as the continuous involvement of municipalities in the TSOs structures, and for the increase of the private ownership occurs as a continuous involvement of private equities (e.g. funds) (CEER 2016b, 17–18).

Another major player in the efficient functioning of Europe's energy markets and influencer on the competition level is DSOs, and for the unbundling regime of a DSO that is also part of a vertically integrated undertaking, legal, functional and ownership unbundling options are offered to the MSs. The DSOs are expected to be independent at least in terms of its legal form, organisation and decision-making from other activities not relating to distribution. And unlike legal and functional unbundling, no derogation is possible from the rules on accounting unbundling in the case of smaller DSOs. Accounting unbundling is therefore the minimum separation requirement to be respected by every network operator, with no exception. For accounting unbundling, an accurate application of accounting principles is of fundamental importance. It is crucial that cost

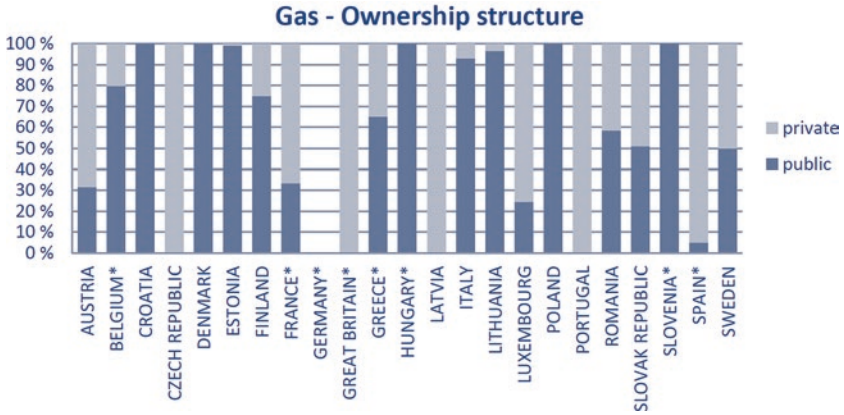


Fig. 3.3 Gas ownership structures of TSOs in EU. (∗BEL (first TSO: 77.7% public and 22.3% private; second TSO: 100% private); FR (TIGF is owned by a consortium composed of four companies: SNAM (40.5%; gas operator), Pacific Mezz Luxembourg S.a.r.l. (31.5%; subsidy of GIC, a Singaporean investment fund), C31 SAS (18%; 100% subsidy of EDF) and Predica (10%; subsidy of Crédit Agricole Group)); GB (other four privately owned TSOs which are interconnector transmission assets); HU (second TSO: 100% private); SL(second TSO: 100% private); ES (second TSO: 17.5 % of public ownership and 82.5 % of private ownership); LU (direct public ownership: 24.56 %, including indirect public ownership: 77.07%); DE (due to various ownership structures of the numerous German TSOs, detailed information on the ownership structure of the individual gas TSO can be viewed in the relevant certification decisions, available on the BNetzA website). Source: CEER (2016b, 17))

items are allocated in a transparent and accurate manner to the activities concerned. Notably, any overstatement of the costs of the network business must be excluded. Such inaccurate cost allocation is likely to lead to cross-subsidisation favouring the supply business and hence distorting competition in the supply market according to CEER (2016c, 21).

To prevent DSOs from taking advantage of their vertical integration as regards to their competitive position on the market, not least in relation to household and small non-household customers, the Third Package calls for careful monitoring of progress in DSOs. The monitoring strictly encapsulates the branding and communication tools of vertically integrated DSOs to prevent potential confusions over the parent companies' separate identity of the supply branch. Whilst ownership unbundling has

been discretionary (only in the Netherlands full-ownership unbundling is required by law), the states that serve less than 100,000 customers are allowed to be exempt from the unbundling requirements (e.g. Austria and Hungary) (Art. 26). Finally, the storage operators are envisaged to operate through legally separate entities that have effective decision-making rights with respect to assets necessary to maintain, operate and develop storage facilities (OJ L211, 96).

The EU is in the process of creating a liberalised, well-functioning (single) energy market, and this process is obvious that their ultimate goal is of a competitive market structure. But the point to note here according to the European Court of Auditors is that, although governments throughout the EU zone have taken substantive steps to restructure and unbundle their TSOs to the fullest extent that is consistent with the EU's legal framework, this has not always led to liberalised and competitive markets. They state in their 2015 report that it is because many governments and incumbent energy companies have continued to restrict third-party network access through regulations and technical restrictions. For instance, new providers in the gas and electricity markets need access to transmission and storage facilities, and without such access, entry into national electricity or gas markets for new entrants would be difficult (ECA 2015, 25).

3.2.1.3 Market Opening

The EU gas directives, in order to facilitate "market opening," have obliged the MSs to firstly designate eligible customers inside their territories, in the following categories:

1. *Gas-fired power generators (irrespective of their annual consumption level)*
2. *Other final customers consuming more than 25 million cubic metres (mcm) of gas per year on a consumption site basis* (Dir. 1998/30/EC, Art. 18(2))

The First Directive foresaw retail market opening in three phases (20% by August 2000, 28% by August 2003 and 33% by August 2008), prescribing the MSs to ensure that the first phase allowed power generators and other retail customers consuming more than 25 mcm to choose their gas suppliers, the second phase extended market opening to all consumers of more than 15 mcm per year, and the third phase offered choice to all

consumers of more than 5 mcm (USITC 2001; EC 2000). Additionally, the MSs were given the flexibility within the Commission's knowledge to introduce "a threshold, which may not exceed the level envisaged for other final customers, to safeguard the balance of their electricity market for the eligibility of combined heat and power producers" (Dir. 1998/30/EC, Art. 18(2)).

With a good implementation response from the members, the Second Directive expanded the consumer switching from designated eligible customers to all customers including residential to be effective from 1 July 2007 and linked the opening-up of the market directly to service quality, consumer protection and security of supply objectives (Dir. 2003/55/EC, Art. 3, 23 (1)). Whilst the definition of eligible customers outlined by the Second Directive remained unchanged, the new measures the Third Directive introduced have been primarily about establishing a timeline for the switching procedure and avoiding an imbalance in the opening of the gas markets, obliging the MSs to ensure that:

- where a customer, whilst respecting the contractual conditions, wishes to change supplier, the change is effected by the operator(s) concerned within three weeks; and customers are entitled to receive all relevant consumption data (Dir. 2009/73/EC, Art. 6(a, b)).
- contracts for the supply with an eligible customer in the system of another Member State shall not be prohibited if the customer is eligible in both systems involved (Art. 37(2a)).
- where transactions as described in point (2a) are refused because the customer is eligible in only one of the two systems, the Commission may, taking into account the situation in the market and the common interest, oblige the refusing party to execute the requested supply, at the request of one of the member states of the two systems (Art. 37(2b)).

According to CEER (2017) in Europe between 2011 and 2016, the number of suppliers serving both household and non-household customers rose from 1666 to 2304, and Belgium, Czech Republic and France had record increases. Switching rates for non-household customers (number of which reached seven million growing by an average rate of 4.3% per annum) remained high as in most countries, whereas in eight European countries switching decreased or not happened at all. Consumer switching inactivity, when looked at through the lenses of the well-functioning

European retail markets, may be illustration of market dysfunctions. Whilst various EU organisations continue examining potential answers for the question of "what are the most influential 'deterrents' of consumer switching behaviour," CEER in its annual report divided de facto commercial barriers that stop customers from switching and create a lack of trust in new entrants in general into two categories. The first barrier is "consumer perception," which includes (1) lack of trust, (2) insufficient monetary gain, (3) complex switching process and (4) satisfaction/loyalty, whilst the second is "commercial contract conditions," which includes (1) unjustified termination fees and (2) value-added services (CEER 2016d, 7). The report summarised that most of these barriers had been caused by incomplete, complex and non-comparable information on prices, contract conditions and market processes, and listed a number of remedies to non-switching:

- Information on offers should be complete, understandable and comparable
- Information should comprise all the essential characteristics of the product (price, duration, start, end, contract conditions etc.)
- Information in the contract should follow seamless from the information in the offer
- Information about the switching process should be provided
- Information during the contract phase is easily accessible
- Information about price changes is complete, understandable and comparable
- Information about the end of the contract, a renewal offer and/or automatic renewal conditions is complete, understandable and comparable (ibid., 37)

Not all countries suffer from low switching obviously, and when looked at from switching rates versus potential savings perspective, ACER/CEER (2016, 12) showed that high switching rates in capitals like Amsterdam, Brussels and Dublin seem to be positively correlated with significant price differentials between the standard incumbent offer and the cheapest offer available on the market (Fig. 3.4).

In terms of number of offers which are available to household consumers, Fig. 3.5 indicates that consumers in countries with a longer liberalisation path (Group III) disposed to benefit from more diverse offers than those in countries which liberalised their retail markets up to five (Group

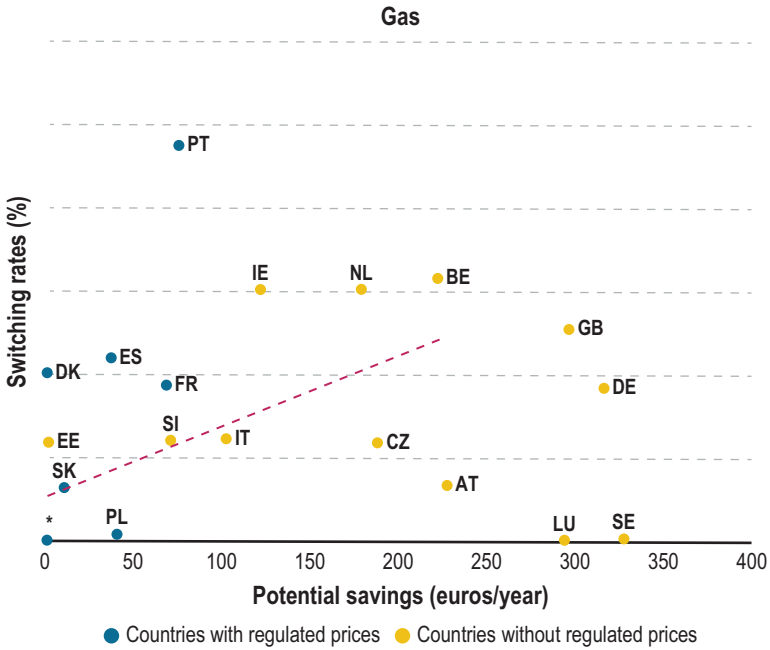


Fig. 3.4 Relationship between "external" switching rates and annual savings available in capital cities of EU MSs—2015 (%, euros). (Note: The observations deviating from the mean by more than two and a half times the standard deviation were excluded from the calculation of the trend line, that is, the outliers are Germany, Sweden and the UK. In this figure, only "external" switching rates are considered, that is, the switching supplier. "Internal" switching is not included, that is, switching tariff/contract with the existing supplier. Source: ACER/CEER (2016, 12))

I) or five to ten years ago (Group II). Moreover, between 2014 and 2015, the number of spot-based offers to gas consumers remained low in the EU, whilst the fixed-price contract offers to consumers increased (ACER/CEER 2016, 13).

It is being advocated that high number of suppliers and low market concentration are the indicators of competitive market, and EU publications effectively discuss that the degree of alignment over time between wholesale prices and the energy component of retail prices (i.e. markups) could be used as an additional indicator for the effectiveness of competi-

MS	Number of countries	Years since liberalisation	Year	Average number of offers	Average number of offers per supplier	Percentage of spot based offers	Percentage of green offers	Percentage of offers with additional services	Average switching rates
Group I	4	≤5	2015	↑ 4	↑1.4	0%	0%	↑ 5%	↑ 6.0%
			2013	3	1.3	0%	0%	0%	0.0%
Group II	15	5≤10	2015	↑ 21	↑1.9	↑1%	↑ 7%	↑ 7%	↑ 5.2%
			2014	14	1.7	1%	3%	2%	4.4%
			2013	10	1.6	0%	5%	0%	4.9%
Group III	7	>10	2015	↑ 73	↑2.9	↑4%	↑19%	↑21%	↑ 9.5%
			2014	63	2.6	2%	20%	20%	10.4%
			2013	59	2.7	0%	6%	11%	8.8%

Fig. 3.5 Overview of the Selection of Differentiating Elements in Gas Offers Depending on the Number of Years Since Market Liberalisation (Europe, 2013–2015). (Note: Average values are presented for each indicator for the three groups (Group I: Bulgaria, Greece, Latvia and Portugal; Group II: Belgium, Croatia, the Czech Republic, Estonia, France, Hungary, Ireland, Lithuania, Luxembourg, Poland, Romania, Slovakia, Slovenia and Sweden; Group III: Austria, Denmark, Germany, Great Britain, Italy, the Netherlands and Spain). Source: ACER/CEER (2016, 13))

tion in retail energy markets (ibid., 10). However, it does not mean that they are always directly proportional. Compared to 2008, gas prices have risen by 5.2% for household consumers, but have decreased by 28.6% for industrial consumers. The results of the ACER/CEER (2018a) analysis show that the falling wholesale gas prices contributed the most to the new trend of lower prices for household consumers, although changes in retail prices have often not been responsive to changes in wholesale prices, and the savings made from the reduction in wholesale prices were not always and everywhere passed on to household consumers. The link between retail and wholesale prices still seems to be weak in many MSs and the energy component of retail prices and wholesale prices seem to correlate better in two groups of countries but for different reasons. Prices correlate well in those competitive markets where the offers available to consumers contain a direct reference to wholesale prices/costs. In addition, a good correlation is also observed in certain countries with regulated retail prices, where such regulated prices are indexed to wholesale prices (ibid., 6).

Lastly, to provide consumers even a wider choice of action, EU adopted a three-pillar strategy (i.e. empowering consumers to act, making smart homes and networks a reality and giving special attention to data management and protection) to deliver a new deal for energy consumers within its EU Framework Strategy in 2015. Acknowledging the fact that retail energy markets has not kept up with the transformation in European

energy sector overall, it published a roadmap which would lead up to removal of obstacles to all consumers (households, businesses and industry) and freeing them to choose their preferred form of active participation in energy markets. The report identified the following obstacles European consumers experience:

- The lack of appropriate information on costs and consumption, or limited transparency in offers, makes it difficult for consumers (or reliable intermediaries and energy service companies, such as aggregators, acting on their behalf) to assess the market situation and opportunities;
- Insufficient competition in many retail markets, a lack of reward for active participation, and difficulties in switching act as disincentives;
- Insufficiently developed markets for residential energy services and demand response that narrow consumers' choices
- Preventing consumers from self-generation and self-consumption reduces potential gains to them; and
- Unequal access to information and high entry barriers for new competitors slow down the adoption of available advanced technologies and practices such as smart metering, smart appliances, distributed energy sources and energy efficiency improvements (EC 2015, 2)

As highlighted above, equal access to (useful/relevant) information may also be problematic in some MSs. Despite the Commission's Energy Efficiency Directive, which clearly prescribes what energy bills should contain, most bills still do not comprise adequate information about actual prices, energy consumption and comparisons of current and previous consumption as well as contact information of organisations where consumers can find information on energy efficiency. Likewise, only in 15 MSs reliable comparison tools are put at the disposal of consumers to provide clear/transparent information so they can make an informed supplier choice (ACER/CEER 2018b, 7).

3.2.1.4 Third-Party Access

TPA to natural gas networks is one of the curial issues faced by countries working for effective energy market reform especially in terms of wholesale pricing. Greater clarity is needed in the downstream area of markets as regards to incentives to be given to domestic producers and for the creation of competition at the large customer level. Due to the absence of an

appropriate roadmap and a rigid implementation motive, the effectiveness of the First Directive of TPA remained shallow, and its terms and conditions for the organisation of access to the system did not go beyond a recommendation of two types of TPA to the member states, namely negotiated (nTPA) and regulated (rTPA). Whilst right of access to the system under the former TPA was simply based on negotiation in good faith, the rights for the latter were obtained on the basis of published tariffs and/or other terms and obligations (Dir. 1998/30/EC, Art. 15(1), 16). Surprisingly, the directive received a strong resistance from vertically integrated incumbents, who already function as transport operators, to open their grids to other firms and to gain market shares (Haase 2008) even though Article 17 clearly made the refusal of network access for both nTPA and rTPA possible:

> Natural gas undertakings may refuse access to the system on the basis of lack of capacity or where the access to the system would prevent them from carrying out the public service obligations referred to in Article 3(2) which are assigned to them or on the basis of serious economic and financial difficulties with take-or-pay contracts having regard to the criteria and procedures set out in Article 25 and the alternative chosen by the Member State according to paragraph 1 of that Article. Duly substantiated reasons shall be given for such a refusal. (Dir. 1998/30/EC, Art. 17(1))

This very clause according to the Energy Sector Inquiry (2005) of EC begot many complaints made by a number of market participants simply due to the exploitation of incumbent players in terms of capacity reservations and available secondary capacity relating to the main transit routes in Europe. In practice, companies would simply request capacity from incumbents to flow their gas in the pipelines but the report revealed that major pipelines were either fully booked[2] or secondary capacity was hardly available for the new entrants[3]. Given those facts, the Second Directive introduced more radical terms and abolished the nTPA altogether. In line

[2] For example, the primary capacity on Benelux-Italy axis was booked until 2022; in other words, the TPA was exempted for the next 17 years (EC 2005, 19).

[3] For example, when capacity was allocated on the secondary market, roughly half of it was being bought by affiliates of the primary capacity owners whilst important part of the secondary allocation was going to other incumbents and gas producers, making barely 5% of longer term capacity available to new entrants (ibid., 20)

with the complementary Gas Regulation 1775/2005, the directive obliged TSOs to offer their services to all network users especially:

> a transmission system operator offers the same service to different customers, it shall do so under equivalent contractual terms and conditions, either using harmonised transportation contracts or a common network code approved by the competent authority. (Regulation No. 1775, Art. 4(1)(a))

The capacity issues caused by the preceding regime were also dealt with in Regulation 1775 and TSOs were given an exclusive right to offer unused capacity to other parties at least on a day-ahead and interruptible basis (Article 5 (3a)). It also put the tariff methodologies into legal text leaving the determination of tariffs at the discretion of the MSs via market-based arrangements (e.g. auctions approved by the NRAs). The TPA to storage facilities was also a subject of the Second Directive given its vital importance for gas suppliers to manage the seasonal fluctuations. The states were provided with the choice of negotiated and/or regulated TPA to storage facilities, line-pack and other ancillary services to be chosen by their regulatory authority. For the rTPA, the access right to storage and line-pack were given to natural gas undertakings and eligible customers on the basis of published tariffs and/or other terms and obligations (Dir. 2003/55/EC, Art. 19(4)), whilst for the nTPA:

> [m]ember States shall require storage system operators and natural gas undertakings to publish their main commercial conditions for the use of storage, line-pack and other ancillary services within the first six months following implementation of this Directive and on an annual basis every year thereafter. (Art. 19(3))

Perhaps the most striking note on the Second Directive, notwithstanding all specified terms and conditions above, was Article 22, which allowed, upon request, the full and partial exemption of major new gas infrastructures (such as interconnectors, LNG and storage facilities) and significant increases of capacity in existing infrastructure from TPA and cost regulation obligations. Corbeau et al. (2012) explain the rationale behind the article as a risk mitigation move for the infrastructure which was according to EC (2009) essential for the integral market and effective competition. Predictably, the Third Directive has followed the same route. It allows refusal of access to existing and major new infrastructure and postulates

the NRAs to, on a case-by-case basis, decide on the exemptions (Art. 35; 36). It does not however provide any specific criteria in terms of financial and volumetric characteristics for a new project to be referred to as "major" for granting exemption. Yafimava (2013) argues that high degree of the EC discretion in these matters may naturally result in costly problems on deciding a project's fitness for the list of liable categories of infrastructure and their added value to the EU supply.

Besides, Regulation No. 715/2009 requires TSOs and storage and LNG operators to offer network users both firm and interruptible TPA services on long- and short-term basis and to make relevant information, especially data on the use and availability services, public (Art. 14,15). Amongst other things, Regulation 715/2009 specifies that TSOs must adopt "Entry-Exit (E/E) systems" as a network access model which is to create gas transport through zones instead of along contractual paths by allowing network users to book capacity rights independently at entry and exit points (Recital 19; Art. 13; DNV KEMA (2013)). Written by the order of the EC, the DNV KEMA report characterises the full E/E system by four features, namely, (1) entry and exit capacities that can be contracted separately by network users; (2) free allocability of capacities meaning that gas brought into the system at any entry point can be made available for offtake at any exit point within the system; (3) virtual trading points which is needed by the E/E system for the tradability of gas independently of its location so that the shippers can bilaterally transfer the title of gas and/or swap their imbalances; and, finally, (4) inclusion of distribution level meaning that both TSOs and DSOs can deal with capacity and connection related issues at their interconnection points, that is, city gates (ibid., 5).

Probably the most important accomplishment of the Third Package has been the demonstration that a problem of vertical integration of supply, generation and infrastructure would lead to a lack of equal access and insufficient investment and, most importantly, the possibility of collusion between incumbent operators, as both Moselle and White (2011) and EC (2007) highlighted. To exemplify, both reports argued that if incumbent gas utilities which control most of the gas present on the national markets hoard capacity on gas pipelines by signing contracts for most or all of the available capacity on cross-border pipelines, then new entrants would have literally no chance to either use the pipeline for their gas importation or compete with the incumbent with their relatively small volume of gas,

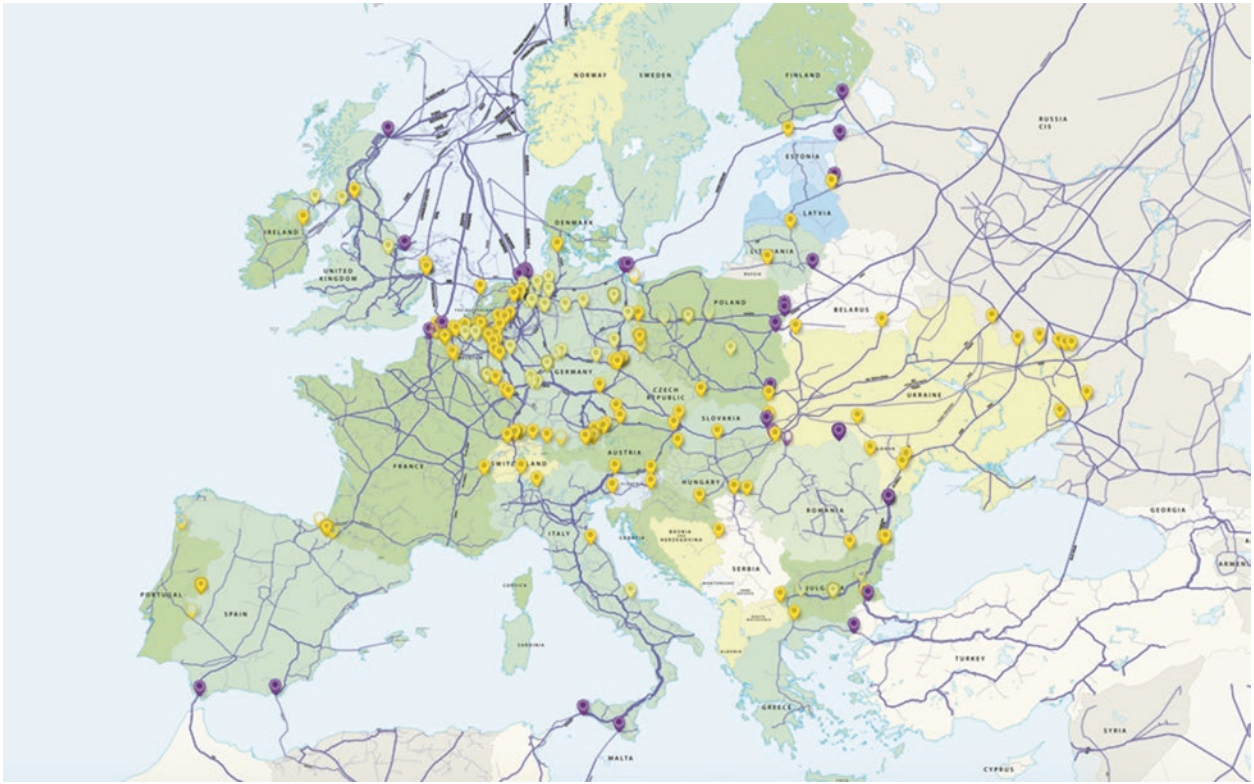
never mind the congestion this situation would create on the interconnectors. Worse still, with the help of non-burgeoning wholesale markets with stodgy liquidity, the process could be extended to accommodate a wide variety of wrong price signals and inadequate remuneration for investments (Moselle and White 2011, 1; EC 2007, 47) (Map 3.1 and Fig. 3.6).

Therefore, because the essence of the internal energy market challenge was that there had been increased interconnections and trade between MSs, EU-wide rules had become critically necessary to level the playing field for all gas undertakings and to allow gas to flow freely across borders providing citizens of the EU with affordable energy. These sat alongside other necessities which simultaneously encouraged the Third Energy Package to define the need for the development of NCs in order to govern all cross-border gas market transactions[4]. The ENTSOG was hence established and tasked with development and implementation of binding union-wide harmonised NCs—together with ACER to prepare non-binding FGs for them—(Art. 8(6)).

Periodic publications of CEER with regard to energy networks highlight that the solution to manage the gas trade between those E/E zones and gas hubs is to get the markets tightly connected especially where interconnector capacity is not effectively used. However, the CEER reports specifically confirmed as of 2011 that there was not effective use of cross-border capacity throughout Europe and that chiefly stemmed from the "contractual congestion" at most interconnection points (IPs) whereby the access was not provided to all market participants—fully booked but mostly went unused instead of being offered back to the market—and capacity was not used in supporting the gas flow from low priced areas to high-priced areas (CEER 2011a, b). Market participants and stakeholders, via the 2011 public consultation and at various CEER/ACER GTM workshops, made headway in a more detailed diagnosis of constraints that manifested evident problems to the market connections, such as the following:

- Capacity allocation mechanisms (CAM) and congestion management procedure (CMP)
- Gas balancing arrangements
- transmission tariff structures

[4] https://ec.europa.eu/cefdigital/wiki/pages/viewpage.action?pageId=55877686.



Map 3.1 The European Gas Network. (Source: ENTSOG Transparency Platform)

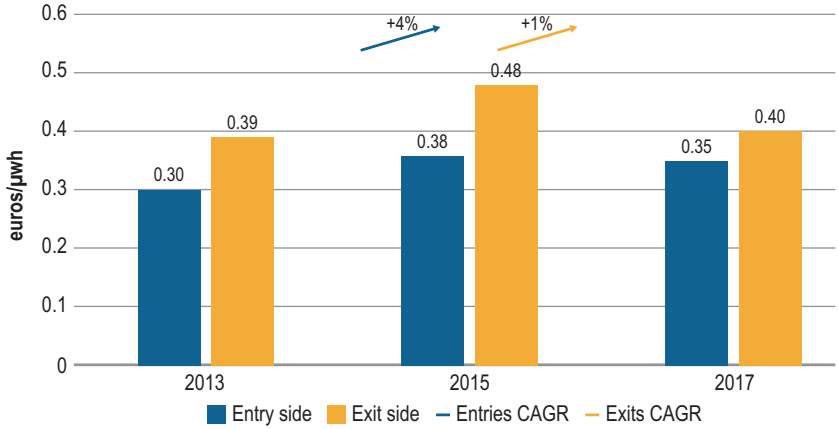


Fig. 3.6 Comparison of average access cost. (Source: EC (2018, 4))

Capacity Allocation Mechanisms and Congestion Management Procedure

In line with the suggestions of the FG on CAM, the first version NC defined a new standardised CAM in the form of an auction procedure (i.e. explicit auctions for long-term trades and implicit auctions for short-term trades) via which the Standard Capacity Products (SCPs)—yearly, quarterly, monthly, daily and within-day—would be made available to all network users registered on a central booking platform in 2012. Moreover, the allocation of existing capacity for the upcoming 15 years would be possible by yearly auction process (CEER 2012). By replacing the E/E capacity products that were being sold per IP separately, countries were expected to implement the final CAM NC and modify their national regulatory frameworks to introduce auctions by harmonising the specified measures such as gas day (D) to be 5:00 to 5:00 in winter and 4:00 to 4:00 in summer, temperature to measure gas and virtual IP creation (ACER 2014). Furthermore, the NC set out how adjacent TSOs should cooperate in order to facilitate capacity sales, having regard to general commercial and technical rules related to capacity allocation mechanisms (CAM NC 2012, Art. 1.1).

After a process of extensive dialogue with market participants, through stakeholder joint working sessions, technical workshops and a number of consultations, an amended CAM NC entered into force on 17 March 2017.

The final version of the NC deals with rules for determining and marketing Incremental Capacity guaranteeing a European-wide harmonised procedure. It contains provisions for a capacity conversion service of unbundled capacity products as well as for harmonising the main terms and conditions for bundled capacity products. New requirements for offering interruptible capacity and new auction dates and rules for long-term capacity products are also amongst the topics the new NC covers.

Although it gained almost full public support, due to the higher level of security of supply and facilitation of cross-border investments they offer, explicit auctions are fundamentally deemed to cause contractual congestion[5] and capacity hoarding since they maintain cross-border bottlenecks where the congestion chiefly appears. CEER (2011a, 15) argued that CMP, or in other words, freeing-up capacity, was feasible through the employment of anti-hoarding mechanisms by requiring TSOs to operate firm use-it-or-lose-it (UIOLI) or use-it-or-sell-it (UIOSI) arrangements via which a volume of unused capacity left behind after the shippers' nomination of day-ahead gas flows could be removed and put into day-ahead auctions for other network users' use for trading across the border, and providing for NRAs to implement overbooking or overselling arrangements to incentivise TSOs to offer additional capacity on a financially firm basis. Nonetheless, explicit auctions are argued to be unable to tackle the capacity issues in short timescales since it requires shippers to coordinate buying network capacity with gas to be eligible for trading across borders (CEER 2011b). As mentioned above, implicit auctions were chosen for short-term capacity allocations and CEER (2011b, 10) describes how the system is expected to work:

> Under implicit allocation, market participants submit bids and offers onto the platform to buy and sell gas on two (or more) entry-exit zones. The platform collates all bids and offers into a single "bid-offer ladder", TSOs provide details on the available interconnection capacity between the entry-exit zones and those bids and offers with the greatest price spread will be accepted until the capacity is fully used or wholesale gas prices converge.

In support of implicit auctions, the CAM FG envisaged that the NC should determine the breakdown of available capacity services appropri-

[5] Regulation 715/2009 Article 2 (21) defines "contractual congestion" as a situation where the level of firm capacity demand exceeds the technical capacity.

ately between long- and short-term services and set aside at least 10% of the available firm capacity at each IP for short-term trading (CAM FG, Art. 2.3).

Gas Balancing Arrangements

As mentioned earlier, the Third Package set forth a range of measures for a well-functioning, competitive internal gas market. Being one of the crucial matters for such a market, of course, the role of gas balancing is undeniable. Imbalance in transmission systems may be attributable to differences between the volume of gas being put into the system and that of exiting from it, or to fluctuations in gas pressure due to varying levels of gas in the system, unlike what would be expected from an operationally secure system in which the pressures should be kept within a certain range (ERGEG 2010). Normally the logic requires the party who causes the imbalance to offset it as long as the system is being used singlehandedly. However, the transmission networks today have multiple shippers utilising their gas at different E/E points; not only does this make the balancing issues more complex, but also structuring the most appropriate balancing regime that preserves system integrity is a must.

Thus, three years after ENTSOG was formally asked by the EC to draft an NC covering balancing rules, including network-related arrangements on nominations procedure, rules for imbalance charges and rules for operational balancing between transmission system operators' systems, the balancing network code (BAL NC) entered into force in April 2014. It shifted the TSOs away from heavy tasks on balancing issues towards a system that gives network users (NUs) a direct responsibility to deal with their own portfolios (Fig. 3.7).

ENTSOG (2018a, 7–10) summarises provisions of the BAL NC, which are designed to promote liquidity and efficiency in short-term market, as follows:

- Accurate and timely provision of information on balancing-related matters (starting from D-1) that TSOs provide to shippers free, electronically accessible, clear and quantifiable information (to be updated at least two times during the D) about the overall status of the network and the NUs' inputs and offtakes for the D (e.g. forecasts and allocations) is curial. This is particularly relevant in markets whereby the vertically integrated incumbents own the majority of networks not least storages and LNG terminals—the main source of flexible gas for balancing (ERGEG 2010).

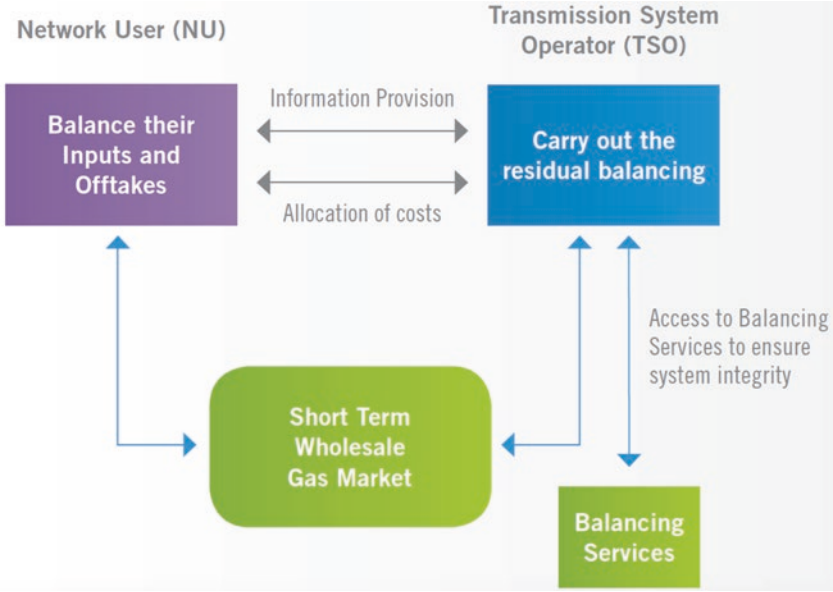


Fig. 3.7 Requirements of Balancing Network Code. (Source: ENTSOG (2018a, 5))

- In a market-based and harmonised balancing daily regime, TSOs undertake residual balancing actions via buying/selling short-term standardised products (STSPs) on a within-day or day-ahead basis seven days a week on electronic trading platform(s). Where trading is limited or products needed by TSOs for balancing purposes are not available on the trading platform, it may be appropriate, as an interim step, for the TSO to procure balancing services via tender and/or balancing products on a balancing platform. A balancing platform means a trading platform where a TSO is a trading participant to all trades. On a trading platform, trades can be made between an NU and a TSO or between NUs only.
- The harmonisation of (re)nominations procedures which is vital to cross-border trade and market liquidity. Hence, according to the NC rules, NUs have to submit their nominations to TSOs, this information get harmonised to have or to change the gas flow (i.e. nomination or renomination) at IPs. The NC also sets common rules about renomination process which is to be possible every hour of the gas

day, with the general rule that the lead time of the renomination is two hours ahead.

- The NUs are entitled to pay or receive, as appropriate, daily imbalance charges (should be cost-reflective) in relation to their daily imbalance quantity for each gas day.
- The imbalance charges, within-day obligations and operational balancing between transmission systems. As set out above, it is clear that in cases of differences in balancing rules across Europe it would not be realistic to expect implications of uniform imbalance fees and/or penalties by TSOs. Whilst the Regulation 715/2009 requires imbalance charges to be cost-reflective and to avoid cross-subsidisation between shippers (Art. 21(3)), the Third Directive empowers NRAs to fix and approve the calculation methodologies for imbalance charges (Art. 41). Based on the BAL NC, the applicable price to be used in daily imbalance charges is determined as either the marginal sell price (where the daily imbalance quantity is positive) or the marginal buy price (where the daily imbalance quantity is negative) including a penalising component—not more than 10% of weighted average price (BAL NC, Art. 22(7)).
- And finally, the principle of TSO neutrality with respect to all related costs and revenues. That is, any costs or revenues arising from such actions are to be passed to Nus, and should these costs be related to balancing actions undertaken by TSOs, then NRA oversight can be required to gauge whether or not the TSOs have reasonably mitigated the cost incurred when undertaking the action (BAL NC, Art. 29–31).

Transmission Tariff Structures

Taking into account the need for efficient gas trade and competition, avoided cross-subsidies and undue discrimination, delivery of cost-reflective charges and ensured cost recovery (Heidelberger 2012), the NC on Harmonised Transmission Tariff Structures for Gas (TAR NC) was developed by ENTSOG and entered into force on 6 April 2017 to be fully applicable in all MSs by 31 May 2019. Regulation 715/2009 has obliged separate tariffs to be set up based on cost-allocation mechanisms and rate setting methodology for each E/E point into/out of the transmission network and foreseen no contract paths for the network charge calculations any more (Art. 13).

The scope of the TAR NC is not homogenous and the applications of its rules require taking into account differences on various points on the transmission network. The transmission services revenue, being based on specific cost drivers (e.g. capacity, distance), is also more than one type and splits into "capacity" and "commodity" parts. In line with provisions of the CAM NC, the TAR NC requires the MSs to apply NRA-set reference price methodologies (RPM), which apply to all E/E points including IPs (physical or virtual points connecting adjacent E/E systems within the EU) and non-IPs (any point other than an IP), other than multi-TSO E/E systems, in order to calculate the reference price for standard firm capacity and interruptible capacity products. This is expected to constitute the starting point for calculation of the reserve prices for yearly standard capacity products (SCPs), whereas for non-yearly SCPs for firm capacity the reserve prices shall include other level of multipliers and seasonal factors with aim to, respectively, incentivise shippers to book long term and to foster efficient system use by allowing higher reserve prices in months with high utilisation rates and lower reserve prices in low-utilisation months (TAR NC Article 12, 13).

The NC details one primary reference price methodology (i.e. capacity weighted distance methodology) and favours 50/50 entry-exit split in order to minimise cross-subsidisation between network users, in particular between cross-border and domestic network users, not to create barriers to cross-border trade, and to avoid differences between allowed revenue and actually obtained revenue. Unlike the preceding TAR NC of 2015, adjustments on tariffs are only made available at entry points from and exit points to storage facilities and at entry points from LNG facilities and infrastructure ending isolation. That is, a discount of at least 50% shall be applied to capacity-based transmission tariffs unless and to the extent a storage facility which is connected to more than one transmission or distribution network is used to compete with an interconnection point. At entry points from LNG facilities, and at entry points from and exit points to infrastructure developed with the purpose of ending the isolation of MSs in respect of their gas transmission systems, a discount may be applied to the respective capacity-based transmission tariffs for the purposes of increasing security of supply (TAR NC, Art. 9) (Fig. 3.8).

ENTSOG had stood clearly against any pricing of interruptible capacity at a substantially lower price than firm capacity especially whilst the firm capacity is still available (Heidelberger 2012). Hence, the NRAs are tasked by the TAR NC to set or approve the parameters of the reference price methodologies in the face of transparency, cost-reflectiv-

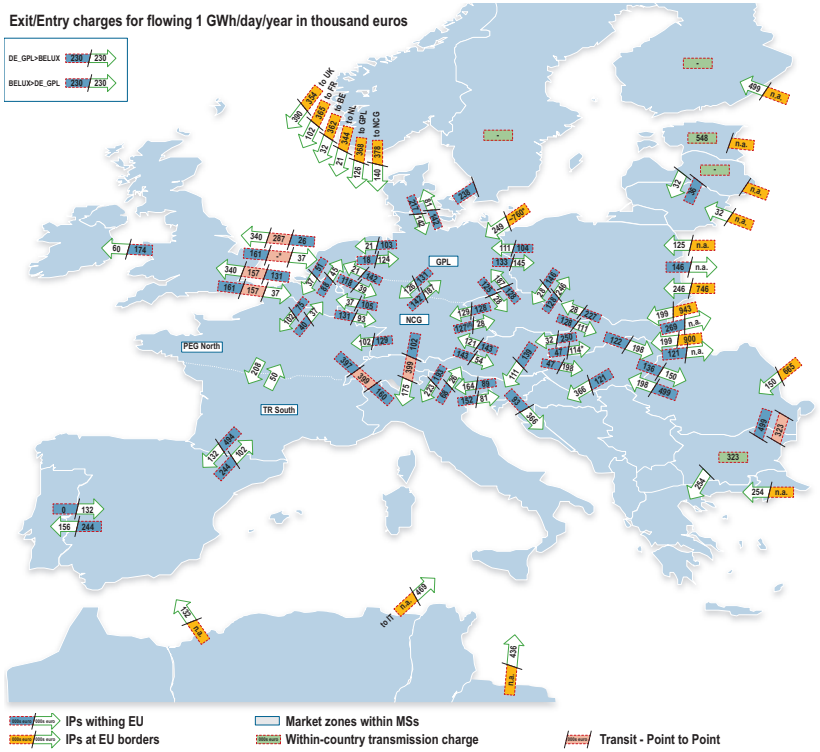


Fig. 3.8 Benchmark of Average Gas Cross-Border Transportation Tariffs—April 2017. (Source: ACER/CEER (2017, 56))

ity, non-discrimination and stability of transmission tariffs, and to publish the information with respect to the allowed or target revenue of the TSO and to the derivation of different transmission and non-transmission tariffs (ENTSOG 2018b, 20).

In terms of revenue reconciliation, as stipulated in Article 19–20 of the NC, the TSOs are allowed to use only one regulatory account for aggregating the under- and over-recovery of transmission services revenue originating from all E/E points. The TSOs are to split the regulatory account into a number of sub-accounts to track the under- or over-recovery originating from a particular group of points or from a particular type of transmission tariff. In the event of the existence of earned auction premia

attributable to a specific account separate from the regulatory account the NC sets, the decision lies once again with the NRAs to use that auction premia for reducing physical congestion or to decrease the transmission tariffs for the next tariff period.

3.3 Conclusion

The purpose of this chapter was to discuss natural gas market liberalisation in the context of the EU and the role of energy directives in the process. The analysis in this chapter has shown that the directives have progressively aimed at freeing gas markets of the MSs and the EU has encouraged its members to look beyond the liberalisation concept to see how an internal gas market can be created step by step and have systematic effects.

For market openness, the foundational position is summarised in designation of eligible customers. Thanks to the Second Directive, all natural gas consumers have been eligible to choose their suppliers—irrespective of their annual consumption level—since 2007, whilst the Third Package has focused on the avoidance of imbalance in the opening of gas markets and set concise timetables for the switching procedure. But contrary to what is expected, the evidence on how well competition can serve the interests of households and small firms does not seem to be fully realised as discussed in Chap. 2 since the rate of switching amidst European consumers remains low.

Also the results in this chapter have showed that the establishment of national energy market regulatory authorities throughout Europe and their equipment with core responsibilities (e.g. licensing, fixing/approving tariffs, balancing, monitoring—even intervening when necessary—the allocation of (interconnection) capacity and congestion management) were materialised via the Second Directive. Once the system was established properly, the more comprehensive Third Package followed and the strengthening of NRAs' impartiality has been developed by granting them extra power to impose dissuasive penalties on natural gas undertakings failing to comply with their obligations, and rights to establish gas-release programmes to promote effective competition and proper functioning of gas markets. Also, in order to overcome the challenges energy regulators face in fulfilling their tasks and to have uniformity so that a degree of comparability among NRAs in Europe could be established, the CEER has listed a number of recommendations under four main areas, namely NRAs' tasks and powers, resource comparisons, independence, and accountability and transparency.

Concomitant with establishing NRAs, the potential conflict of interest between network owners and operators—when both involved in generation or supply phases—is another issue the EU has tried to address via the directives. Unbundling—or vertical separation—brings together the search for economic gain through extracting monopoly rents with the authorities' (mainly regulators') efforts to protect customers from being overcharged by the monopolist for network access. The EU discusses three models for transmission segment of the markets: (1) ownership unbundling; (2) establishing an *independent system operator*; and (3) the *independent transmission operator*; and for the unbundling regime of DSOs, legal, functional and ownership unbundling options are presently offered to the members. The DSOs are expected to be independent at least in terms of its legal form, organisation and decision-making from other activities not relating to distribution and no derogation is possible from the rules on accounting unbundling in the case of smaller DSOs. Also to prevent them from taking advantage of their vertical integration as regards to their competitive position on the market the Third Package calls for careful monitoring of progress in DSOs especially in relation to household and small non-household customers. The monitoring strictly encapsulates the branding and communication tools of vertically integrated DSOs to prevent potential confusions over the parent companies' separate identity of the supply branch. Finally, the storage operators are envisaged to operate through legally separate entities that have effective decision-making rights with respect to assets necessary to maintain, operate and develop storage facilities.

Since greater clarity is needed in the downstream part of markets as regards to incentives to be given to domestic producers and for the creation of competition at large customer level, the non-discriminatory TPA to natural gas networks has become the main component of the hard core discussions of the EU. The Second Directive and Regulation 1775/2005 were particularly important in this regard since the former abolished the nTPA in transmission networks (though kept providing both nTPA and rTPA options for storage facilities, line-pack and other ancillary services), the latter dealt with the capacity issues by empowering TSOs to offer unused capacity to other parties at least on a day-ahead and interruptible basis (secondary market), and also put the tariff methodologies into a legal text leaving the determination of tariffs at the discretion of the MSs via market-based arrangements. Equally fundamental, the Second Directive allowed the full and partial exemption of major new gas infrastructures

from TPA and cost regulation obligations. These shifts were supported and justified in the Third Directive, and it has postulated that the NRAs, on a case-by-case basis, decide on the exemptions. The Third Package has also required TSOs to adopt E/E systems as a network access model to serve as guideposts for creating gas transport through zones instead of along contractual paths.

Besides, Regulation No. 715/2009 required TSOs and storage/LNG operators to offer network users both firm and interruptible TPA services on long- and short-term basis and make relevant information, especially data on the use and availability services, public. However, the CEER spotted that there were evident problems like ineffective use of cross-border capacity throughout Europe that chiefly stemmed from contractual congestion at most interconnection points (mainly due to fully booked but mostly unused capacities), and to overcome such concerns it made a list of recommendations following the rudiments of the network codes on capacity allocation mechanisms and congestion management procedure, gas balancing arrangements, and, finally, transmission tariff structure.

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PART II

The Evolution of Turkish Natural Gas Market

CHAPTER 4

An Overview of the Turkish Natural Gas Market

4.1 Introduction

Whilst short-term changes in energy demand and the substitution of one fuel for another can be explained by energy prices and seasonal conditions by and large, long-term changes in energy sectors can be addressed by a number of diversified reasons such as countries' deficient energy resources, openness to the development of unconventional energy resources which is presently led by developed countries, increasing energy needs mainly due to rising incomes and the provision of access to energy in poor regions of the world.

Turkey's natural gas market is in the midst of a reformative transformation, and its role in global gas supply and demand is becoming a subject of interest. The Ministry of Energy and Natural Resources (MENR) of Turkey has set three strategic targets, that is, a strong and reliable energy infrastructure, optimum resource diversity and effective demand management to be met by 2019. The objective of this chapter is to provide an updated review of natural gas developments in Turkey over the 2001–2018 period. This thorough analysis is aimed at providing a prelude for the next chapter, where the regulatory framework of the gas sector and liberalisation efforts of the Turkish government are examined. The chapter has four parts and begins with an overview of the country in economic and political terms. Part two delineates the evolutionary context of the Turkish energy markets in other segments, and a broad scope of the literature pertinent to

O. Demir, *Liberalisation of Natural Gas Markets*, The Political Economy of the Middle East, https://doi.org/10.1007/978-981-15-2027-3_4

the background of Turkey's natural gas industry (e.g. the concept of recent trends, unconventional gas developments, import dependence, increasing consumption and developing infrastructure) is reviewed in the third part. Finally, part four concludes.

4.2 Country Overview in Economic and Political Terms

In line with the lessons learnt from the implications of restructuring a reform programme supported by the International Monetary Fund (IMF) to attenuate the severe economic crises encountered in 1999 and 2001, the rise of Turkey in the global arena led by the successive AKP governments since 2002 have been evident. Turkey, like many other developing countries, adopted the "External Financial Liberalisation" policy and has experienced an upsurge in foreign influence in both foreign direct investment (FDI) inflows and portfolios since 1989. Turkey's membership in the World Trade Organisation as a founder since 1995, followed by its accession to the Customs Union a year later and long-standing negotiations with the EU as a candidate country, has played a major role to shape the Turkish economy to go beyond the Uruguay Round Commitments in shaping the liberalisation of international trade ahead of other members of the developing countries.

Turkey is eager to play a leading role as a regional and global player both economically and politically and this has, over the past decade, been fuelling a paradoxical debate upon the feasibility of a geopolitical alteration in its neighbourhood. The crucial questions often asked include whether or not Turkey is trying to gain ground to be the next leader in the region, how it could enhance its stalled accession negotiations with the EU and, moreover, how the mutual foreign policy tools initiated by both Turkey and the EU could lead to an achievement of essential consequences, to name but a few (Alessandri and Altunışık 2013; Burns 2012; Düzgit and Tocci 2009; Kirişci 2006; Torun 2012; and Seale 2012). Without a doubt, recent developments in the Turkish economy, worldwide achievements of the Turkish firms operating in various industries abroad and the salient reputation of Turkey's visa-free regime with more than 70 countries have greatly contributed to the improvement of the new leadership image of Turkey as an economic powerhouse (Fig. 4.1).

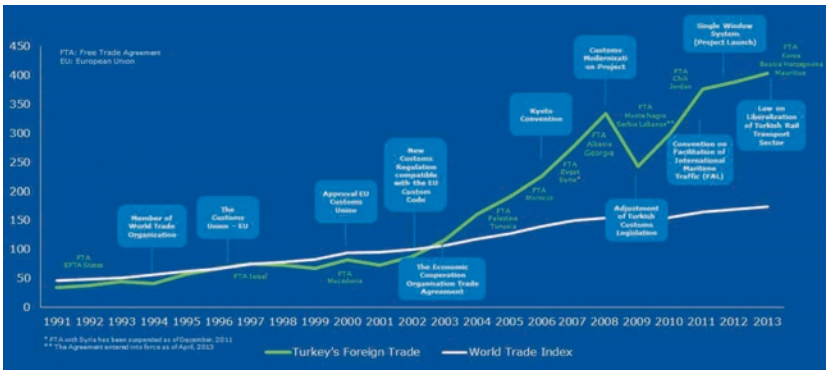


Fig. 4.1 Turkey's foreign trade with major trade policy developments. (Source: OECD (2015a, 20))

Notwithstanding its general strength particularly under the single-party regime over the last 17 years, the Turkish economy is still a volatile one with recorded high increases followed by periods of equally rapid decline. Due to the global financial crisis in 2008–2009 during which many of the world economies contracted, Turkey, too, experienced a slowdown. The foreign trade volume of Turkey that had been on the rise since 2002, for example, decelerated markedly to US$243 billion in 2009 by a 27% decrease compared to that of 2008. However, the economy managed to regain momentum with growth rates of 9.2% and 8.5% in 2010 and 2011, respectively, and these were the world's highest rates of growth after China, making Turkey the Europe's fastest-growing economy. The year 2012 was a similar year in which a steep decline in gross domestic product (GDP) growth was experienced (2.2%). With a prompt recovery throughout 2013, the economy grew by 4.3%, almost doubling the growth expectation from the World Bank for Turkey. In the same year, the GDP reached US$683.6 billion, an almost 80% increase comparing to that of the US$364.5 billion in 2001, with a compound annual growth rate of 4.6% during the 2000–2012 period which kept the country's position as the world's 17th largest economy (and the sixth largest in Europe) unchanged (World Bank 2013; OECD 2015b).

However, Turkey's much-lauded development achievements over the last decade have been slowing down. A contributing factor to this is likely the significant external borrowing which has depreciated the exchange

rate steadily since mid-2017 and finally led to a further depreciation of around 30% in August 2018 given intensified market pressures. The World Bank and the Organisation for Economic Co-operation and Development (OECD) data project the Turkish economy to contract in 2019 as a sharp fall in domestic demand from the second half of 2018 to be offset only partially by an increase in exports. A gradual recovery in domestic confidence and demand is projected to help growth to recover in 2020, but if confidence is restored more swiftly than assumed and delivers faster reductions in risk premia and long-term interest rates, this period could be shortened and the economy can recover more rapidly (OECD 2018a, 199–201). Services and industry sectors have been the major drivers of this big economy by a 53% and 29% GDP contribution, respectively, whilst agriculture, though its share is relatively small (6%), occupies 18.75% of Turkey's labour force according to World Bank 2018 statistics. Also, an ambitious privatisation programme embarked upon by the AKP government throughout their administration to reduce the state's involvement in sectors including banking, transport, industry, telecommunication and infrastructure resulted in an accumulative revenue of US$68.9 billion generated between 1986 and 2017 (Privatisation Administration 2018).

4.3 The Evolution of Turkish Energy Markets

Clearly, the patterns described above reflect an ongoing cycle of economic prosperity in Turkey and that has rapidly spread across other economic activities in light of globalisation. The energy sector, in this context, following a high degree of urbanisation, economic diversification and growth, has become one of the most sought-after industries by investors given the growing demand and investment requirements.

Turkey is highly dependent on fossil fuel, namely natural gas (accounts for 28.2%), oil (30.9%) and coal (28.3%) as of 2017 (BP 2018); and when compared to its relatively small indigenous production, the country's overarching leadership strategy seems to be undermined. Since energy is directly and indirectly related to the national security of any country as a vital instrument fuelling the economic engine, and political and social stability, Turkey has long been striving to address its energy security and efficiency issues. At the outset, trouble appears to begin with the cost of energy imports which has been a heavy burden on the Turkish economy for decades.

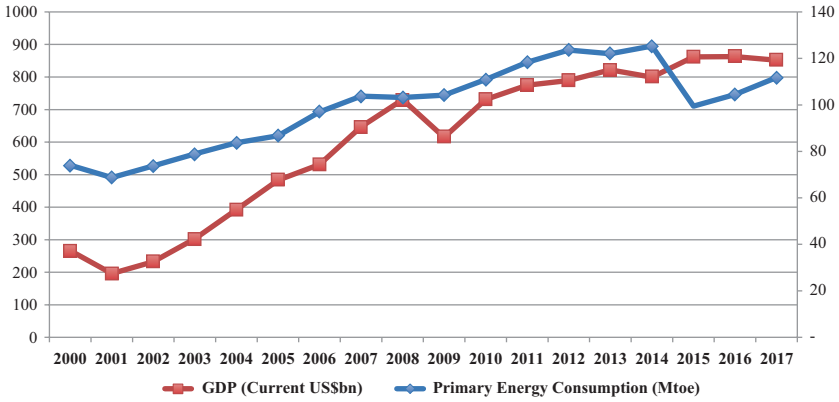


Fig. 4.2 Primary energy consumption and GDP of Turkey, 2000–2017. (Source: EIGM; IEA; WDI)

An aggregate US$606 billion has been paid for energy imports between 2002 and 2018, whilst the cost of 2018 alone was US$42.99 billion (BOTAŞ 2014; TUIK). The contributory factors for Turkey's rising energy dependence, amongst others, may be attributed to the continual population increase (17.3% growth from 2000 to 2018), expanding economic developments and its enfolding impacts on the living standards of people. Figure 4.2 shows the changes in gross domestic product and primary energy consumption of Turkey over the 2000–2017 period.

Turkey's primary energy consumption continues to follow an increasing trend since 2001 with the exceptions of the volatility during the economic recession in 2008 and the coup attempt in 2016. Similarly, its total primary energy supply (TPES) reached 126.9 million tonnes of oil equivalent (Mtoe) in 2015 by growing 67% since 2000. Industrial and residential energy consumptions have so far been the largest in Turkey, whilst commercial consumption increased its use of energy the most between 2004 and 2014 (by around 105.4%). Despite the fact that the energy demand of Turkey grew at the fastest pace within the OECD in the past few years, its per capita energy consumption (1.75 toe as of 2016) remained still relatively low compared to those of the OECD (4.11 toe) and the world (1.85 toe) averages (IEA 2018; OECD 2018b).

The same picture can be drawn for the per capita electricity consumption of the country which stood at 3114 kWh equalling about one-fourth

of the OECD realisation for the same year. In order to measure and compare a country's energy efficiency performance against others, energy intensity[1] is one of the most commonly used indicators and is traditionally higher in low- to medium-income countries (Bergasse 2013). The energy intensity of Turkey increased by 7.1%, reaching 1.7 toe between 2005 and 2015, although it is still one of the lowest among the International Energy Agency (IEA) countries (IEA 2016). Turkey is expected to see the fastest medium- to long-term growth in energy demand among IEA member countries (reaching 170.3 Mtoe by 2020) despite the bleak 2030 projections of the BP Energy Outlook (2011) which posited at least a 10% decline for the share of other OECD countries in global primary energy consumption (IEA 2018). These facts clearly call for further growth in the Turkish energy sector as well as indicating a necessity for large investments.

Major energy sources of Turkey are coal, natural gas, oil and renewables (in the form of hydropower, solar, geothermal and waste). Fossil fuels accounted for 90% of the country's total primary energy output, with coal providing 29.2% of shares in 2017. Coal (primarily lignite) constitutes the largest fossil fuel reserve of Turkey, and the MENR undertakes rigorous works on exploration of new and development of existing fields in parallel with the ongoing industrialisation. In terms of oil, the demand between 2000 and 2017 showed a noticeable increase, rising from 662.8 thousand barrels per day (kb/d) to 1007 kb/d, whilst the share of oil in TPES had constantly increased from 17.1% to 30.5% during the same period. The transport sector is the major consumer of oil, and given its limited indigenous output, Turkey imports crude oil from a restricted number of countries, predominantly Iran (26.9%), Russia (18.9%), Iraq (16.6%) and India (8.2%) (EMRA 2018b). The country has two major oil pipelines—the Iraq-Turkey Crude Oil Pipeline and the Baku-Tbilisi-Ceyhan Oil Export Pipeline—carrying crude oil from Iraq and Azerbaijan to Turkey under the operatorship of BOTAŞ and the latter generates significant revenues to the host countries as well as holding exceptional importance for Europe and the Mediterranean as an East-West Superhighway.

The Turkish government has hugely raised its upstream investments for the exploration of new oil fields from US$100 million in 2002 to US$4.6 billion in 2017. But, in the face of increase in the world's proven oil reserves mostly due to a large proportion of increase in the heavy crude oil

[1] Energy Intensity is measured by the quantity of energy required per unit output or activity.

reserves of Iran and Venezuela, the recoverable domestic oil reserves in Turkey still remains relatively small (365 million barrels). Notwithstanding the discovery of new oil fields and the development of secondary production methods which have incontestably saved the indigenous oil production from declining sharply, around 93% of Turkey's discovered oil fields can only be classified as small whilst a mere 7% of which is midfield to date. In case of no new discoveries, with the current production level of total domestic crude oil the reserves only have a life span of 18.5 years (TPAO 2013). The small production capacity in addition to a set of undiversified import destinations proves a great vulnerability for Turkey's oil supply security and hence for the socio-economic developments.

Turkey's installed hydropower capacity was at 12,241 MW in 2002, and by increasing by 118% over a 14-year period, it reached 26,681 MW in 2016. There is an economically feasible 140 billion kWh/year of total hydropower potential in Turkey, 44% of which has already been facilitated, whilst another 31% is still under construction by enterprises. Similarly, the installed capacity of geothermal energy which was marginal a decade ago (17.5 MW) rose dramatically totalling 820.9 MW in 2016. Turkey has 31,500 MWt geothermal potential and the energy produced by which is mainly used for heating (not least residential and greenhouse) and tourism purposes. The developments in wind energy have been by far the most bewildering with installed capacity increased from as small as 18.9 MW in 2002 to 5751 MW in 2016. With the addition of 199 new projects by private investments during the 2013–2014 period, some 3980 MW capacity has entered into system, and plans are underway to gradually increment the share of renewables in the country's energy mix even further over the next ten years (MENR 2017).

Lastly, despite having the Turkish Atomic Energy Authority readily established since 1956 and some unsuccessful prior attempts to build nuclear power plants during the 1965–1997 period, nuclear energy as a means of alternative energy came to Turkey's agenda in real terms as belated as 2005. This was chiefly due to the hypertrophic growth in electricity demand and the government's sustainable economic growth targets. The selection of locations for Turkey's two commercial nuclear power plants was finalised in 2006 and the Turkish Electricity Trade & Contract Corporation (TETAŞ) started to invite bids from interested parties for the Akkuyu site and Sinop in 2008 and 2013, respectively (TAEK 2013). For the Akkuyu project, consequently, an intergovernmental agreement was signed with the Russian Federation National Nuclear Corporation

(Rosatom) in May 2010 for four 1200 MWe VVER-type AES-2006 units to be built on build, own and operate (BOO) basis and the Russian government to be the guarantor of the project[2]. The construction start date was the end of 2018 with the aim to bring the first unit online in 2023–2026. The US$22 billion build-operate-transfer (BOT)-based Sinop nuclear project, on the other hand, was agreed to materialise by a consortium led by Mitsubishi Heavy Industries and Itochu, with GDF SUEZ (now Engie) following the intergovernmental agreement signed with Japan in 3 May 2013[3]. The proposed project includes four Atmea 1 reactors with a total capacity of 4480 MWe to be commenced in 2019 and the first unit to be commissioned in 2023 (IAEA 2015; MENR 2017).

4.4 Emergence of Natural Gas: A Background to Turkey's Natural Gas Industry

The Energy Information Administration (EIA) data predicts that world energy demand will increase more than 50% between 2010 and 2040, although the OECD region projections shows almost no growth at all (0.5% per annum). According to the Evolving Transition scenario of BP (2018)—which assumes that government policies, technology and social preferences will continue evolving in a manner and speed seen over the recent past—world energy demand will increase by a third by 2040, although the OECD region projections shows almost no growth at all. Turkey is perhaps the only member of OECD that foresees over 80% increase in its TPES by 2023 (MENR 2015) and notwithstanding the government plans to either integrate the nuclear power plants into the Turkish electricity grid or to switch away from natural gas and liquid fuels when feasible, natural gas is expected to supply almost a quarter of the energy used in Turkey by 2023 and continue to be the backbone of energy supply. This being the case, the following sections provide the natural gas market outlook of Turkey in greater detail.

[2] A fixed proportion of the power to be generated (70% output of the first two units and 30% for the other two) in the Akkuyu site will be bought by TETAŞ at fixed price of US$12.35 cents/kWh on weighted average for 15 years and the rest will be sold in the open market. The Turkish government will start to be paid 20% profit after 15 years (IAEA 2015).

[3] The World Nuclear Association details equity shares of the parties as MHI (15%), Itochu (15%), Engie (21%) and Turkish Electricity Generation Joint-Stock Company (EUAŞ) (49%); see http://www.world-nuclear.org/info/Country-Profiles/Countries-T-Z/Turkey/.

4.4.1 Reserves and Production

Whilst oil exploration and production activities in Turkey date back to the 1930s, natural gas exploitation is a comparatively new development that has been accelerated chiefly from 1987. Turkey has limited proved gas reserves of 25.98 bcm as of 2017 (EMRA 2018a), with a remaining producible gas of 6.8 bcm in 2012, which reduced to 5.3 bcm in 2013 and 4.3 bcm in 2017. This, according to Turkish Petroleum Corporation, translated into less than 14 years of life for the remaining recoverable gas if no new discoveries were made (TPAO 2018). Table 4.1 illustrates the natural gas reserves in Turkey and the upstream companies that operate them.

The last decade saw a marked 13-fold increase in pre-drilling exploration activities (chiefly materialised using public resources) by the national petroleum company—TPAO—compared to the preceding years. Although the upstream activities of TPAO had traditionally been onshore, it has expedited its exploration and production (E&P) activities of hydrocarbon resources both in Turkey and overseas. Throughout 2018, the exploration focus had comprehensively been on the large-scale offshore developments in deep waters, and Turkey's possession of its very first drilling vessel—Fatih—with a capability of drilling to a depth of 40,000 feet to commence its deep-sea operations in the under-explored basins of Eastern Mediterranean Sea is deemed to have important effects on (inter) national energy markets. As has been said at the beginning, Turkey's natural gas market is in the midst of a reformative transformation, and in spite of the TPAO's long-term exclusivity in the upstream Turkish natural gas market for almost 50 years, private companies have been allowed since 2003 to take part in E&P activities primarily in Southeastern Anatolia, Thrace and Western Black Sea regions. The E&P activities are carried out under exploration and operation licences (Petroleum Law No. 6491) granted by the General Directorate of Petroleum Affairs. The law does not deem natural gas generation as a market activity, but since the generation companies are required to hold a wholesale licence to operate, they can trade their output to wholesale, import, export and distribution companies within the country. The local output can also be sold to compressed natural gas (CNG) transmission and distribution companies with the exception of CNG sales companies if the gas is not brought out from the wellhead or by the eligible consumers (EMRA 2018a).

Table 4.1 Natural gas reserves of Turkey and producers, 2012–2017 (m^3)

	Company	*Original gas in place*[a]	*%*	*Recoverable gas*	*%*	*Remaining recoverable gas*	*%*
2012	TPAO	16,267,954,165	63.1	12,050,635,459	59.29	3,972,681,642	58.1
	N.V. Turkse Perenco	340,680,073	1.32	340,680,073	1.68		
	Amity Oil Int. and TPAO	1,924,833,289	7.46	1,586,975,398	7.81	86,853,167	1.27
	Thrace Basin and Pinnacle Turkey Inc.	5,320,873,992	20.63	4,828,601,173	23.76	2,299,472,242	33.63
	Tiway and TPAO and Foinavon and P.O.A.Ş.	1,336,910,000	5.18	1,005,490,000	4.95	143,089,510	2.09
	TransAtlantic and Petrako and Valeura Energy	140,993,784	0.54	133,253,784	0.66	9,796,449	0.14
	Arar	240,013,267	0.93	192,013,267	0.94	190,588,584	2.79
	Tiway-TEM	161,400,000	0.62	141,600,000	0.7	135,316,297	1.98
	Petrogas	27,533,214	0.1	27,533,214	0.14	40,208	
	Amity Oil Int.	17,656,097	0.06	17,656,097	0.09	3539	
	Maya and Çalık Enerji and Petrogas	1,049,720	0.004	1,049,720	0.005		
	2012 Total	**25,779,897,601**	**99.94**	**20,325,488,185**	**100**	**6,837,841,638**	**100**
	2013 Total	**24,359,724,923**	–	**19,432,830,521**	–	**5,383,639,186**	–
	2014 Total	**23,079,577,130**	–	**18,414,676,595**	–	**3,863,376,035**	–
	2015 Total	**23,180,917,237**	–	**18,657,686,896**	–	**3,707,662,926**	–
	2016 Total	**26,206,504,365**	–	**20,480,286,172**	–	**5,148,665,260**	–
	2017 Total	**25,987,376,299**	–	**19,950,561,587**	–	**4,254,645,508**	–

Source: TPAO; PIGM

[a]Sum of proven, probable and possible reserves

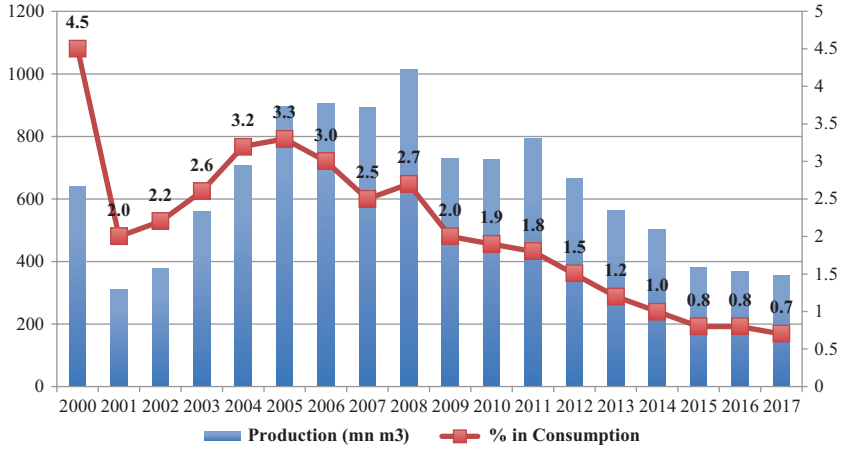


Fig. 4.3 Natural gas production in Turkey and share in consumption, 2000–2017. (Source: EMRA; TPAO)

Thanks to successfully attracted participation of international producers, some significant gas production growth was realised in Turkey[4] between 2003 and 2008 (Fig. 4.3). However, given the economic crisis and depleting fields, domestic output has been declining and has barely covered more than 2% of total demand since then.

4.4.2 Shale Gas Developments

Although the production of unconventional oil resources via horizontal drilling and hydraulic fracturing began in the 1980s, the commercially viable, large-scale unconventional gas production—deep shale gas in particular—was pioneered by the Mitchell Energy and Development Corporation in the Barnett Shale in North-Central Texas in the 1990s (EIA 2013). These sweeping changes have opened a whole new door for ambitious energy companies and the new finds of unconventional gas supplies are forecasted to transform the world's energy mix. Undeniably, the advent of developments in shale gas, inventions of necessary technologies and adequate drilling and completion equipment combined with experi-

[4] Mainly in five cities, namely Düzce, Edirne, Istanbul, Kırklareli and Tekirdağ, collectively providing 97% of the output (EMRA 2014).

enced personnel could be a game changer for countries which are not only net exporters with ample conventional resources but also for those that lack resources and fight for energy security. Turkey is clearly one of them.

The TPAO and several international companies have commenced exploration activities in shale formation in two basins, the Thrace Basin in western Turkey and the Southeast Anatolia Basin along the border with Iraq and Syria (Map. 4.1). According to the EIA's assessment of technically recoverable shale oil and shale gas resources in 41 countries outside the US, these two basins were estimated to contain a collective 164 trillion cubic feet (tcf) of risked gas in place and 23 tcf of technically recoverable shale gas resource in 2013 as illustrated below.

With a substantial volume of petroleum source rocks throughout its 6500 square miles area and reservoirs in two formations, the Thrace Basin holds 34 tcf risked gas in place and 6 tcf technically recoverable shale gas for which significant exploration works are underway by the TPAO and Canada-based TransAtlantic Petroleum (Table 4.2).

Hamitabat is the Thrace Basin's oldest, deepest and most thermally mature formation having shale in the gas window at depths of 14,000 feet to 16,400 feet in the centre. The proliferation of exploration activities by

Map 4.1 Shale gas assessment of Turkey. (Source: Stratfor (2014))

Table 4.2 Detailed tabulation of shale gas resources of Turkey, 2011–2013

	Basin	*Formation*	*Risked gas in place (tcf)*		*Technically recoverable resource (tcf)*		*Success factors*		
							Play	*Prospective area*	*Composite*
			2011	*2013*	*2011*	*2013*	*2013*	*2013*	*2013*
Turkey	Thrace	Hamitabat	14	34	4	6	60%	60%	36%
		Mezardere	7	–	2	–	60%	50%	30%
	SE Anatolian	DadaŞ	43	130	9	17	40%	60%	24%
Turkey Total			**64**	**164**	**15**	**23**			
World Total[a]			**22,016**	**31,138**	**5760**	**6634**			

Source: EIA (2011, 2013)
[a]Not including the US shale gas resources

both companies into new shale plays has increased the risked gas in place and technically recoverable shale gas resources of the basin from a respective 14 tcf and 4 tcf in 2011 to 34 tcf and 6 tcf in 2013, according to the EIA and Advanced Resources International (ARI) 2013 calculations. Mezardere has been deposited in a deltaic environment and is another thick, regionally extensive shale interval formation in the Thrace Basin after the Hamitabat. It was found, according to the EIA's 2011 investigations, that Mezardere contained 7 tcf of risked gas in place, of which approximately 2 tcf was to be technically recoverable, but as less than 2% organic content was found by the geological studies of EIA in 2013, a quantitative assessment of the formation was not made (EIA 2011, 2013).

Described by the same report as having great affinity to oil-rich Saudi Arabian and Iraqi plates, the Southeast Anatolian basin is already the chief oil-producing site of Turkey. The over-pressured DadaŞ formation is the primary source rock in the basin and contains 130 tcf of risked gas in place and 17 tcf of technically recoverable shale resources in three main reservoir wells (i.e. Göksu-#1R, Bahir-#1 and the Çalıktepe-#2). According to the EIA and TPAO estimations, the Sivas, Black Lake, Taurus, Salt Lake and the onshore portion of the Black Sea basins might also hold shale gas potential, but given the limited reservoir data on shale formations, the exact resource potential has not been assessed yet.

4.4.3 Consumption

Turkey has risen to the top ranks in global energy demand with its fast-rising natural gas demand that outpaces its trivial indigenous production by about 98.8%. It is one of the OECD's largest natural gas importer and Europe's fourth largest consumer of gas. Natural gas has been the major source of its primary energy consumption accounting for 35% followed by coal (28.5%) and oil (27%) in 2015, and Turkey consumed 53.9 bcm natural gas in 2017, almost quadruple the volume 17 years ago. The upward trend of the country's gas consumption growth noticeably slowed only twice during the 2008–2009 and 2015–2016 periods due to the global recession and mild weather conditions. As shown in Fig. 4.4, the MENR resources declare the power generation sector as Turkey's largest consumer of gas, with 38.1% of the mix, followed by industry (24.8%), residential (25.1%), service (6.9%) and other sectors (5%) in 2017.

Turkey is one of the largest electricity markets in the EU and natural gas has been the major fuel source for generation since 1987 primarily

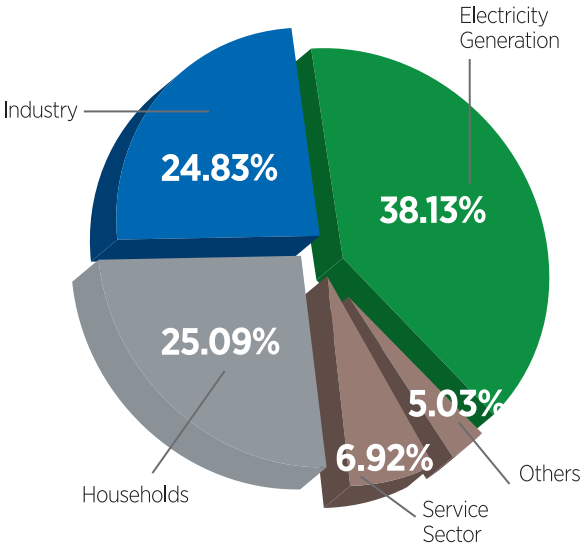


Fig. 4.4 Turkey natural gas consumption by sector, 2017. (Source: MENR)

used by the subsectors like gas-fired power plants, auto-producer power plants and auto-producer heat and power plants. Whilst natural gas made up 32.1% of the output in 2016, the volume of gas used in the above plants decreased by 5.8% compared to that of 2015. At the end of 2016, about 68% of generated electricity came from thermal power stations, whilst the contribution of hydro towards generation stood at 24.6% (MENR 2017).

According to the projections of the MENR of Turkey, a huge 96% demand growth (amounting to 500 TWh) is foreseen by 2023 (MENR 2011). The challenge for this, when considered on the basis of the country's shrinking base of its own resources and a wider range of possible sources of supply disruption, lies in developing robust supply security measures. Turkey can hardly meet half of the said demand even if all its renewable resources are fully utilised, and this may potentially place a great pressure on the government if the involvement of nuclear power in Turkey's energy mix is postponed for any reason.

Consumption of gas in the industry sector began with only 5 mcm gas in 1989 and reached billion figures (2 bcm in 1998 and 13.3 bcm in 2017). Although the sector experienced some contractions over the years

and the use of natural gas wherein markedly fell four times between 1998 and 2009, the industry sector today consumes almost quarter of Turkey's total, whilst subsectors as organised industrial zones (OIZs), iron and steel, non-metallic minerals and food and beverages dominate this consumption (with respective 28.3%, 11.4%, 12.8% and 8.1% market shares as of 2017) (EMRA 2018a) (Figs. 4.5, 4.6, 4.7, 4.8, 4.9, and 4.10).

The third strong demand anchor comes from the residential sector in Turkey and thanks to regional distributors the natural gas penetration in the sector has grown exponentially. Previously being available to six cities only, natural gas has now been converted into a better-shared prosperity for the Turkish people, and almost 15 million customers had access to gas as of November 2018. Istanbul, Ankara, Bursa, Kocaeli, Izmir, Eskişehir and Konya have the largest customer base and consume nearly 70% of Turkey's gas total (EMRA 2019). From the standpoint of the residential

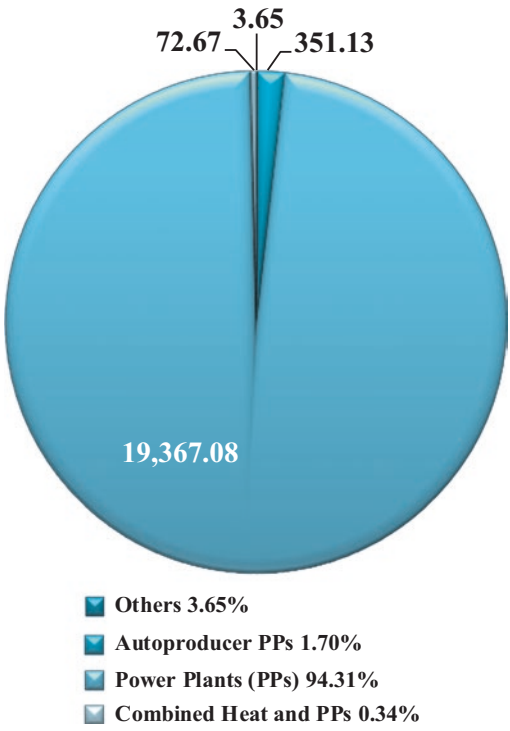


Fig. 4.5 Largest gas consumers in power generation sector, 2017

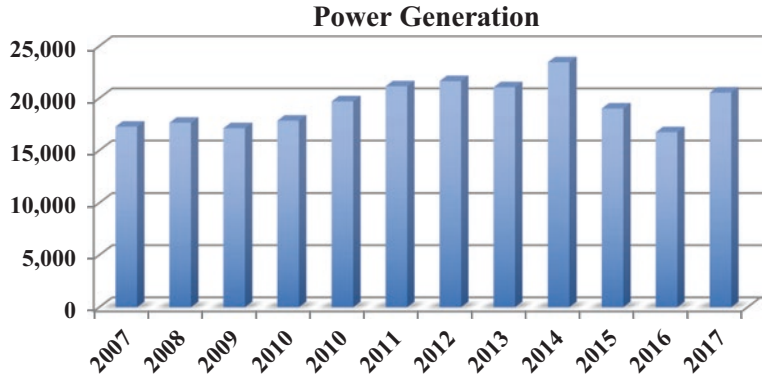
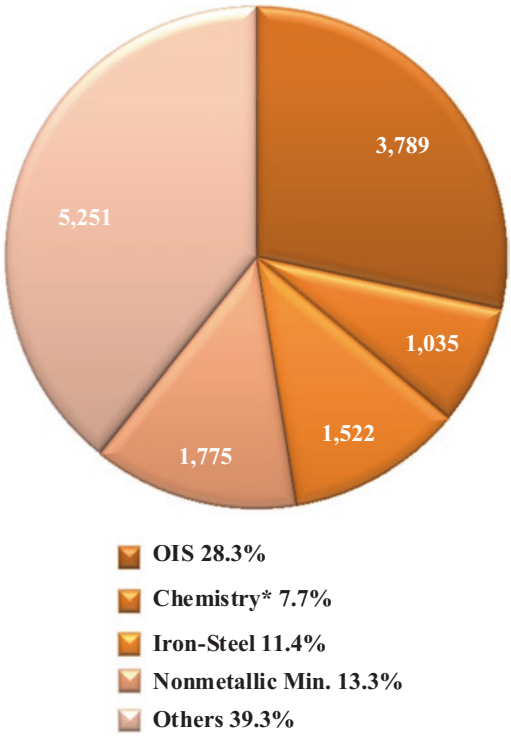


Fig. 4.6 Gas sales to power generation sector, 2017

Fig. 4.7 Largest gas consumers in industry sector, 2017



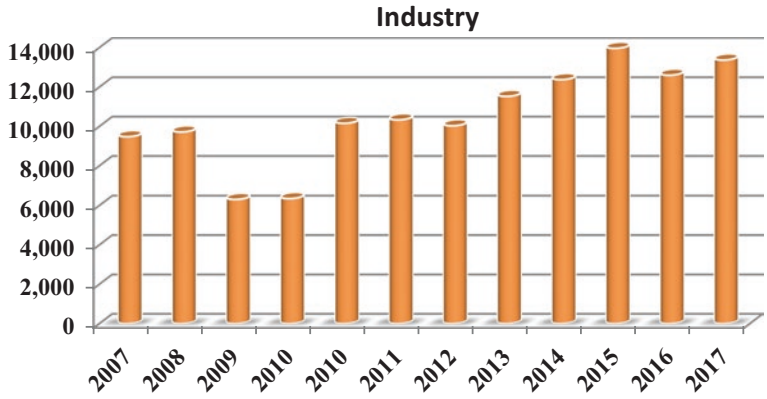
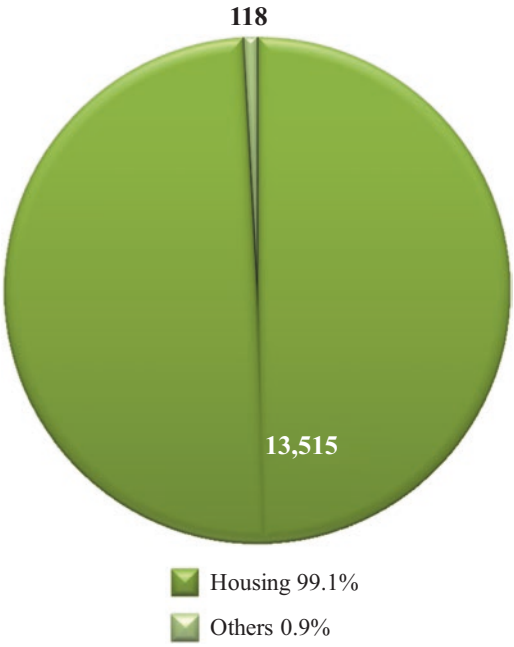


Fig. 4.8 Gas sales to industry sector, 2017 (mcm)

Fig. 4.9 Largest gas consumers in residential sector, 2017. (Source: EMRA)



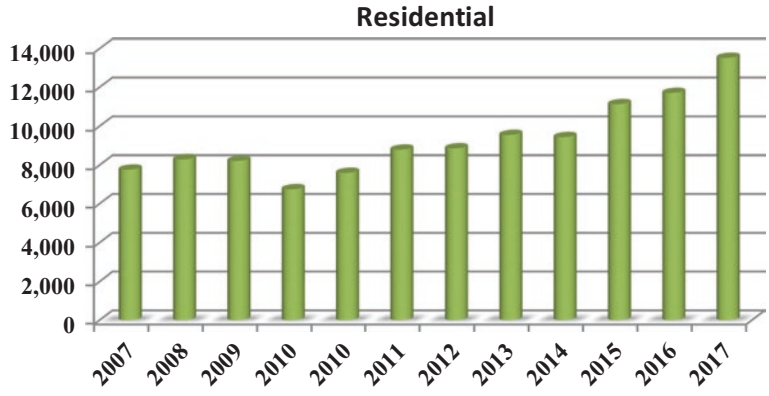


Fig. 4.10 Gas sales to residential sector, 2017 (mcm). (Source: EMRA)

consumers, the affordability of natural gas is important, and according to MENR (2017) the share of gas consumption in the minimum-wage bracket decreased from 32.2% in 2002 to 9.8% in January 2017 given the country's constantly rising GDP, as illustrated in Table 4.3.

In 2017, the service sector used 3.7 bcm natural gas which translated into 6.9% of the country's total and businesses as a subsector received the vast majority of gas (1695 mcm). Transport (i.e. vehicular fuel, pipeline transportation), energy (i.e. petroleum refineries, blast furnaces), agriculture and forestry, and stockbreeding (i.e. fisheries, poultry and cattle dealing) are the other sectors which consume natural gas at marginal levels in Turkey.

4.4.4 Imports

As almost no gas production occurs in Turkey, nearly the whole consumption is met by the natural gas production of Russia, Iran, Azerbaijan, Nigeria and Algeria. Turkey has been one of the largest importers of natural gas amongst OECD countries since 2005, and it has seven long-term import contracts with six different countries. Though initially considered as an ideal solution to air pollution mainly in big metropolitan cities, the state-owned BOTAŞ signed an agreement for Turkey's first natural gas delivery project (Western Line) with Soyusgaz Export Company of the Union of Soviet Socialist Republics (USSR) on 14 February 1986 to expand the use of natural gas even further. From the standpoint of liberalisation reforms in Turkey, natural gas importation and distribution carry a

Table 4.3 Share of natural gas consumption in minimum wage, 2002–2017

Year	*Minimum wage*	*Gas consumption*[a]	*Share of gas consumption in minimum wage*
	(TRY/Net)	*(TRY/125m³)*	*(%)*
01.01.2002	165	52.6	32.2
01.01.2003	226	48.4	21.4
01.01.2004	303	39.2	12.9
01.01.2005	350	51.2	14.6
01.01.2006	381	61.3	16.1
01.01.2007	403	76.9	19.1
01.01.2008	482	83.1	17.3
01.01.2009	527	136.3	25.8
01.01.2010	577	90.2	15.6
01.01.2011	630	90.2	14.3
01.01.2012	701	104.3	14.9
01.01.2013	773	134.9	17.4
01.01.2014	846	134.9	15.7
01.01.2015	949	146.9	15.5
01.01.2016	1301	149.1	11.5
01.01.2017	1404	137.2	9.8

Source: MENR (2017, 37)
[a]Average monthly gas use of a Turkish family is estimated at 125 m³

lot of weight and they are expected to provide an adequate foundation for transformation of the Turkish natural gas sector into a natural gas market by the third-party access given to a number of new entrants. This section of the chapter is divided into three parts, and whilst the first summarises Turkey's natural gas imports by long-term contracts, the second part reviews the LNG and spot LNG imports. The third part analyses the contract release programme initiated by the EMRA in 2004 in an effort to liberalise the industry by reducing the state's monopoly as well as encouraging the involvement of the private sector.

4.4.4.1 Imports by Long-Term Contracts

As demand for natural gas is set to continue domestically, Turkey signed two more agreements with Russia in 1997 and 1998, and delivery of an additional 4 bcm and 16 bcm gas through 1261 km transmission pipelines to Turkey was secured. Although the Turkish imports of Russian natural gas have been and still are the biggest, BOTAŞ continued to sign further natural gas purchase agreements with Iran in 1996, Turkmenistan in 1999 and Azerbaijan in 2001 and 2011 (Table 4.4).

Table 4.4 BOTAŞ' existing import contracts

Contract	*Volume (Bcm, plateau)*	*Date of signature*	*Date of operation*	*Length (years)*	*Expiration date*	*Status*
Russia (Western)	6	1986	1987	25	2012	Terminated[b]
Russia (Western)	8[a]	1998	1998	23	2021	In Operation
Russia (Blue Stream)	16	1997	2003	25	2025	In Operation
Iran	10	1996	2001	25	2026	In Operation
Turkmenistan	16	1999	Pending	30	–	–
Azerbaijan(Ph-I)	6.6	2001	2006	15	2021	In Operation
Azerbaijan(Ph-II)	6	2011	2017	15	2032/2033	In Operation
Azerbaijan(BIL)	0.15	2011	2011	35	2046	In Operation
Algeria (LNG)	4	1988	1994	20	2024	Renewed
Nigeria (LNG)	1.2	1995	1999	22	2021	In Operation

Source: BOTAŞ
[a]Half of this import was transferred to private companies
[b]Contract was renewed in 2012 and private companies took it over

Natural gas from Iran is imported via a 1491 km pipeline and transported to Doğubeyazıt compressor station. The agreement signed between BOTAŞ and the National Iranian Gas Exporting Company (NIGEC) on 8 August 1996 secured the delivery of a peak capacity of 10 bcm natural gas per annum for 25 years with the first delivery realisation in 2001. Despite the previous and ongoing disputes over gas disruptions and prices between the two countries, there are several natural gas projects the governments of Iran and Turkey have been examining since 2007. Such as the involvement of the TPAO in the development of the South Pars gas field and constructing a US$15 billion gas pipeline to deliver Iranian gas to Europe since Turkey, besides its import undertakings, poses a strategic export route for Iran's future production to the West. Perhaps this project, along with a few others discussed between the two countries, could not only finally realise the prolonged expectation of Iran to become a major exporter as it has somehow become a net importer despite its own massive resource endowment since 1997 (Jalilvand 2013) but also highlight the importance of Turkey's strategic position between those energy-rich and energy-seeking regions.

In practice, Azerbaijan is within pipeline reach to eastern Turkey through Georgia and Armenia, and BOTAŞ has been importing a contracted 6.6 bcm gas from the State Oil Company of Azerbaijan Republic

(SOCAR) since 2007. The 15-year-long contract signed in 2001 was followed by two more agreements for the additional import of 0.15 bcm and 6 bcm gas in 2011, the latter of which being the actualisation of the second phase of the 2001 agreement, whilst the former took effect immediately. Altogether Azerbaijan accounted for 10.8% of the total Turkey natural gas imports between 2007 and 2017, providing the country with an annual average of 4.7 bcm gas during that time scale. As little as 0.75 bcm of Turkish imports of Azerbaijani gas is re-exported to Greece via the Turkey-Greece interconnector. However, Turkey and Azerbaijan are keen to shift their collaboration on energy affairs to a new level and a sizable volume (16 bcm) of Azerbaijani natural gas will be transported to Italy via the combination of a 1850 km Trans-Anatolian Natural Gas Pipeline (TANAP[5]) running from the Georgia-Turkey border to the Turkey-Greece border, and Trans-Adriatic Pipeline (TAP[6]) to link TANAP from Greece to Albania and Italy from 2019.

Turkey also has natural gas sales and purchase agreement signed with Turkmenistan in 1999 for the delivery of an annual 16 bcm gas with plans to gradually increase the amount to 30 bcm, 14 bcm of which is to be sold to Europe via an infrastructure across the Caspian Sea and Azerbaijan. However, this agreement was never implemented (Table 4.5; Map 4.2).

As previously stated, Russia and Iran are Turkey's biggest natural gas suppliers of piped gas, although this is expected to decline in the next decade because of the increased interest of the Turkish authorities in diversifying the supply sources with cheaper alternatives as well as the emergence of spot LNG to the country.

4.4.4.2 Imports of LNG and Spot LNG

As Turkey has gone on diversifying its gas sources over the past 20 years so as to secure more gas to meet its markedly growing domestic demand, Algeria and Nigeria were added to the list of its gas import destinations in the form of LNG. Turkey's LNG supply is met by BOTAŞ' purchase through two long-term contracts with Algeria and Nigeria since August 1994 and August 1999, respectively. Its first source of LNG, Algeria, has undertaken a delivery of 4 bcm/yr LNG to Turkey and supplied about

[5] Shares of companies in TANAP: SOCAR 51%, BOTAŞ 30%, BP 12% and SOCAR Turkey 7%.

[6] Shares of companies in TAP: BP 20%, SOCAR 20%, Snam S.p.A. 20%, Fluxys 19%, Enagás 16% and Axpo 5%.

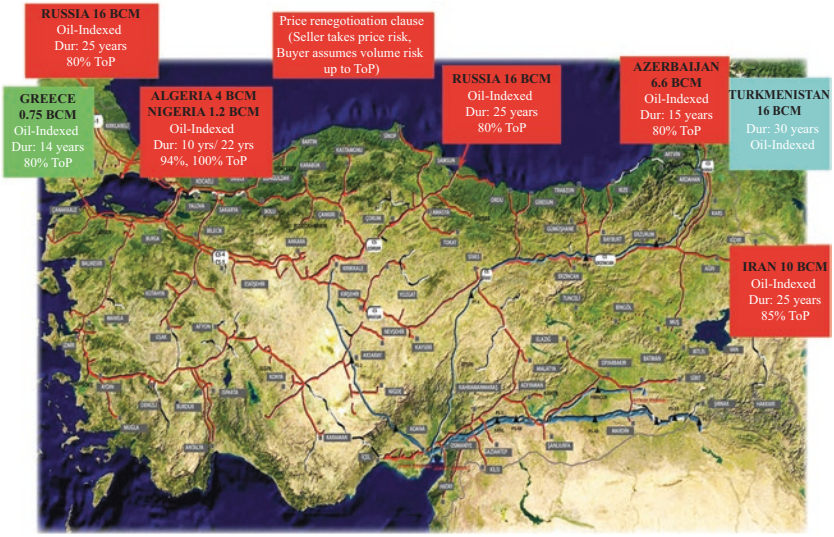
Table 4.5 Natural gas imports to Turkey by pipeline and LNG, 2000–2017

	From						
	Pipeline (bcm)			*LNG (bcm)*			
Years	***Russia***	***Iran***	***Azerbaijan***	***Algeria***	***Nigeria***	***Spot LNG***	***Total imports***
2000	10.08	–	–	3.59	0.70	–	14.37
2001	10.93	0.11	–	3.63	1.20	–	15.87
2002	11.57	0.66	–	3.72	1.13	–	17.08
2003	12.46	3.46	–	3.80	1.11	–	20.82
2004	14.10	3.50	–	3.18	1.02	–	21.80
2005	17.52	4.25	–	3.79	1.01	–	26.57
2006	19.32	5.59	–	4.13	1.10	0.08	30.22
2007	22.76	6.05	1.26	4.21	1.40	0.17	35.84
2008	23.16	4.11	4.58	4.15	1.02	0.33	37.35
2009	19.47	5.25	4.96	4.49	0.90	0.78	35.86
2010	17.58	7.77	4.52	3.91	1.19	3.08	38.04
2011	25.41	8.19	3.81	4.16	1.25	1.07	43.87
2012	26.49	8.22	3.35	4.08	1.32	2.46	45.92
2013	26.21	8.73	4.25	3.92	1.27	0.89	45.27
2014	26.98	8.93	6.07	4.18	1.41	1.69	49.17
2015	26.78	7.82	6.17	3.91	1.24	2.49	48.43
2016	24.54	7.71	6.48	4.28	1.22	2.12	46.35
2017	28.69	9.25	6.54	4.62	1.34	4.80	55.25
Total	**364.05**	**99.60**	**51.99**	**71.72**	**20.83**	**19.97**	**628.083**

Source: EMRA

11.4% of Turkish imports between 2000 and 2017, whilst an annual 1.2 bcm Nigerian gas covered 3.3% of the total imports during the same period (Table 4.6).

Being exposed to several gas supply disruptions that caused costly market imbalances during the last decade, Turkey has been considering diversifying its contracts in other LNG ventures. It has already started to take advantage of gas developments in Qatar, Egypt and Norway and signed a number of short-term agreements with them. BOTAŞ' exclusivity in the spot LNG trade ended in 2009 with the involvement of EgeGaz A.Ş. in the sector. Two companies aggregately imported 781 mcm gas in 2009 where BOTAŞ' share accounted for 91.5%. The share of EgeGaz imports is fluctuating though, and according to the EMRA (2018a) report EgeGaz provided approximately 37.66% and 10.76% of Turkey's spot LNG volumes in 2010 and 2017, respectively.



Map 4.2 Turkey's import (and export) destinations. (Source: BOTAŞ; Interview Data)

Table 4.6 Projected contracts to be transferred via gas release programme

Contract/Country	*Exporter company*	*Contracted volume (bcm/a)*	*Volume to be released (bcm/a)*	*Equivalent lots to be released (lot/250 mcm)*
Russia (West)	Gazexport	6	3	12
Russia (West)	Gazexport	8	4	16
Russia (Blue Stream)	Gazexport	16	3	12
Iran	NIGC	10	3.5	14
Algeria (LNG)	Sonatrach	4	2	8
Nigeria (LNG)	NLNG	1.2	0.5	2
Total			**16**	**64**

Source: Akçollu (2006)

To date, the total number of companies (inclusive of private) granted licences to import spot LNG in Turkey is 41, rising from 18 in 2010, but apart from BOTAŞ and EgeGaz spot LNG imports are not undertaken by these licensees. Whilst a small number of them prefer wholesaling the imported LNG domestically, the rest are not active at all. The spot LNG

imports have been following an evenly fluctuating path since 2009, and 65.6% of LNG imports came from Qatar, Nigeria and Norway, whilst the US, Trinidad and Tobago, and other countries provided 15.98, 8.73% and 9.7%, respectively, of the supplies in 2017 (EMRA 2018a) (Fig. 4.11).

Between 2000 and 2017, Turkey imported an accumulative 628.087 bcm natural gas from various countries and about 55.25 bcm of which (including LNG and spot LNG) constituted the share for 2017. Russia's contribution out of that total was 28.69 bcm (51.9%), which was the highest of that year, and was followed by the second largest supplier Iran with 9.25 bcm (15.86%) gas sent to the country. Azerbaijan and Nigeria stood out as the smallest contributors to Turkey's supplies with 11.9% (51.99 bcm) and 2.4% (20.83 bcm), respectively, in terms of piped gas and LNG. Turkey's long-term LNG supplier since 1994, Algeria sent 71.72 bcm (11.42%) gas during the same period.

Apart from Qatar and Norway, destinations for the spot LNG to Turkey have been changing since 2015. Whilst the two have remained Turkey's stable spot LNG provider so far, countries like Nigeria, Trinidad and Tobago, the US and Equatorial Guinea have become the new suppliers (Fig. 4.12).

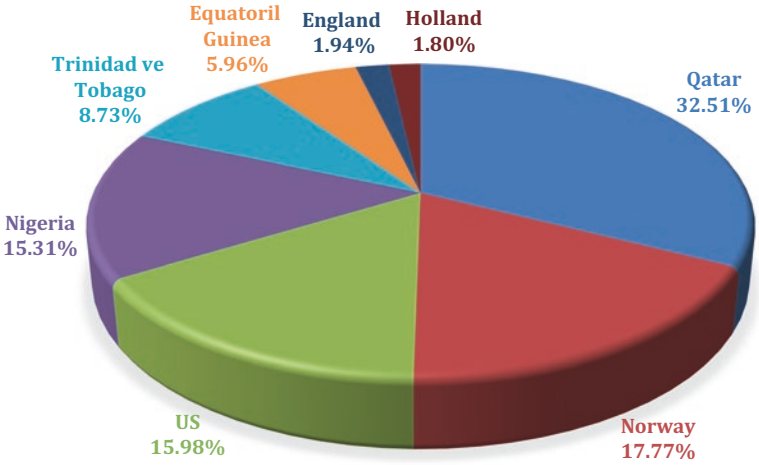


Fig. 4.11 Turkey natural gas imports and destinations, 2017. (Source: EMRA (2018a, 15))

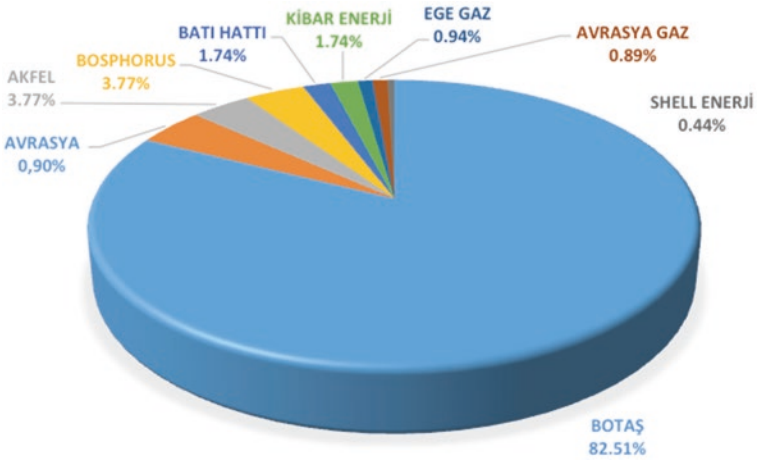


Fig. 4.12 Share of companies in overall gas imports into Turkey, 2017. (Source: EMRA (2018a, 10))

4.4.4.3 Gas Release Programme

Theoretically, the Natural Gas Market Law (NGML) of Turkey has had a strict requirement to lower the market share of BOTAŞ by 2009 so as to liberalise the gas industry by shifting the state's monopolistic position. To be specific, the law required BOTAŞ to meet an aggressively reduced market share from 100% to 20% by 2009—by transferring 10% share of its import obligations to other market players per year commencing from 2002—as a means to trigger competition in the natural gas industry. However, this has never been met.

This being the case, a "Gas Release Programme" or "Contract Transfer" was initiated by the EMRA in 2004 as a step to private participation in the gas sector, and the primary aim was to transfer the exclusive importation rights of BOTAŞ to private entities. According to the implementation model contemplated for the programme, BOTAŞ was to guarantee non-discriminatory public access to all interested parties by auctioning up to 41% of its gas undertakings[7] per annum. That translated into 16 bcm of

[7] The programme comprised the import contracts with Russia (Western 1, Western 2, Blue Stream), Iran, Algeria and Nigeria. The contracts with Azerbaijan (6.6 bcm), Turkmenistan (16 bcm) and spot LNG were excluded.

gas to be auctioned and accordingly the first tender was arranged to be based on lots (each totalled 250 mcm/pa and applicable to a minimum US$500,000 contract transfer fee).

According to its proponents, contract transfers allow marketers to enter new markets where the situation is simply "no competition" but of course there might still remain a widespread reluctance to consider such programmes as a solution to certain sectors at all, as in Turkey. For example, incensed by the dilatory and reluctant proceedings of BOTAŞ towards the contract transfers—which was primarily due to the imbedded complications such as the confidentiality clauses making the contract details non-seeable by the third parties and having some contracts with debt service issues—the energy market regulator fined BOTAŞ and having already postponed tenders four times, it finally took place on 30 November 2005 after much heated debates (Akçollu 2006). The participating parties were allowed to make appropriate preparations, especially in getting the preliminary Seller's Consent Protocol (SCP) from the respective export companies on a lot basis and the Import License Qualification Document (ILQD), which is required to be obtained from both foreign suppliers and the EMRA (for many, these specific requirements were intentionally stipulated to raise extra difficulties in the process). Out of 40, 37 companies were found eligible for the tender and the final four bid for a total 4 bcm gas contract with Russia, whilst for the Iranian, Algerian and Nigerian contracts no valid interest was shown[8] (Akçollu 2006; IEA 2009). Consequently, BOTAŞ conducted the contract transfer of 50% of the gas imports from Russia (Western-2) and the highest bidders Shell Energy A.Ş. (with US$2.01 million per lot), Bosphorus Gaz Corporation A.Ş. (US$1.81 million/lot), Enerco Enerji Sanayi ve Ticaret A.Ş. (US$1.6 million/lot) and Avrasya Gaz A.Ş. (US$0.91 million/lot), respectively, won 1, 3, 10 and 2 lots (BOTAŞ 2010; Sabah 2006). Shell being the first company to obtain the tripartite agreement "Deed of Assignment (DoA)" between the seller, the purchaser and BOTAŞ started its operations in December 2007 followed by Bosphorus Gaz in January 2009, and Enerco and Avrasya Gaz in April 2009 (Akçollu 2006; BOTAŞ 2010, 2011).

[8] Since the bidders failed to obtain the preliminary SCPs from the respective foreign suppliers, bids made towards the contracts with Iran, Nigeria and Algeria were deemed invalid, whilst the lots went out to tender as part of Russia (West-1) contract received no bids at all (Peker et al. 2007).

The identical action sets another auction for the transfer of another BOTAŞ-Russia Contract (Blue Stream) for 6 bcm (24 lots) natural gas was scheduled on 8 September 2011. Due to Russia's refusal to provide SCPs to potential bidders—ironically justifying this choice by reference to the "impossibility of the transfer of an intergovernmental contract[9]"—no desirable outcome was reached and the tender was nullified (Deloitte 2012). Coinciding with the expiration of Turkey's oldest gas contract with Russia in 2012, private companies expressed their interest again to take-over and renew that contract at the invitation of BOTAŞ. Amongst 13 vetted and assessed applications, only 4 private entities (i.e. Kibar Enerji, Bosphorus Gas, Akfel Gaz, Batı Hattı) submitted a gas purchase agreement signed with Russia and entered the market with actual imports to start from 2013 (Table 4.7).

A large body of literature discusses that gas release programmes, should they remain in place for a sufficiently long time, could be useful in ensuring that appropriate conditions and even market structures are shifted and elaborated, so that a sustainable level of competition can be promoted (Bartok et al. 2006). In this manner, durations for both gas release programmes in Turkey were set for 15 and 30 years, respectively.

Table 4.7 Materialised contract transfers to private companies (bcm/a)

	Start	*Expiry*	*Private company*	*Import destination*	*Import amount*
Gas release programme 1	12.07.2007	12.07.2022	Shell Energy	Russia (West2)	0.25
	18.10.2007	18.10.2022	Bosphorus Gas	Russia (West2)	0.75
	31.12.2008	31.12.2022	Enerco Enerji	Russia (West2)	2.5
	26.02.2009	26.02.2022	Avrasya Gaz	Russia (West2)	0.5
				Total	**4 bcm**
Gas release programme 2	26.11.2012	26.11.2042	Kibar Enerji	Russia (West1)	1
	26.11.2012	26.11.2042	Bosphorus Gas	Russia (West1)	2
	26.11.2012	26.11.2042	Akfel Gaz	Russia (West1)	2.25
	26.11.2012	26.11.2035	Batı Hattı A.Ş.	Russia (West1)	1
				Total	**6 bcm**

Source: EMRA

[9] The prior contract transfer was made based on the fact that the gas purchaser of the contract was not directly BOTAŞ but instead a private company called "Gama Gazprom" (the name of which was later changed to Turusgaz Taahhüt, Pazarlama ve Ticaret A.Ş.) in which BOTAŞ involvement was by 35% equity (Altunsoy 2011).

To date, as shown in Fig. 4.12, about 18% of Turkey's natural gas imports have been opened to private entities through gas release programmes. Although BOTAŞ has reduced the competition concerns of many onlookers at home and abroad, it has obviously failed to fully meet the provisions of the 2001 Law.

4.4.5 Distribution

Prior to 2001, there were seven distribution companies (all either municipality, BOTAŞ or privately owned) supplying natural gas to seven million customers in six major cities in Turkey through a TRY6 billion network (EMRA 2010). In order to satisfy the forecast demand and insure security of supply domestically, both the 2001 Law and relevant secondary legislation outlined a roadmap for introducing competition for the retail distribution segment of the gas industry and obliged the EMRA to prepare regional distribution tenders from 2003 onwards. Since, the authorisations have been granted to winners via a competitive bidding process for the construction, enhancement and operations of distribution networks in regions wherein no access to natural gas exists. Today, the distribution of natural gas in almost all of Turkey is performed by regional monopolies and city gas companies each supplying gas to customers within a franchised service area through its own distribution lines. In order to bring about the curtailment of the exercise of monopoly power, the Turkish government planned to introduce competition for the market in phases and decided firstly to remove BOTAŞ from the distribution business by privatising BURSAGAZ and ESGAZ in 2003, and set the timetable for the privatisation of other four municipality-owned companies,[10] given that all the external debts backed by the Treasury are cleared.

In 2003, the EMRA initiated the exclusive grants of franchise on a regional basis and commenced the tendering process for natural gas distributions in concert with the 2001 Law and the Distribution and Customer Services Regulation. There are 72 tenders that have been concluded to date (Table 4.8), and some of the terms a standard tender file covers include the designated region to be distributed; licence duration; a one-

[10] The privatisation of IGDAŞ was not realised as of 2019, and it still belonged to Istanbul Metropolitan Municipality, whilst the Privatisation Administration finalised the sale of 90% shares of AGDAŞ in 2003, 100% Başkentgaz (formerly EGO) in return of US$1.162 billion in 2013 and 90% IZGAZ for US$232 million in 2009.

Table 4.8 Distribution companies established before and after the 2001 Law

Natural Gas–Distributed Regions Before the 2001 Law				
	Region	**Distributor company**[a]	**Date of operation**	**Nb**
	Ankara	EGO (municipality)	1988	1
	Bursa	BURSAGAZ (BOTAŞ)	1992	1
	Istanbul	IGDAŞ (municipality)	1992	1
	BahçeŞehirgaz	(Nurol-Mesa-Suzer-TOKI)	1994	1
	Eskişehir	ESGAZ (BOTAŞ)	1996	1
	Izmit	IZGAZ (municipality)	1996	1
	Adapazarı	AGDAŞ (municipality)	2002	1
Total				7
Distribution Tenders and Licences Given After the 2001 Law (as of 2018)				
	Tenders concluded (72)			
	Licenses given for distribution regions (72)			
	Gasified cities			71
	Cities to be gasified			3[b]
Total				74
Grand Total				**81**

Source: EMRA (2018a)
[a]Parent companies are given in parentheses
[b]Artvin, Hakkari, Şırnak

off consumer connection fee (CCF) to be charged; core services and rights the winner company will have to agree to provide to both customers and the municipality (i.e. a free 10% ownership and representation in the board of directors and board of auditors, and an additional 10% share upon a negotiated price should be requested by the municipality without the Treasury backup); thresholds for eligible customers; a timetable for required investment and the provisions of equipment and quality standards; and, lastly, the Unit Service and Depreciation Charge (USDC) for supplying 1 kWh natural gas to consumers (¢/kwh) which are individually determined for each distribution zone; and a fixed term the USDC are to be effective for (NGML 2001 Art. 4/4g; Reg. 24925 Art. 10, 12, 21). In addition to investment plans and quality and safety standards, the considerations of the tenders chiefly revolve around the best financial terms (i.e. the USDCs) proposed by the bidders, and subsequently, the lowest three offers get shortlisted. Those three then compete against each other (the so-called Dutch auction) until the bidders' minimum acceptable price is reached, and henceforth, the lowest offer wins as articulated in Regulation of Distribution and Customer Services Article 12. Natural gas distribution

licences which give companies the exclusive right within the franchised area to construct, operate and maintain the gas distribution system (together with the right to use portions of roads, rights-of-way, and other lands owned, controlled or managed by the respective municipality) are granted to franchisees for a standard term of 30 years according to the latest version of the 2001 Law and the respective Regulations. After several amendments over the years, the terms and conditions for obtaining exclusive distribution franchises rested on stringent conditions (Table 4.9):

The franchisees are allowed to sell or transfer their distribution network (as a whole) to a third party before the expiration of their licences (subject to the EMRA approval) insofar as the new purchaser is technically and financially eligible to be granted a new licence and agrees to all the terms and conditions of the agreement the seller had with the municipality. Lastly, in the event termination of an agreement becomes inevitable, a new tender is prepared by the EMRA pursuant to the terms of the terminated agreement inclusive of the predetermined USDC as the price-ceiling (NGML 2001 Art. 4/4g; Reg. No. 24925 Art. 31, 32). The latest amend-

Table 4.9 Procedure for distribution franchise in Turkey

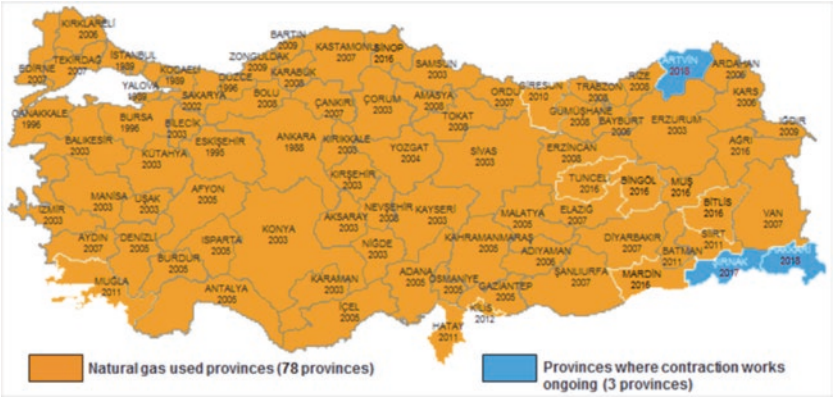
- The company bears the full responsibility for the natural gas distribution system and starts investments within 6 months.
- The company starts the first natural gas delivery within 18 months and finishes the supply coverage of the entire franchised area within 5 years.
- The company establishes a dispatch control center for the distribution grids unless determined by the EMRA Board otherwise due to lack of capacity.
- The company ensures all services provided pursuant to the tender agreement are in accordance with the tariffs specified and monitored by the EMRA (subject to price-cap regulation)
- The company obtains infrastructure information system and/or ISO 9001 quality management systems and/or ISO 14001 environmental management system within 18 months.
- BOTAŞ connects the distributor's franchised region to the transmission grid not later than 12 months from the effective date of the auction.
- The company is obliged to connect any customer residing in its franchised area given that they comply with technical criteria set out by the EMRA. In the event of refusal to connect, the case is submitted to the EMRA for determination and the Board may order the connection of the refused party.
- The company gives written notice to the EMRA not less than 12 months prior to the expiration of the license term regarding its intention to negotiate renewal of the franchise agreement. The EMRA prepares a new tender otherwise.

Source: EMRA

ment to the 2001 Law (Official Gazette No. 24390 Art. 114 dated 10 September 2014) authorises a joint corporation by the provincial special administration and the municipalities to perform the distribution activities in cities where tenders are offered three times with no interest at presence.

Turkey is an example of a country that has had a sufficient pipeline network constructed through franchise auctions executed by the EMRA since 2003. Turkey's natural gas distribution networks have extended over 93,000 km with total investment of TRY15.1 billion (excl. VAT), almost triple the amount compared to that of TRY5.8 billion made towards the seven distribution regions before the 2001 Law (EMRA 2018a). Turkey's distribution network has 318 entry points, 47 of which are being operated by BOTAŞ and 271 by private companies (IEA 2016, 113). To date, there are over 60 companies, joint ventures and other entities that distribute natural gas throughout Turkey some of which (e.g. Aksa Gaz Dağıtım A.Ş., Enerya Gaz Dağıtım A.Ş. and Akmercan Group) holding distribution licences for up to 20 regions. Between 2003 and 2017, the number of gasified cities increased from 7 to 78 (out of 81), whilst for three cities the tenders have concluded and winner companies are currently working towards completion of the respective networks for early 2019 (Map 4.3).

As can be seen in Table 4.10, the USDCs seem to be the only revenue coming from gas sales for licensed distributors, whilst the transportation charge comes from gas dispatch to eligible customers who would rather buy natural gas from other suppliers. There existed a one-off CCF, deter-



Map 4.3 Natural gas distribution in Turkey. (Source: BOTAŞ)

Table 4.10 Natural gas tariffs breakdown for residential customers

			VAT (18%)	**Gas Price for Residential Customers**
		USDC	Revenue of Distribution Companies	
	Special Consumption Tax (Fixed*)	Purchase Price Paid by Distribution Companies		
Profit Margin of BOTAŞ	BOTAŞ' Gas Selling Price to Distribution Companies			
Storage Cost				
Transmission Cost				
Gas Import Cost				

Source: Erdoğdu (2009, 33)

[a]SCT for natural gas is fixed at TRY0.023/m^3

mined at the discretion of bidder companies during the tender process, and was limited to be no more than 10% of the actual cost of connection for customers which used natural gas for production such as industrial (Deloitte 2012). However, this rule is no longer in use.

The lion's share of prices being paid by customers goes to BOTAŞ and VAT components, whilst the USDCs differ from one region to another depending on whether or not they are distributed with gas before 2003. The USDCs for the regions distributed before 2003 were ranged from 3.6% to 9.7% and after 2003 from 0% to 4.5% as of October 2008. Despite the fact that what the margin distribution companies are entitled to is subject to a price-cap (which according to sector representatives does not help especially in the regions operated with high turnovers and should be covered by an additional margin to prevent distributors from falling prey to retail sales risks), there has been fierce competition for the franchise of certain regions that resulted in bids with zero USDCs (e.g. in Antalya, Elazığ and Gaziantep the asking CCF were as little as US$5–30, whilst the most striking bid "zero USDC + zero CCF" was made for the Edirne, Tekirdağ and Kırklareli region by Trakya Bölgesi Doğal Gaz Dağıtım A.Ş. on top of TRY2.5 million guaranteed payment to be made by the bidder (Erdoğdu 2009)). In reality, because the said region hosts most of Turkey's production fields and the winner company would be eligible to buy its gas directly from those producers whose prices were about 10% cheaper than that of the BOTAŞ', this very fact thus probably provides a partial justification for why the bidder decided to abandon a profit of upto 4.5% (via the USDC) and the connection fee.

The existence of such a possibility that any company accepting to invest into infrastructure and to supply gas in return for no cost recovery nor any profit for the first eight years obviously raises the issue of what brings companies to these almost charitable acts, as Erdoğdu (2009) rightly argues. His perturbation was noticeable, and hallmarks of his arguments highlighted that the companies did either (i) expect huge profits after the initial eight years so they took the risk; or (ii) planned to import gas themselves in the future so they could make a big profit by removing the middle man; or (iii) the connection fees they were to charge was alone enough to cover the investment and ensure they survived for the initial period; and, finally, (iv) it was the large industrial companies colluding and bidding "0" together to provide the asking investment which was reportedly cheaper for them to pay the USDC to another company (ibid, 17).

Long time has passed since Erdoğdu's article, and no study has been published since to critically analyse how the distributors have thus far progressed with their activities and what their latent motives actually were in entering the business. It is now known that the tenders have rigorously continued since 2009 and in the current picture of distribution market today, some old tenders cancelled or renewed or transferred to other companies and nine new regions have access to natural gas together with some foreign companies joint ventured with local distribution companies. At the time of writing, 62 companies had come to the end of their first eight-year fixed-tariff period and are now charging their customers at regulated tariffs under oversight of the EMRA (Fig. 4.13).

It was pointed out in many EU documents that via market opening EU customers would reap the benefit of lower domestic bills for electricity and natural gas. In the case of Turkey, the latest analysis of Okan Yardımcı, an energy expert on tariffs applications from the EMRA, can be helpful to see how natural gas tariffs have changed since 2011, or as soon as the distribution companies stopped charging their customers the fixed tariffs. Figure 4.14 illustrates that the distribution tariffs, which were kept stable for eight years,[11] are increasing for all regions, and with almost 0.8 cent/kWh growth, Afyonkarahisar has realised the strongest increase. This is important since it could be a partial answer to the discussions of Erdoğdu (2009), who questioned the charitable acts of some companies that bid zero USDCs for cities like Afyonkarahisar during the tendering process

[11] Eight-year fixed-tariff period did not apply to Istanbul, Ankara, Bursa, Eskişehir, Adapazarı and Izmit regions.

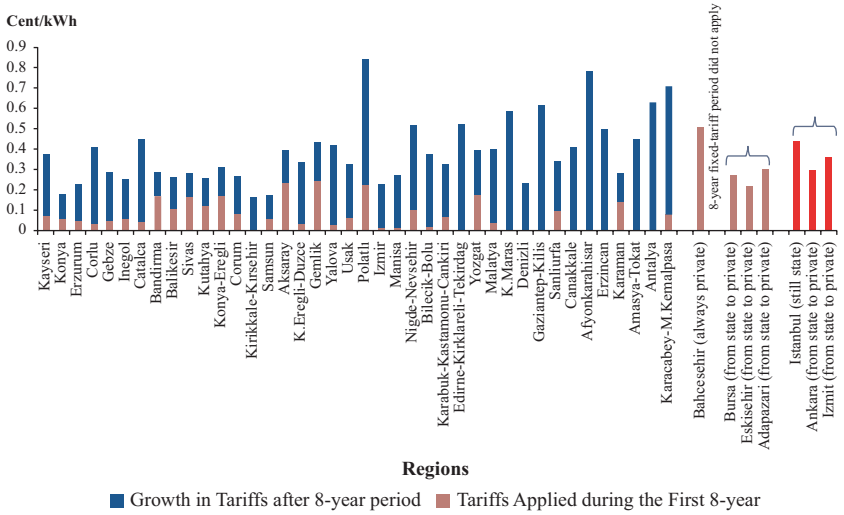


Fig. 4.13 Natural gas distribution tariffs before and after eight-year fixed-tariff period (as of September 2015). (Source: Yardımcı (2015a))

and the likelihood of their high-profit expectations for a post-fixed-tariff period. Other "zero bidden" cities have also shown some tariff growth to date, although not as much, for example, Denizli 0.25 cent/kWh, Amasya-Tokat 0.45 cent/kWh and Edirne-Tekirdağ-Kırklareli 0.5 cent/kWh. When compared with regions with private distribution companies, surprisingly a lower growth rate of the country's only state-owned region, Istanbul, is notable. This is indicative of the need for cooperation between the EMRA and distribution companies in Turkey that should develop in all crucial areas, particularly in tariff regulations, investments and service efficiency since the idea is to give due protection to end users during and after the liberalisation of energy markets.

4.4.6 Exports

Albeit small at international levels, Turkey's BOTAŞ and Greece's public gas corporation DEPA have a long-term ToP contract signed on 23 December 2003 for the exportation of 750 mcm gas from Turkey to Greece. Turkey is one of the three piped gas suppliers of Greece along

with Algeria and Russia, and provides about 23% of the country's supplies (IEA 2011). The gas BOTAŞ exports are sourced by Azerbaijan's Şah Deniz field,[12] and it is considered to be the formation of the "South European Gas Ring" project of the EU, which has started with interconnecting the gas grids of Turkey and Greece and is subsequently expected to pave the way for the delivery of Caspian gas supplies to Italy and other European countries via soon-to-be-built infrastructure (Akçollu 2006).

There have also been some negotiations between BOTAŞ and Bulgargaz for the construction of a new Turkey-Bulgaria pipeline to link Bulgaria's gas compressor station in Lozenets to both Turkey's LNG terminals (Giamouridis and Paleoyannis 2011). Whilst this, in practice, is legally possible on Turkish grounds and provides Bulgaria with an access gain to short-distanced gas supplies (for which Bulgaria has been rigorously striving in particular to lessen its reliance on Russian supplies since the Russia-Ukraine crisis of 2009), the ambition Turkey harbours is a broader one in view of becoming an energy hub in the near future. Against this backdrop, the EMRA started issuing export licences to private companies as well, and the number of licensees has reached 15 between 2010 and 2019 with destinations pooling around Greece, Macedonia and Bulgaria (Table 4.11).

4.4.7 Storage

In terms of procurement of natural gas especially for countries like Turkey—which is utterly dependent on external sources via long-term ToP contracts that oblige the country to pay penalties for any amount of contracted gas it claimed responsibility for yet cannot take—storage facilities play a crucial role in natural gas markets. By importing gas at substantial amounts, Turkey remains highly vulnerable in politically sensitive situations and permutations of various supply disruptions and thus needs to provide flexibility, reliability and a timely response to seasonal imbalances of natural gas supply and demand through adequate storage facilities.

Presently, Turkey suffers from a lack of storage in terms of both underground storage (UGS) and LNG terminals, although with coming into operation of Etki and BOTAŞ Dörtyol FSRU LNG terminals, and BOTAŞ Tuz Gölü UGS, between 2016 and 2018, the country's capacity of gas and

[12] Only the import agreement Turkey has with Azerbaijan allows the re-exportation of imported gas (unless in the form of LNG) within an added destination clause.

Table 4.11 Natural gas exporters in Turkey and destinations

Licence status	*Start date*	*Finish date*	*Licensee*	*Destination*
Active	30.05.2019	30.05.2049	Gazport Doğalgaz Top. Sat. Tic. ve San. A.Ş.	Macedonia
Active	21.02.2019	21.02.2049	Aygaz Doğal Gaz Top. Sat. A.Ş.	Greece
Active	21.02.2019	21.02.2039	Batı Hattı Doğalgaz Tic. A.Ş.	Greece
Active	24.01.2019	24.01.2049	Global Gas Trans Enerji San. ve Tic. A.Ş.	Bulgaria
Active	13.12.2018	13.12.2048	Enerjisa Doğal Gaz Top. Sat. A.Ş.	Greece
Active	06.12.2018	06.12.2048	Doğal Enerji İthalat A.Ş.	Greece
Active	24.05.2018	24.05.2048	Engie Enerji Tic. ve Paz. A.Ş.	Greece
Active	06.04.2014	06.04.2024	BOTAŞ	Greece
Active	13.03.2014	13.03.2044	Socar Turkey LNG Satış A.Ş.	Greece
Active	12.12.2013	12.12.2043	Gunvor Enerji A.Ş.	Greece
Active	01.08.2013	01.08.2043	Türkerler İnş. Tur. Mad. Enerji Ür. Tic. ve San. A.Ş.	Greece
Active	22.03.2012	22.03.2042	Tmak Natural Gas İhr. Tic. Ltd.	Macedonia
Active	11.11.2010	11.11.2040	Ege Gaz A.Ş.	Greece
Active	27.10.2010	27.10.2040	Liquefied Natural Gas İhr. Tic. Ltd.	Greece
Active	08.04.2010	08.04.2040	Setgaz Doğalgaz İth. İhr. ve Toptan Satış A.Ş.	Bulgaria

Source: EMRA

amount of stock increased rapidly. There are six facilities owned and operated by BOTAŞ, TPAO, private Ege Gaz A.Ş. and Etki Liman İşletmeleri A.Ş. Figures 4.14 and 4.15 illustrate how Turkey is placed amongst other IEA countries as regards storage capacities and meeting gas demand[13]:

Besides the main energy directives which have directly targeted coordination and harmonisation of the gas markets of member states, the EC has issued some auxiliary directives and regulations (e.g. the 2004 Directive (2004/67/EC) and Regulation (EU) 994/2010 adopted following the 2009 gas crisis) specifically concerning measures to safeguard the security of natural gas supply. Neither of these imposed mandatory natural gas storage requirements upon the members but instead left the necessary actions to be taken by the states themselves, such as the following: "Member States may set or require the industry to set indicative minimum targets for a possible future contribution of storage, either located within

[13] These figures do not cover data that include Tuz Gölü UGS, Etki and Dörtyol FSRU inputs.

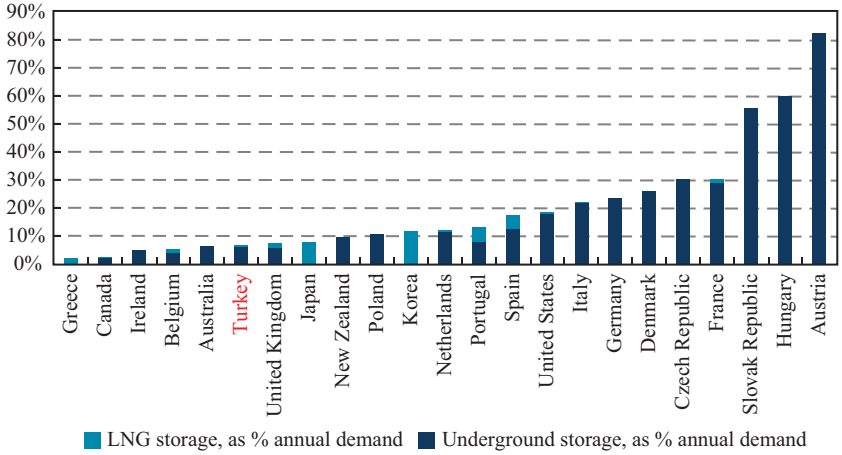


Fig. 4.14 Storage capacities as a percentage of annual demand. (Source: IEA (2014, 60))

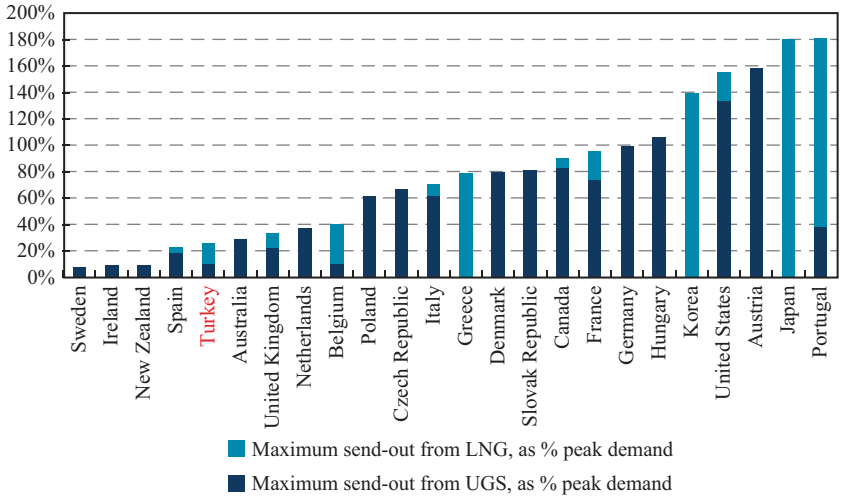


Fig. 4.15 Storage and send-out capacities as a share of peak demand. (Source: IEA (2014, 60))

or outside the Member State, to security of supply. These targets shall be published" (Directive 2004/67/EC Art. 4(6)). As in countries like Denmark, Italy, Poland, Portugal, Slovakia and Spain, the NGML of Turkey imposed a gas stock obligation upon natural gas suppliers of 10% of their supplies into the country to tackle security of supply problems. In 2016, this has changed to 6% for piped gas importers and 2% for wholesalers and spot LNG importers (Board Decision 6574–7; 8).

Based on the data presented in the IEA's Energy Supply Security (2014) report, Estonia, Luxembourg, Norway and Switzerland had no storage facility at all (due to e.g. using facilities in neighbouring countries or being either a net exporter or well connected to interconnecting points). Whilst eight members of the IEA were able to meet 20% of the annual demand taking into account both underground and LNG storage capacities, only 14 members could meet 10% of the annual demand, and Turkey was amongst neither (Fig. 4.14). Again, in terms of meeting its peak demand by means of maximum withdrawals from both UGSs and LNG terminals, Turkey still could not meet a 30% peak demand (Fig. 4.15), whereas 12 countries covered at least 80% of their peak demand this way and 6 met a 100%. No data/analysis is available for recent years.

4.4.7.1 Underground Natural Gas Storages (UGS)

Turkey has two operational underground storage facilities. First is Silivri, owned by the national oil company, TPAO,[14] and it consists of two depleted production fields, Kuzey Marmara (offshore) and Değirmenköy (onshore), discovered between 1988 and 1994. The Natural Gas and Reproduction Services Agreement signed between BOTAŞ and TPAO in July 1999 sealed the allocation of a 1.6 bcm capacity use of Silivri to BOTAŞ, and operations started in 2007. Second is Tuzgölü UGS, which was financed by the World Bank and became operational in 2017. Having been operated by BOTAŞ, it is projected in the salt domes of the Salt Lake to add up to a reasonable proportion of Turkey's annual consumption with its 12 caverns (each with 630,000 m^3 volume), a working gas capacity of 1 bcm and 30 mcm of injection/40 mcm of withdrawal capacity in total. It will ideally be used for storing the gas imports of Azerbaijan and Iran (BOTAŞ 2010; IGDAŞ 2014; EMRA 2018a).

[14] The storage rights were given to TPAO in a form of public document within the scope of 6326 Petroleum Law in 2001; however, the storage facility was handed over to BOTAŞ on 1 September 2016.

Following the implementation of the 2001 Law supporting TPA to underground storage facilities together with the secondary legislations issued by the EMRA[15] on 4 June 2011, TPAO first ended BOTAŞ' exclusivity in Silivri and initiated a project to increase the capacity storage of the facility in three phases (and to gradually allocate capacities to private companies). The first leg of the project was realised in 2012 and a 1 bcm additional storage was added to the system amounting to 2.6 bcm in total. In 2013, nine private market participants (e.g. Aygaz, OMV, Bosphorus, Enerco, Enerjisa and Ewe) accessed the capacity whilst BOTAŞ' share still accounted for 81% (TPAO 2013). The latest capacity reservations presented that during the 2014–2015 period BOTAŞ kept its 2.1 bcm capacity whilst private companies were given 428 mcm, and 133 mcm capacity remained idle. In 2017, 23 companies used underground storage services, 15 of which were import licensees, whilst 8 were wholesalers. Tuz Gölü UGS gave service to BOTAŞ only in the same year.

Following the TPAO's capacity increase programmes, the Silivri UGS's capacity is planned to increase to 4.3 bcm and daily gas injection and withdrawal levels to 40 mcm/d and 75 mcm/d, respectively, by 2020. For the 2019–2020 period, the daily amount of gas being injected into Silivri is projected as 16 mcm/d—although this may fluctuate due to reservoir pressure, transmission network pipeline pressure, gas temperature and other operating parameters—and the withdrawal amount as 25 mcm/d.

Geographically, underground storage facility potential within Turkey seems to be plentiful thanks to an inherently appropriate geological structure with many available caverns suitable to be converted into storage sites. Some suitable areas have recently been identified by TPAO for further establishments in the near future and one could well be correct to point out that Turkey's courage to develop more underground storage facilities is gaining prominence (Table 4.12).

Turkey is well aware of the fact that the gas industry would not take off without new storage capacities. Given the falling indigenous production and the role of gas storage in GFPPs, Turkey encourages new UGS projects proposed by suppliers and independent project promoters. On 2 February 2014, Toren Doğalgaz Depolama ve Madencilik A.Ş. and Gaz Depo ve Madencilik A.Ş., both subsidiaries of an established market player Bendis Enerji Üretim Madencilik Danışmanlık San.Tic. Ltd. Şti., were provided

[15] Regulation on the Basic Use and Principles of Natural Gas Underground Storage Facilities published on Official Gazette No. 27954, dated 4 June 2011.

Table 4.12 Suitable fields for underground natural gas storage in Turkey (bcm)

Fields/City	*Gas in place*	*Producible gas*	*Cumulative gas*	*Remaining producible reserves*
Hamitabat (Kırklareli)	5.2	3.4	3.2	0.2
Adatepe (Tekirdağ)	0.6	0.5	0.4	0.1
Güney Karaçalı (Tekirdağ)	0.6	0.5	0.4	0.1
Göçerler (Tekirdağ)	0.6	0.5	0.4	0.1
Derin BarbeŞ (Diyarbakır)	0.5	0.3	0.3	–

Source: Incedalcı (2014, 9)

30-year underground natural gas storage licences by EMRA. The UGS is envisaged to have three injection and production stations for which typical configurations range between:

1. Ballıca Station: storage capacity (2bcm), injection rate (0.8 mcm/hr) and withdrawal rate (1.6 bcm/hr);
2. Alifaki Station: storage capacity (1bcm), injection rate (0.4 mcm/hr) and withdrawal rate (0.8 mcm/hr); and
3. Kocaköy Station: storage Capacity (1bcm)

with a combined working gas capacity of 4 bcm to be come on stream by 2023 (Jordan 2014). Although the project is at different stages of advancement and licensing process to date and an estimated US$3 billion investment was planned to be allocated to it (Radikal 2014), it is not clear whether or not the project will go ahead.

4.4.7.2 LNG Terminals

The first LNG import to Turkey occurred in 1994 following a 20-year contract signed between BOTAŞ and Sonatrach—the Algerian National Company for the Transportation and Marketing of Hydrocarbons—for the 2 bcm equivalent of liquefied natural gas. Given the decline of indigenous production and the rigorously increasing natural gas demand, the volume of Algerian LNG imports subsequently rose to 4 bcm and soon was followed by another long-term LNG purchase contract signed with Nigeria (Shell) for an additional 1.2 bcm in 1995. To act as a supply source in accordance with the LNG imports and to provide other sub-services

(e.g. unshipping, storing, gasifying and dispatching to transmission lines), Turkey's first LNG terminal—Marmara Ereğlisi—was commissioned in 1989 and has been on stream since 1994. Undergoing a few expansions since its establishment, its capacity nearly quadrupled between 1996 and 20018 (37 mcm/d). Izmir province has Turkey's second LNG terminal—Aliağa—founded by a private enterprise, Çolakoğlu Group, in the west of Turkey. The installation of the infrastructure started in 2001, and under a terminal service contract signed with BOTAŞ, operations started with the unloading of the first LNG from a commissioning cargo in 2006. The hourly gas deliverability from storage is 685,000 m^3 and it has a total regasification capacity of 6 bcm per year and entry point send-out capacity of 40 mcm/d. In 2016, Turkey had its first operational Floating Storage Regasification Unit (FSRU)—Etki—owned and operated by Etki Liman İşletmeleri Doğal Gaz İthalat ve Ticaret A.Ş., and everything carried out within were officially deemed as storage activities. The second FSRU, BOTAŞ Dörtyol, was added to the inventory of Turkey's LNG terminals two years later, the characteristics of which are presented in Table 4.13.

Given the structure and ownership of LNG terminals, there exist some fundamental differentials in the services both terminals provide as Marmara Ereğlisi predominantly stocks the Algerian and Nigerian LNG supplies imported by BOTAŞ and private gas suppliers who strive to balance their supply/demand portfolios (e.g. importers and wholesalers that are required to make arrangements with storage operators for 2% of their contracted gas volumes within five years of their entrance into the market), whilst the storage capacity of Aliağa has been booked and filled by BOTAŞ only.

4.4.8 Transmission

As broadly depicted in Map 4.4, the Turkish natural gas grid is extensive and transports gas from both gas production fields and import points to more than 14 million small and large customers. The total network length is about 14,000 km (Caner 2018) and is owned and operated by BOTAŞ, although construction of new lines by private enterprises is legally possible and equally encouraged. The current NGML defines the transport of gas through gathering lines (used chiefly by production companies) and gas pipeline networks (exclusive of distribution networks and transports via LNG vehicles), and BOTAŞ holds sole responsibility of taking all measures to ensure secure and cost-effective transmission of natural gas as the country's only system operator—TSO—(EMRA 2012). Non-discriminatory TPA to transmission

Table 4.13 Characteristics of Turkey's LNG terminals

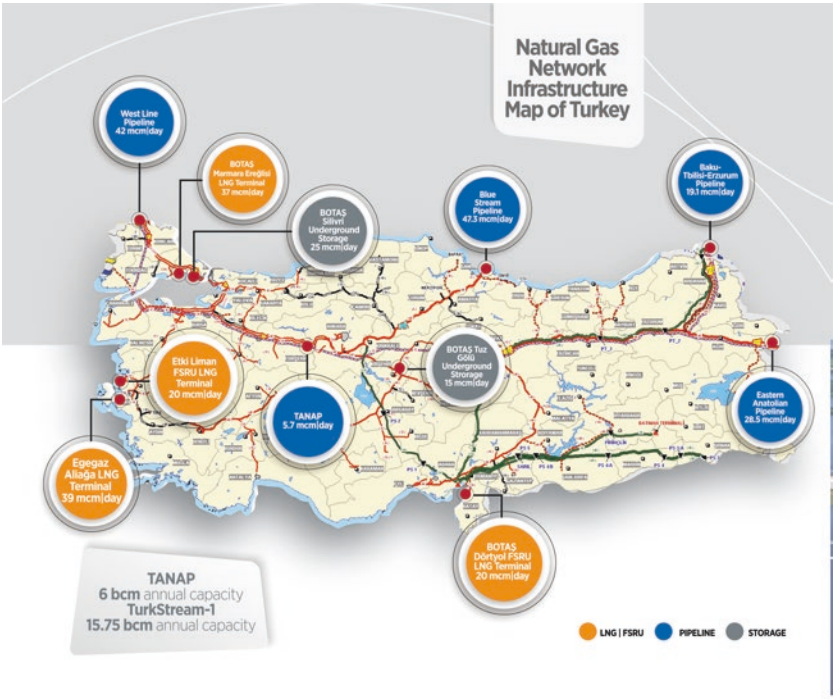
	MARMARA EREĞLİSİ	*ALİAĞA*	*ETKİ FSRU*	*DÖRTYOL FSRU*
Description				
Ownership	BOTAŞ	EgeGaz A.Ş.	Etki Liman A.Ş.	BOTAŞ
Shareholder	BOTAŞ	Çolakoğlu Group	Kalyon Yat. A.Ş., Kolin İnş. A.Ş., İska Liman A.Ş.	BOTAŞ
Location	M. Ereğ./Tekirdağ	Aliağa / Izmir	Aliağa/Izmir	Dörtyol/Hatay
Functions	LNG storage; Regasification; Dispatch	LNG storage; Regasification; Dispatch	LNG Storage; Regasification; Dispatch	LNG storage; Regasification; Dispatch
Schedule	Operational: 1994	Operational: 2006	Operational: 2016	Operational: 2017
Investment	US$364 million (approx.)	US$400 million (approx.)		TRY390 million
Technical Features				
Storage Cap.	3x85,000 m^3	2x140,000 m^3	143,000 m^3	263,000 m3
Send-out Cap.	936,045 m^3/hr	685,000 m^3/hr	–	–
Regas. Cap.	8.2 bcm/y	6 bcm/y	5 bcm/y	7.3 bcm/y
Trans. Sys. Entry Cap.	37 mcm/d	40 mcm/d	24 mcm/d	20 mcm/d
Contractors	Freyssinet; CB&I; Tractabel, Sapiem LNG	Freyssinet; CB&I etc.	–	–
Supplies				
Resources	Algeria; Nigeria	Various[a]	Spot LNG	Spot LNG
Reserved Cap.	BOTAŞ	Own Use	Own Use	BOTAŞ
Regulatory Approvals				
Licence Effectiveness	10 yrs	30 yrs	30 yrs	30 yrs

Source: BOTAŞ; EMRA

[a]Imported, wholesaled or exported LNG by state or privately owned energy companies

lines is allowed through regulated tariffs (issued by BOTAŞ) as long as transport and delivery contacts are signed between the TSO and other market players, say, for example, import, export, wholesale, production and storage companies[16]. EMRA acts as a dispute settler over the connection

[16]Transport contracts are required to be signed between the TSO and import, export, wholesale and production companies, whilst delivery contracts are signed between the TSO



Map 4.4 BOTAŞ Natural Gas Network Infrastructure. (Source: MENR (2018, 14))

issues between the parties and requires "open access" by obliging the TSO to connect willing companies to the most convenient point of the network in accordance with the respective provisions of the transmission Network Operation Principles and Procedures (NOPP), which is a guideline regarding system entry, carriage quantity statement and programming, outage operation, dispatch control, system balancing, communication system, capacity allocation, natural gas delivery and gauging operation and so on. Turkey's extensive network of pipelines transport gas from Russia, Iran and Azerbaijan, and export a small amount of gas to Greece.

Since 2003, EMRA has moved forward with the construction of a total 93,804,355 metre distribution grid as a means of regional distribution by calling for a number of natural gas distribution tenders to transport gas to/from remote locations. Presently, there are 72 distributors taking gas

and eligible consumers, storage and other transmission companies (if any).

to 78 cities and more than 200 districts (EMRA 2018a) which were not otherwise covered by the then existing BOTAŞ infrastructure. The tenders have helped with the extension of natural gas supply to almost all of Turkey (only three cities remain gasless), whilst more than 14 million customers were served and a massive TRY15.12 billion investment (excluding operation costs and VAT) flew into the market by private sector. Most notably, as of 2019, the domestic distribution network throughout Istanbul (operated by IGDAŞ) stood out at around 17,844 km (which was barely 152 km in 1989 and 4615 km in 2000) and is Turkey's largest (Fig. 4.16).

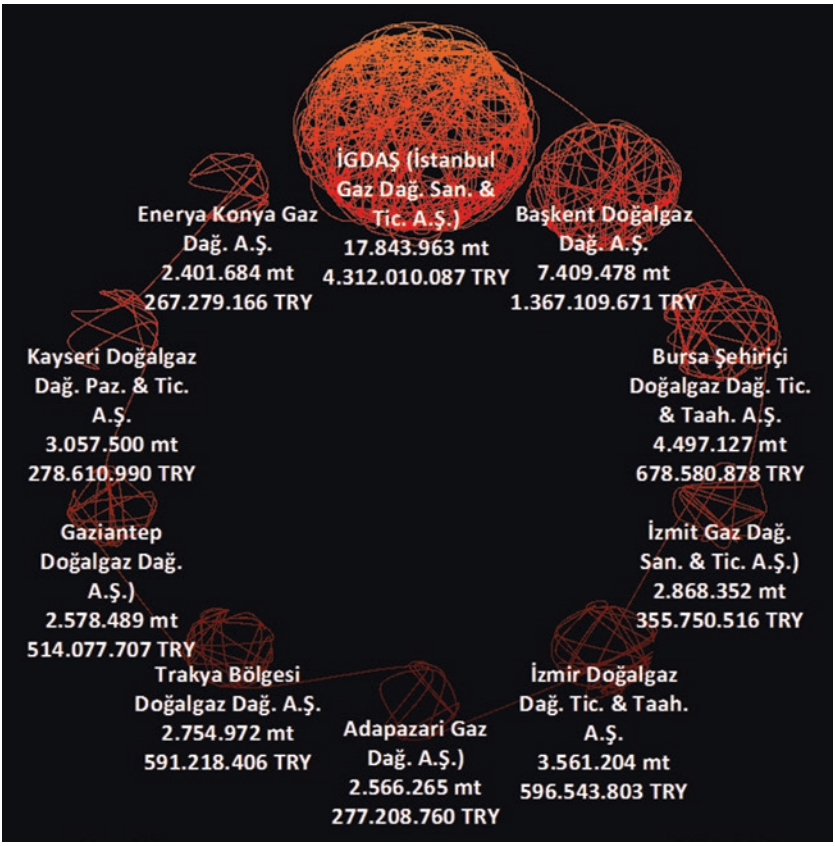


Fig. 4.16 Top ten regional gas distributors by installed pipelines (metre) and investment made (TRY), 2017. (Note: Pipelines include both steel and polyethylene. Source: EMRA (2018a))

The second largest Başkent Doğalgaz Dağ. A.Ş., providing roughly 7% of the population with almost 3 bcm gas sales per annum, has 1458 km steel and a 5950 km polyethylene pipeline network. More than TRY1.63 billion investment was made towards the appropriate construction for the gasification of the cities of Bursa, Izmit and Izmir, each of which was to consist at least 2800 km pipelines laid in (EMRA 2018a). Besides, works have been done towards the construction of a compressor station in Eskişehir which comprises 4xSPCP-400 units (each 13.4 MW) and is expected to not only contribute significantly to increased hydraulic stability of Turkey's gas network but also ensure cost reductions for BOTAŞ by guaranteeing higher energy efficiency by the supplier Siemens (Girbig 2015). BOTAŞ paid an estimated US$65 million for this project (EMRA 2011).

In terms of LNG transmission, probably no other area of the natural gas market has witnessed such full private sector participation without any involvement of the state at any level. Fourteen private companies have been licensed by the EMRA to carry out LNG transportation in Turkey, and the amount of LNG transmitted since 2014 has increased steadily.

4.5 Conclusion

One of the inescapable features of the energy market cycle, given countries' natural endowments and proximities to strategic regions that have rich resources, is the swing of the pendulum between self-reliance and costly import-dependence. This chapter explored how the pendulum has swung with regards to Turkey's natural gas market over the course of 2001–2018 and presented the main factors that influenced the sector's development.

Turkey is a big country, composed of poor hydrocarbon resources and growing energy needs. The gap between its energy demand and supply, together with the orientation of its future energy policies (based on regulatory framework), is expected to shed light on what direction the Turkish natural gas market might be heading in the future (e.g. more statist-leaning or market-oriented). With increasing GDP growth under the AKP rule over a decade, Turkey's economic development has been noteworthy, although not necessarily sustainable unless it is set to continue reforming the energy markets, especially electricity and natural gas, as remains the view of a large body of scholars and energy experts. Electricity is important, as the demand for it has been expanding constantly since 2003. The

dependence of the transformation sector on natural gas as the fuel of choice, which currently stands at 48% and is likely to remain stable or in flux going up, raises the importance of natural gas in Turkey even further. As such, natural gas represents more than 30% of the country's TPES (followed by coal and oil), and at this junction the challenges the Turkish natural gas market faces today can be summarised in two areas:

Small production/high import dependency. Due to the absence of enough indigenous production, Turkey's natural gas demand is almost entirely met by imports. This segment of the market has particularly seen a glut of sweeping changes over the last decade including expired contracts, declining contracted import supplies—which was then to be compensated by gas from other sources and by more spot LNG, and allowance of new market entrants via contract release programmes to name but a few. All of Turkey's long-term gas supply contracts are based on take-or-pay obligations which have made the country solely dependent on every one of the five supplying countries for at least 20 years in length. As in Turkey, De Hauteclocque and Glachant (2009) quite rightly discussed this pervasive feature of the European gas markets and challenged the assumption that the refinement and harmonisation of the European market designs would ever succeed in the face of long-term contracts that, according to the authors, have anti-competitive foreclosure effects when imperfect competition prevails.

Arguably, the authors' notion holds firm for the case of BOTAŞ too, although it was probably not intentional that BOTAŞ has been using the long-term contracts signed with several countries a long while ago to control the market given the scarce prevalence of short-term contracts back then, and the less common use of LNG as an alternative form of gas as well as the role of trading hubs in natural gas markets until recently. One explanation, of course, is that BOTAŞ has the predominant market share as the apologists of liberalisation blatantly complain about, and there is a great deal of accumulated evidence in its favour if one looks at the logic of long-term contracts which leave both sellers and buyers with strictly defined obligations. Turkey, for example, is linked with Russia, Iran, Azerbaijan, Nigeria and Algeria into bilateral monopolies, and the ToP clauses of these gas contracts bind Turkey to purchase at least 80% of the contracted amount annually regardless of whether or not the gas is actually taken (payment liabilities incur for the shortfall otherwise). As with so many crucial undertakings at present and billions of dollars at stake, it is not surprising that these assumptions result in a much more benign view of BOTAŞ' current status.

Oil-linked prices which the long-term contracts are based on are another prolonged issue Turkey has been the victim of. Despite there no longer being a robust European gas demand and greatly pressurised high Gazprom prices, Turkey continues to buy the most expensive gas from Iran[17] (US$507 per 1000 m^3) and Russia (US$429/1000 m^3), according to Rzayeva (2014). Though controversial to the notion that LNG requires more and a longer process and so should be more expensive the Algerian and Nigerian LNG imports seem to be the least detrimental of all to the Turkish economy. The oil-indexed prices are put into gas contracts to protect both parties from notable price differences of those alternative fuels, and in Turkey's case they are reviewed in January, April, July and October on an annual basis. Turkey is Iran's largest and Russia's second largest gas customer (in Europe), and after a number of disputes, renegotiations and seeking international arbitrations over high prices Turkey seems to be managing to get reductions along with the global gas developments and cost of crude oil. There is a hope that Turkey will no longer suffer from major disruptions caused by technical or price-related conflicts.

Indeed, Turkey has been a victim of price-/technical-/terror-related conflicts between three gas import/transit countries (i.e. Iran, Russia and Ukraine) since December 2004, and the bill for the last gas interruption by Russia at the expense of Turkey was around US$11.7 million a day in return of 11 mcm/d emergency LNG imports from Nigeria, Norway and Algeria (Gürer 2009). However, not only does Turkey's search for minimising future supply cuts continue, but the country is also in the process of negotiating very strategic projects that would put the country in the centrepiece of the energy world today. By promptly shifting its route from South Stream[18] to the 31 bcm TurkStream project, Russia plans to replace Ukraine's transit role with Turkey's, and that project alone is believed to cultivate Turkey's ambition of becoming a gas trading hub and strengthen its bargaining power for reducing the gas prices (Giuli 2015).

Whilst the import segment of the Turkish gas market has been in such a state, the contract release programme had been and still is an opportu-

[17] Since indigenous production is reserved for the domestic demand, Iran itself imports gas cheaply from Turkmenistan and transits it to Turkey with a very high price tag (Kinnander 2010).

[18] To deliver gas directly to Europe, the South Stream was planned to abandon the Ukrainian transit corridor completely and to have two lines with 31 bcm capacity which were to be expanded to four lines with a total of 63 bcm/yr by the end of 2020 (Dickel et al. 2014, 65).

nity for BOTAŞ to dispel the lingering doubts about its intentions to keep the monopolistic power in the eyes of Europe. In an effort to create and sustain competition in markets whereby all companies are supposed to compete for bringing gas at competitive prices, the role of removing entry barriers for new comers is clearly undeniable. Hence, in this framework, BOTAŞ has passed on the importation of 10 bcm of Russian gas to private companies. In fairness, BOTAŞ did request the willing entrants to have the Seller's Consent Protocol to be qualified for the release programme when it first initiated the programme in 2004 (which was actually considered as an extra impediment to make the programme more difficult by many at the time) but it was in fact Russia, Iran, Algeria and Nigeria that rejected providing the SPCs to companies other than BOTAŞ. Leaving aside the growing literature rationalising these suppliers for the righteousness of their actions of not switching from BOTAŞ as a sole buyer of big volumes with sovereign back up of the Treasury to several different companies with changing contract terms and conditions, the current landscape of the Turkish market gives a rather different picture. Given the fact that BOTAŞ has transferred only the Russian gas contracts, and the ownerships of some major private companies the contracts were transferred to are largely with Russia's state-owned gas company Gazprom, the legitimacy of certain liberalisation components of the energy directives (i.e. unbundling) seems to be in a danger.

One could well be correct to point out that fundamental aspects of the Gazprom strategies are on the verge of change particularly because of unconventional gas revolution, the rising star of LNG and spot trading, unpopularity of oil-linked long-term agreements and, most importantly, the EU's eagerness to diversify their import destinations given the bitter disruptions experienced recently. Now Russia does not merely want to export gas but also aims to play a role in the downstream markets of other countries. The EU is vehemently trying to thwart the vertical integration strategies of supply countries like Russia by prohibiting them from owning majority stakes in downstream markets via its energy directives, and although the legal framework of this issue is briefly touched upon in Chap. 3, the discussions of actual risks of cartelisation and dumping Turkey could be exposed to are left to the next chapter.

Lack of infrastructure/need for investment. Turkey's natural gas demand has seen considerable growth mainly driven by the transformation sector and is expected to reach 70 bcm by 2030. The present lack of storage and other infrastructure however undermine confidence in Turkey's

future commitment to effectively manage the risk of supply disruption and to provide flexibility to offset seasonal and intra-day supply/demand gaps and robust price signals. The storage capacity of Turkey accounted for only 5.7% of its annual consumption, whilst the LNG terminal capacity to consumption was 47% as of early 2018 and supply companies (excluding spot LNG importers) are still obliged to hold storage capacity to respond to the peak demand of their customers. This is clearly not enough to meet the country's large increase in demand. Although the MENR's 2015–2019 Strategic Plan called for expansion of Turkey's storage facilities, it is as yet far from reaffirming a clear strategy for the investors with no specific measures or timetables provided. Similarly, there exists limitation in Turkey's transmission system entry point send-out capacity in all directions which reduces BOTAŞ' ability to offtake gas from its suppliers and move it within Turkey not least to more industrial provinces due to bottlenecks.

Following the unanticipated disruptions during the cold winter, both the EU and the IEA have set Energy Supply Security programmes to be differentially well informed concerning the predictable emergency response of their members to specific energy security issues. Turkey, as a founding member of the IEA and a candidate to the EU, is part of these programmes and is subject to the oversight of both organisations on a regular basis. Requiring more capital-intensive infrastructure in comparison to oil, the emergency measures countries can take to mitigate the impact of gas disruptions include emergency gas stocks, supply and demand response, interruptible contracts and fuel switching. The limited gas stock obligation Turkey has initiated is already discussed above, and in terms of supply response, which is the subject matter of next chapter, BOTAŞ as the transmission operator takes action to identify the importer-caused imbalances to the system and requires them to correct their imbalances within eight hours. If not identifiable, then the operator implements interruptible contracts to redress the consumptions itself. The 2014 assessment report of the IEA states that Turkey has an established Commission for Enduring and Supervising Security of Natural Gas Supply since 2011, and the core of which is to ensure all power plants hold sufficient amount of secondary fuels (e.g. diesel) for fuel switching in case of emergency (IEA 2014, 461). Undoubtedly, for the entire mechanism to work decisively and effectively, considerable reformation work has to be done both at the trading points (i.e. physical and virtual) and the plants. This would require seminal investment contribution from both state and private entities.

In this chapter, the Turkish gas industry is depicted, and this analysis suggests that considerable efforts have been made in the industry by the

government since 2002, although a great deal of challenges still remains unaddressed. Having unearthed the fundamental facts as a skeletal basis, the following chapter looks at how regulatory institutions have attuned to sector developments and where Turkey's natural gas industry liberalisation stands in the context of the EU.

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CHAPTER 5

Turkey's Natural Gas Market Liberalisation in the Context of the EU

5.1 Introduction

Energy for a strategically important country like Turkey, which sits at the crossroad of major supply and demand regions, clearly plays a crucial role both economically and politically. Therefore, the role of liberalisation in a healthier gas sector to serve the country's many needs has been particularly debated in Turkey since the late 1990s, and Turkey, whose natural gas consumption today accounts for more than one third of the EU's gas supply, has begun restructuring its inherently monopolistic natural gas industry in conjunction with the process of liberalisation of the markets. Different parts of the market have thus far been affected by the reforms created by the country's first and only NGML although the degree and form of which vary considerably. Against this background, the objective of this chapter is to provide an updated overview of Turkey's natural gas market liberalisation in the context of the EU energy legislation and to discuss how regulatory institutions have attuned to sector developments. Furthermore, it is intended to answer the first research question: "What are the characteristics of the legal framework that has been created to ensure natural gas market liberalisation in Turkey and how effective is it?"

To do so, the chapter begins with a review of Turkey's natural gas market structure before and after the NGML to compare how the reforms have led to changes including price regulation and the subsidies. It then studies the compulsory measures of the EU Energy Directives and compares the compliance of the 2001 Law with those. The final section concludes.

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5.2 The Turkish Natural Gas Market Structure: Before and After the Natural Gas Market Law of 2001

Although a marginal amount of natural gas was already being produced by TPAO in the mid-1980s (IEA 2013) natural gas was properly introduced to Turkish consumers in 1987 following the first gas sales and purchase agreement signed between BOTAŞ and Soyusgaz of the USSR in February 14, 1986. The Statutory Decrees No. 350 in 1988 and No. 397 in 1990 were the earliest legislations regarding the country's natural gas sector which granted the governance of the sector consecutively to BOTAŞ authorisation to be able to import, purchase, transmit and sell natural gas and LNG (Yardımcı 2011). At that time, only the production segment of the sector was open to private participants and BOTAŞ was the sole seller to OIZs and industrial users consuming more than 1 mcm gas per year which, in other words, meant that BOTAŞ was the direct price setter for almost 80% of the market and indirectly for the rest.

The introduction of liberalisation reforms in Turkey's energy markets began on 20 February 2001, when the government of Turkey approved the Electricity Market Law No. 4628, which was soon followed by the NGML No. 4646 to be effective from 2 May 2001. The provisions of both laws aimed at the harmonisation of the Turkish energy legislation with the EU's energy acquis (Akçollu 2006) and the NGML was developed to introduce competition into the sector and enhance opportunities for private sector involvement with the hope, in turn, to create lower prices and consumer choice for final gas users (USITC 2001). BOTAŞ was a vertically integrated de facto monopoly until the enactment of the 2001 Law[1] as stated above and held considerable market power by participating in all aspects of the market except production and later distribution (Fig. 5.1).

The 2001 Law can be considered as the beginning of a long, onerous process of transition for Turkey's gas sector governance and institutional framework, in which the liberalisation reforms were predominantly driven

[1] BOTAŞ was founded to transport Iraqi crude oil to Turkey in 1974. The responsibilities of BOTAŞ was first expanded to natural gas transportation and trade activities in 1987 and soon followed by further monopoly rights granted on natural gas import, distribution, sales and pricing in 1990. Formerly acting as an affiliation to TPAO, BOTAŞ was restructured as an independent state-owned enterprise as a result of advancing natural gas operations (Çetin and Oğuz 2007).

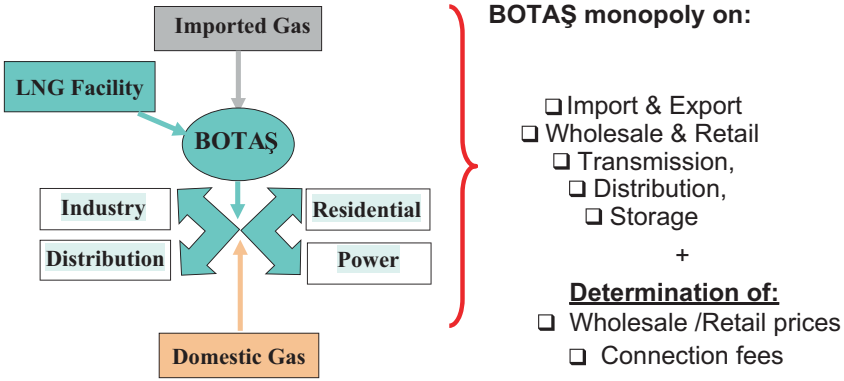

Fig. 5.1 Turkish natural gas market structure before the 2001 Law. (Source: Yardımcı (2018, 6))

by the EU energy directives. Following the provisions of the First Directive, the initial primary objectives were set out for the domestic market starting with the encouragement of the private sector to participate in market activities. This was bolstered with the establishment of an independent regulator, the Energy Market Regulatory Authority (EMRA), which was again initially set up as part of the liberalisation reform process for the electricity market and later became the sole regulatory authority for the entire energy market centralising powers previously spread amongst various agencies.[2]

The Law allowed a preparatory period of 12 months starting from May 2001 for both the EMRA to enact the secondary legislation (Table 5.1) and the companies keen for market entry to prepare for the licence applications. Given there was no availability of licence or certificate grants to any company until the end of the preparatory period, the companies which were already involved in the market, based on an acquired legal right, document, permission or authorisation prior to May 2001, were allowed to continue their acts for a maximum of 24 months starting from the date the 2001 Law came into effect. Permanent continuation of their market activities was strictly conditioned to (1) submission of a new application to

[2] The duties of the EMRA was expanded to the oil market as a solely responsible authority by the Petroleum Market Law (PML) No. 5015 in 2003 and for liquefied petroleum gases (LPG) by the Law No. 5307 in 2005. In 2013, the EML No. 6446 was revised and the duties of the EMRA were re-arranged and expanded even further.

Table 5.1 Natural gas market regulations and communiqués by EMRA

Natural Gas Market Law
Natural Gas Market Law (NGML) No. 4646
Natural Gas Market Regulations
Natural Gas Market Regulation on Licensing
Natural Gas Market Regulation on Certification
Natural Gas Market Regulation on Distribution and Customer Services
Natural Gas Market Regulation on Tariffs
Natural Gas Market Regulation on Facilities
Natural Gas Market Regulation on Transmission Network Operation
Natural Gas Market Regulation Internal Installations Regulation
Regulation on Organised Natural Gas Wholesale Market
Regulation on Information Security of Industrial Control Systems Used in Energy Sector
Regulation on Selection of Legal Persons Applying for Natural Gas Storage Activities at the Same Facility
Regulation on Principles and Procedures for Carrying out Inspections, Preliminary Researches and Investigations within the Natural Gas Market
Regulation on Basic Utilisation Principles and Procedures Applicable to Natural Gas Underground Storage Facilities
Regulation on the Establishment of Basic Utilisation Principles and Procedures Applicable to Liquefied Natural Gas
Natural Gas Market Communiqués
Communiqué on Principles and Procedures Applicable to Grid Connections
Communiqué on Principles and Procedures Applicable to Illegal or Irregular Use of Natural Gas
Communiqué on Liquefied Natural Gas Transmission
Communiqué on Determination of Thresholds as a Basis for Natural Gas Invoicing and Its Rudiments
General Communiqué on Accounting Practices and Financial Reporting
Communiqué on Fines to be Applied Under Article 9 of Natural Gas Market Law

Source: EMRA

the EMRA within 20 months from the effective date of the Law and (2) be not previously banned from performing such activities (NGML 2001, Art. 6/6a(4); Temporary Art. 1).

In these circumstances, the effective control held by the state-owned BOTAŞ over import and wholesale segments of the market was to be terminated so the nationwide gas market could be freed of monopoly power abuse. Article 7a(2) of the Law is specifically concerned with the liberalisation of gas market supplies and thus with the formation of a stable and transparent gas market along with private companies, neither of which is to be able sell more than 20% of the forecasted national gas consumption

per annum (excluding producers). This was particularly important for breaking the BOTAŞ monopoly in the supply chain since the Law precluded BOTAŞ from executing any more gas purchase contracts until its import share was gradually reduced to 20% of the national consumption by 2009. Although the Law theoretically required all companies to constrain their market shares, a set of principles as per Article 4/4a(3) and Temporary Article 2 placed two further restrictions on the operational flexibility of prospective import licensees planning to enter the market:

- New import companies cannot import natural gas from countries with which BOTAŞ already has unexpired gas sales agreements.
- The licensees must store 10% of their imported gas in the national territory for five years.

From 2003, Turkey began updating the 2001 Law and issued several amendments to clarify and place additional liabilities on the market participants. In that vein, the Law which initially allowed all companies to perform only one market activity and enabled them to participate in another legal entity with the condition they not own or hold the majority shares outside their market field was amended to exclude BOTAŞ[3] from such liability in 2008. In the same year the amendment No. 9/7/2008-5784/20 also introduced an exception in favour of BOTAŞ being able to sign new LNG import contracts as opposed to the Temporary Article 2 which prohibited BOTAŞ' new contract signings until its market share was gradually reduced to one fifth of the national consumption.

With the exception of two companies, Bursagaz and Esgaz[4] which were owned and operated by BOTAŞ, the distribution segment of the Turkish gas market was essentially municipality owned prior to 2001. The 2001 Law oversaw that those two companies be transferred to the Privatisation Administration within two months after its enactment and privatised within six months in order to remove BOTAŞ from the distribution segment completely along with other three municipality-operated companies (i.e. EGO, IGDAŞ and Izgaz). Provided the clearance of external debts

[3] And its current subsidiaries and prospective companies BOTAŞ may set up for international projects in the future.

[4] The companies distributed gas in Bursa and Eskisehir, respectively, and their privatisation was overseen within 3 years.

was backed by the Treasury, the municipalities were mandated to remain in all distribution cities/regions by holding up to 20% of shares.[5] What is more, the Law thwarted distributors from buying more than 50% of their supply from a single supplier (whether importer or wholesaler) per Article 7/4d and restructuring the distribution segment of the industry this way appears to have not only been favourable to new entrants but also laid effective groundwork for achieving a free and competitive trade in the gas market.

Nonetheless, despite the fact that the 2001 Law has broadly created the necessary conditions for the establishment of a competitive market the distribution sector continues to be regulated owing to its monopoly characteristics. To this end, the Law empowers the EMRA to ensure that open, non-discriminatory access is provided to new entrants for domestic gas distribution on a tender basis and to regulate the interregional/intercity transportation rates, tariffs and terms of service. This is actually a direct illustration of 'competition for the market' commonly applied by countries when the competition within the market is not feasible/undesirable as discussed in Chap. 2 in greater detail. When observing the number of licences granted to state-owned and private companies by the EMRA following the adoption of the 2001 Law between 2005 and 2019 (Table 5.2), it would be appropriate to say that the impact of Turkey's first legislation towards liberalisation had been effective and there was noticeable interest from private participants who were drawn into the market.

As identified in the previous chapter, the ownership of Turkey's natural gas sector is still largely with the state. The infrastructure is owned by the government and each segment of gas value chain has its own issues to be addressed. In a very broad sense especially when compared with the gas market structure before the Law, the essentials of a competitive market, at least legally, seem firmly established and Turkey had clearly moved from a single vertically integrated utility to a partially competitive market structure with a diverse set of generation, distribution, storage and wholesale companies now operational (Fig. 5.2).

[5] The Law oversees that the distribution companies must offer a 10% partnership to municipalities of their operation region with no capital investment in return. The share of municipalities could be increased for another 10% in return of capital equivalence paid by the municipalities' own resources given that the municipality does not hold any debt to the Treasury (NGML, Art. 4/4 g).

Table 5.2 Number of licences granted to companies by EMRA, 2005–2019

No.	*Type of licence*	*2005*	*State Owned*	*Private*	*2019*[a]	*State Owned*	*Private*
1	Import	6	6	–	65	10	55
	Long Term (Pipeline&LNG)	5	5	–	18	9	9
	Spot LNG	1	1	–	46	1	45
2	Export	1	1	–	14	1	13
3	Whole sale	11	1	10	51	1	50
4	Storage	2	1	1	8	4	4
	Storage (LNG)	1	–	1	4	2	2
	Storage (Underground)	1	1	–	4	2	2
5	Transmission	10	1	9	15	1	14
	Transmission (Piped Gas)	1	1	–	1	1	–
	Transmission (LNG)	9	–	9	14	–	14
6	Compressed Natural Gas (CNG)	28	–	28	95	–	95
	CNG Sale	21	–	21	38	–	38
	CNG Transmission and Distr.	7	–	7	40	–	40
	CNG (Auto)	–	–	–	17		17
7	Distribution	33	–	33	72	1[b]	71
	Total	137	18	119	320	33	287

Source: EMRA

[a]As of April 2019

[b]Istanbul Metropolitan Municipality still owns IGDAŞ

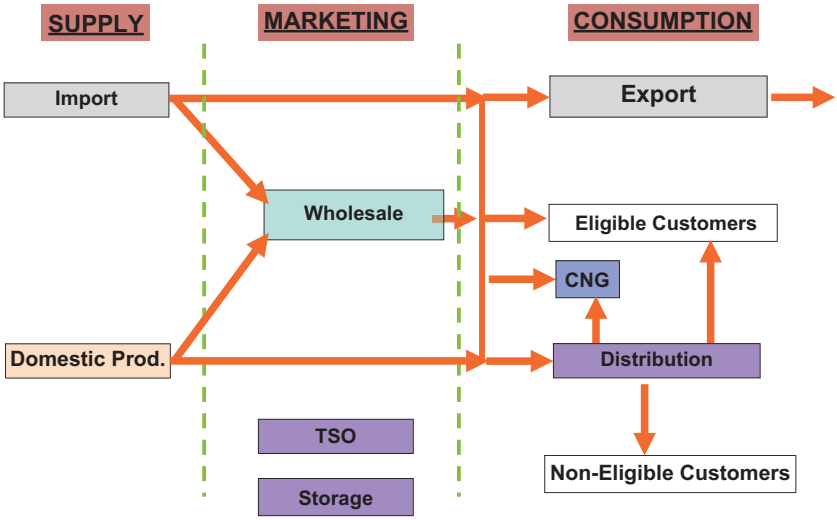

Fig. 5.2 Turkish natural gas market structure after the 2001 Law. (Source: Yardımcı (2018, 7))

5.2.1 *Pricing Regulations and Subsidies*

According to the 2001 Law natural gas producers and importers sell their gas to eligible customers, wholesalers, importers, distributors and CNG companies[6] at unregulated prices whilst distributors sell gas to end users at regulated prices. Transmission and dispatch control tariffs, a key contribution to reflect balance between fixed and variable costs, are also regulated and set up *ex ante* according to predefined methodologies (subject to "revenue cap" regulations) approved by the EMRA. Since 2011 the focal point of the distribution tariffs (subject to "price cap/hybrid" regulation) has been the rising end user prices applied by those distributors who came to the end of their eight-year fixed tariff periods (see Sect. 4.4.5). This particularly highlights the importance of regulating this new "competition introduced for" sector appropriately and monitoring all anti-competitive behaviour ahead of broader governance progress if necessary. In terms of storage, the NGML and respective regulations leave the contract terms and tariffs for access to storage to be freely determined between market participants.

In a competitive setting, natural gas markets are expected to be sustainable, secure and providing affordable gas to users reflecting both supply and demand fundamentals (UNECE 2012). In the progress towards this, gas-pricing mechanism is another area to look at. In 2014 alone, gas-on-gas (GOG) price formation was used in just over half of all pipeline gas import (304 bcm) made worldwide, Europe being the main contributor (200 bcm). At the heart of that were Germany, Italy, the UK and France wherein prices were determined by the interplay of supply and demand, and trades were made over a variety of different periods (e.g. daily, monthly, annually or other). In 2018, the GOG competition increased from almost zero in 2005 to 75%, whereas oil price escalation (OPE) declined from 85% in 2005 to 22%. Likewise, for pipeline imports there has been a continuous rise in GOG competition at the expense of oil price escalation, rising from 23% in 2005 to 61% in 2018, as OPE declined from 57% to 31%. Together with Spain and Italy, Turkey is one of the contributors to OPE price formation which constitutes 30% of all pipeline imports made worldwide, and it is argued that the global decline in OPE has been partly offset by the imports of piped gas from Turkmenistan to China, and in 2016, the change in one of the gas contracts from Russia to Turkey. Unlike the UK, Belgium and the Netherlands, where the domestic market

[6] Producers can only sell 20% of their output to eligible customers and the rest to other participants.

pricing mechanism is GOG, Turkey uses it for the importation of spot and short-term priced LNG cargoes (IGU 2019, 13–14). BOTAŞ treats the cost of imported gas as a trade secret and does not reveal them but it is indicated at many platforms that Turkey pays relatively high prices particularly for Iranian and Russian gas.

Whilst future developments will determine the exact role of long-term oil-indexed contracts in Turkey's liberalising gas market, the country replaced its pricing mechanism for energy products with cost-based pricing in 2008 and introduced subsidisation in 2009, and as it is discussed in Rzayeva (2014), BOTAŞ' profitability has been severely impacted since then (loss of TRY1.3 bn in 2011 and TRY606 mn in 2012). When used as a tool for political gain, subsidisation in the energy sector may look appropriate from the end users' point of view, but could apparently be incompatible with the solvency in the gas sector. In the case of Turkey it is also notably controversial in terms of natural gas and electricity applications since BOTAŞ tends to recover its losses by increasing the price of gas sold to built-operate (BO)- and built-operate-transfer (BOT)-based natural gas–fired power stations (GFPPs) which produce about 30% of country's electricity (Fig. 5.3).

To provide a starting point for a brief discussion on subsidies, it would probably be correct to first acknowledge the fact that finding a commonly agreed definition of subsidies is difficult since countries largely decide to adopt their own definition of energy subsidies as IEA et al. (2010) explained. The report reveals that although judicious use of energy subsidies might help address market failures or respond to social and distributional objectives, especially where social welfare mechanisms for directly

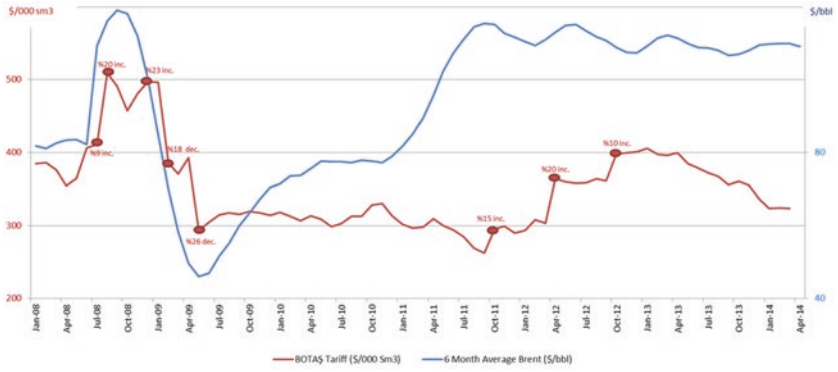

Fig. 5.3 Cross-subsidisation of BOTAŞ. (Source: Keuchel (2014, 9))

providing income support to the poor do not exist, they are not free from shortcomings and may insidiously lead to distortive price signals, higher energy production/consumption and barriers to entry for cleaner energy services and thus create environmental challenges (ibid., 8) (Table 5.3).

Coal subsidies represent the largest subsidies that Turkey provides to fossil fuel producers (and to coal consumers) due to country's vast reserves followed mostly by petroleum. However, given the increasing prevalence of

Table 5.3 Post-tax energy subsidies in selected countries, 2015

	2015		
Country	*US$ billion*	*% GDP*	*Per capita US$*
Argentina	19	2.9	435
Australia	29	2.3	1198
Canada	43	2.7	1191
China	1432	12.8	1025
Colombia	13	4.6	278
Costa Rica	1	2.2	257
Côte d'Ivoire	2	5.6	81
Ethiopia	2	2.5	16
France	35	1.4	545
Germany	72	2.1	885
India	209	10.0	160
Indonesia	97	11.3	377
Iran	111	29.6	1399
Jamaica	1	4.4	217
Japan	177	4.0	1382
Kazakhstan	29	15.6	1617
Mexico	54	4.6	431
Morocco	3	2.9	84
Pakistan	18	6.8	97
Philippines	10	3.4	99
Russia	551	40.3	3832
Saudi Arabia	117	17.9	3709
South Africa	45	14.0	806
Tanzania	2	4.0	34
Thailand	40	9.9	577
Turkey	64	7.4	814
Ukraine	61	66.7	1357
UAE	22	6.3	2452
UK	28	1.0	427
USA	649	3.6	2028

Source: Coady et al. (2019, 35)

gas use, the total value of natural gas subsidies has increased notably depending on year-to-year fluctuations in world prices, shifts in demand and domestic pricing policy changes. As discussed in Chap. 4 the upstream activities of TPAO have now been expanded to large-scale offshore developments in the deep waters of Turkey and overseas, and thus the largest subsidy in the form of a direct budgetary transfer goes to TPAO (Bast et al. 2014).

A review carried out by Coady et al. (2006) found supporting evidence that universal energy subsidies were not a cost-effective way to protect the real incomes of poor households, since they involved substantial leakage of benefits to higher-income groups using examples from Bolivia, Ghana, Jordan, Mali and Sri Lanka. Similarly, the Independent Evaluation Group of the World Bank found that the bottom 40% of the population ranked by income distribution receives only 15–20% of the fuel subsidies whilst the rich receive the most of the total value of the subsidies (IEG 2008 in IEA et al. 2010, 24). When looking at Turkey, however, it is hard to estimate and monitor whether the BOTAŞ subsidisation of residential consumers is really distinguished between truly poor and better-income consumers. An interesting approach, at this junction, came from Rzayeva (2014), who discussed that the scale of gas subsidies provided to Turkish customers through low, regulated tariffs was not necessarily stimulating excessive demand and argued that the (subsidised) price of gas, which was US$390/1000 m^3 for households at the time of writing, was not entirely affordable for the average income level of Turkish population anyway.

Given the national circumstances, it would not be incorrect to say that currently available subsidies are fundamentally specific to Turkey, and although the greater proportion the Turkish private gas sector opposes them, the government backs the concept as it uses them as policy instruments to attain various economic and social objectives. In line with the arguments of private gas sector players in Turkey, Oil Change International (2015) also suggests that Turkey should phase out fossil fuel subsidies altogether by implementing the G20 commitments since they threaten Turkey's economy with a strained budget, increasing government liabilities, and heightening the risk of stranded assets whereas IEA (2006) attaches importance to the broad benefits of the transition period during which a healthy degree of caution on the speed of implementing price adjustments may be given and potential social discontents could be forestalled. At the time of writing, there has been no sign of any revision on the existing subsidies provided in the sector.

As discussed in Chap. 2, a large body of literature exists indicating that countries' success in materialising reform programmes may not always be as great as the policymakers and/or international organisations suggest.

This situation may become even more insurmountable if one considers the increase of susceptibility in transferring the strategic energy monopolies to the private sector. Being no different to any other developing country trying to reform their gas markets, the past 18 years in Turkey have been a watershed for the test of liberalisation policies and regulations by all market participants including the state-owned national champion, BOTAŞ. The following sections analyse the dynamic evolution of the Turkish natural gas market in terms of the EU energy directives and provide what liberalisation has actually meant for Turkey, to what extent Turkey has managed to realise the reforms depending on the appropriateness of its governance structures and other characteristics. In that context the first research question "What are the characteristics of the legal framework that has been created to ensure natural gas market liberalisation in Turkey and how effective is it?" is addressed.

5.3 The Liberalisation Process: Compliance of the 2001 Law with the EU Energy Directives

As has been discussed in Chap. 1, the EU initiated the process of creating market integration via various energy Directives for a borderless internal energy market where competition is ensued in all segments of natural gas and electricity industries. The EU mandates the alignment of member states' (MSs) energy laws with the Community Energy Acquis and the implementation of the relevant regulatory instruments, which have been framed through the Directives since the 1990s, to be finalised (Corbeau et al. 2012).

Also as briefly touched upon in Chaps. 1 and 4, the liberalisation of the energy markets was not due to the obligations of EU membership since Turkey has no legal obligation outside of the scope of the Customs Union until the accession negotiations were officially launched between Turkey and the EU[7] in 2005 (EC 1999). Liberalisation had been in the government policies and progress reports for quite some time until the IMF-guided economic stabilisation programme formed in 1999 (IMF 1999a, b;

[7] Turkey's official candidacy and the reaffirmation of its political criteria fulfilment were approved at the Helsinki Summit on 10–11 December 1999 and the Brussels Summit on 16–17 December 2004 respectively. The accession negotiations were subsequently launched between Turkey and the EU in October 2005.

CBRT 2001a, b) actually gave the process a concise direction. Thanks to the advance level of alignment with the IMF reforms, Turkey only had to bring the prevailing laws into force and check the functioning of the competitive markets as required. It would also be fair to say that the 2001 Law has achieved most of the hallmarks of a liberalised market (at the time) transposing the EU dimension of energy reforms into Turkey's legislation although the full implementation remains unaccomplished. Table 5.4 shows the major concerns of the EU's first, second and third energy directives and the compliance of Turkey's NGML with them (Table 5.5):

The basis of European energy reform is analysed in more depth in the next section by distinguishing the four mandatory instruments used to weigh up the institutional feasibility of such reforms for the structurally monopolistic Turkish gas industry. First is the establishment of regulatory authority, which is one of the major requirements for liberalisation of energy markets to ensure that they are financially viable, stable and transparent where independent regulation and supervision are provided for sufficient energy resources at low cost and in a reliable and environment-friendly manner. It is followed by other measures, namely, unbundling, market opening and third-party access (TPA). The TPA has subsections analysing respective Network Codes of the EU towards the creation of internal gas market and Turkey's place in it, with special emphasis on the role of wholesale market functioning inclusive of capacity allocation and congestion management, gas balancing arrangements and transmission tariff structures.

5.3.1 Energy Market Regulatory Authority

In February 2001, the Turkish government enacted the Electricity Market Law and ultimately created a new electricity market regulatory authority, the name of which was later changed to an umbrella term, "Energy Market Regulatory Authority," and oversaw all energy markets, natural gas, petroleum and liquefied petroleum gases, to be subject to regulatory authorisation by 2005. The EMRA is structured as a commission with nine members and its responsibilities in terms of the natural gas market include introducing and promoting competition; protecting the interests of consumers; optimisation of quality, reliability and safety of the services; introduction of investment and improving the transparency of the regulations. The EMRA has been undergoing structural changes since 2003, and with the adoption of the EU directives in particular, the power and responsibilities of the EMRA have been refined and expanded greatly to, for example,

Table 5.4 Compliance of the Turkish natural gas market law with the EU directives

	EU First Directive (1998/30/EC)	*EU Second Directive (2003/55/EC)*	*EU Third Directive (2009/73/EC)*		*Turkey The 2001 Law*	
Effective date	10/08/98	04/08/03	03/09/09		02/05/01	
Transposition date	10/08/00	01/07/04	03/03/11		–	
End of validity	30/06/04	02/03/11	–		–	
Unbundling	Transmission • Accounting (mandatory) • Legal (optional) Distribution: • Accounting Storage: • Accounting	TSO and DSO[a] • Legal (mandatory) • Management (optional) • Accounting (optional) (Possibility of exemption from legal & management unbundling for DSOs)	TSs & TSOs[b] • Ownership – ISO – ITO Establishment of LNG & Storage System Operators (LSOs & SSOs)	DSOs • Legal • Management • Accounting	TSO (BOTAS) • Accounting[c] LSOs & SSOs • Accounting	DSOs • Accounting • Legal Distribution & retail still bundled
TPA	Transport and LNG access: rTPA, nTPA or hybridTPA Distribution and price system: Postage stamp tariffs Distance-related tariffs Entry-exit tariffs	Transport: rTPA Storage: rTPA, nTPA	Transport: rTPA Storage: rTPA, nTPA Upstream pipelines: rTPA, nTPA		Transport: rTPA Storage: rTPA Distribution and price system: Postage stamp tariffs Entry-exit tariffs	

Market opening[d] (Eligible consumers)	Phase 1 (20% openness): Power Gen. & Retail consumers of >25 mcm by 2000 Phase 2 (28% openness): PGs & all consumers of 15 mcm by 2003 Phase 3 (33% openness): PGs & all consumers of 5 mcm by 2008	All consumers except households by 2004 All consumers by 2007	Consumers eligible in multiple systems can have supply contracts in another state	80% market openness Formerly: >1 mcm for old distribution regions >15 mcm for new distribution regions As of 2019: All consumers (except households with <75.000 m^3 consumption) served by distributors/tenderers completed 5 years in business (as stated in tender notice/license for new distribution regions)
Regulatory body (RB)	Establishment of a RB	Establishment of a RB	Establishment of ACER to complement national regulators	Establishment of EMRA in 2001

Source: EMRA; EC (2000); EU Law and Publications (First; Second; Third Gas Directives)

[a]Countries serving less than 100,000 customers were exempted from both legal and management unbundling requirements for their DSOs

[b]Further separation of production and supply from transmission networks

[c]BOTAŞ accounting unbundling meant separation for monopoly BOTAŞ' trading (import, export and wholesale) and transmission and storage (LNG) activities

[d]First Directive also introduced a "ceiling" on market opening (concerned states wherein the market openness was already >30% in phase 1 could limit their openings in a balanced manner, namely to 38% in phase 2 and 43% in phase 3)

Table 5.5 Timetable of actions required by the 2001 Law

Actions Required			2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Enactment of 2001 Law															
Preparatory Period															
Unbundling of BOTAŞ	Accounting by 2003	Distributors													
		BOTAŞ													
	Legal by 2009	BOTAŞ													
Privatisation of BOTAŞ' Activities															
Gas Release Program (Private 80%, BOTAŞ 20%)															
Mandatory Storage	Importers														
	Wholesalers	Sales to Eligible Cust.													
		Sales to Distributors													

Source: Akçollu (2006, 11)

acceptable accounting principles and procedures; regulating third-party access to network and storage/LNG facilities; unbundling; wholesale and retail pricing; and setting tariffs for transmission, storage and distribution services.

Similar to regulators of other countries in the liberalisation process, the EMRA is considered administratively and financially autonomous,[8] growing in experience and improving the clarity of its secondary legislation via regulations, communiqués and Board decisions (USITC 2001). With regard to establishing a competent regulatory authority with the same minimum set of competences to be shared in all other member states, as required by the 1st and 2nd Directives, the alignment with the EU's Directives was fully achieved by the 2001 Law (Akçollu 2006). Given the monopolistic structure of the Turkish natural gas market and the national champion BOTAŞ being responsible for virtually all operational activities within the entire gas market, the EMRA was given the task of processing Turkey's gas market transition from exclusive ownership and control by BOTAŞ in both upstream and midstream activities to the competitive market. The EMRA has been allowing private sector participants in various gas market activities previously reserved solely for BOTAŞ by granting, amending and policing licences/certificates to companies which either produce, import, transmit, store, wholesale, export or act as retail suppliers since 2003. The EMRA forms not only the secondary legislation

[8] The EMRA is mostly financed through fees collected from certificates; approvals; permissions; visa transactions and licence applications, including renewals, modifications, licence copies and annual licence fees.

but also determines the conditions and fees of the licences and arranges the transfer of operating rights within the scope of existing contracts based on the provisions of the 2001 Law. Table 5.6 illustrates responsibilities of the EMRA in line with other regulatory bodies.

The EMRA consists of the Energy Market Regulatory Board and Presidency and Service Units whilst the power of decision taking fully lies with the Board. The Board has nine members with one president and a

Table 5.6 Tasks of the energy market regulatory authority

Allocation of Licences and Certificates	• Granting, amending, policing and revoking (when necessary) licences to companies which produce, import (long term or spot), transmit (piped gas, LNG or CNG), distribute, store (LNG or underground), wholesale, export or act as retail suppliers or gas operators • Determining length, scope, conditions and fees of licences and rights and liabilities of the licensees • Arranging transfer of operating rights within the scope of existing contracts • Forming, modifying, executing and auditing distribution and customer services regulations
Allocation of fair/ reasonable profits	• Regulating natural gas transport and distribution to ensure that prices charged are fair and reasonable in Turkey
Promoting competition	• Promoting and protecting competition both in gas supply and demand markets to prevent power abuse of existing monopolist(s) • Ensuring compliance with the legislation designed to prevent further monopolies • Cooperating closely with the Turkish Competition Authority
Efficiency and rationality	• Promoting rational use of natural gas whilst ensuring due protection of the environment in Turkey
Optimisation of quality	• Promoting interests and rights of Turkish users through improvement of quality of public service • Setting service quality standards, which may be accompanied by financial incentives and penalties
Reliability, safety and continuity of the services	• Setting technical and safety standards for the Turkish gas industry • Raising the levels of safety and reducing the number of incidents connected with the provision of service • Ensuring the continual and uninterrupted provision of services at all times • Promoting efficiency and continuity of transport and distribution services
Market opening	• Revising definition and conditions of eligibility and announcing thresholds for eligible customers at the end of December each year

(*continued*)

Table 5.6 (continued)

Third-Party Access	• Facilitating and enforcing non-discriminatory TPA to existing and newly constructed networks (provided that sufficient capacity is available), and promoting better operation, reliability and equality • Setting standards for management of transmission network capacities in a transparent, reliable and fair manner whilst consulting all relevant parties whilst setting up principals • Determining charges for capacity procurement and utilisation • Approving a suitable methodology for access tariffs proposed by BOTAŞ • Approving structure of balancing market and methodology for setting fixed charges for the purchase and sale of balancing energy • Determining rules, in some cases, for allocation of costs for (un) bundled businesses and taking an active role in setting out requirements of the compliance audit • Reviewing and implementing rules for transparent and non-discriminatory allocation of congested infrastructure • Carrying out an audited account of the use of any revenues from capacity allocation mechanisms • Involving in investment decisions of network operators through revenue-setting procedure (and deciding on possible exemptions for TPA for new investments, if any) • Developing guidelines concerning the form and content of applications for coverage under the BOTAŞ network code
Guidelines for consumer switch procedure	• Enabling customers with simple and flexible procedures to change supplier without charge • Metering of consumption, including designation of who is responsible at what cost
Monitoring and reporting	• Monitoring and reporting to the Ministry on security of supply issues • Supervising fulfilment of obligations and rights of concessionaires and licensees • Carrying out all inherent and necessary actions for fulfilment of the functions of transport and distribution services in accordance with the prevailing rules • Monitoring market performance of participants and keeping records • Ensuring compliance of obligations and rights of licensees with environmental legislation • Examining market and system operations • Ensuring the NGML is authorised and appropriately treated in the market • Enforcing and improving transparency of regulations

(*continued*)

Table 5.6 (continued)

Unbundling	• Eliminating restrictions on foreign trade • Providing partial or full unbundling of natural gas transportation services from gas marketing services • Requiring all firms to maintain an accounting separation between business segments
Pricing structure	• Identifying and ensuring cost reflecting prices
Securing investments	• Overseeing the introduction of investment • Promoting investments to ensure supplies in the long term • Involving in investment decisions of network operators through revenue-setting procedure and decides on possible exemptions for TPA for new investments
Dispute settlement	• Acting as dispute settlement authority for the upstream industry • Conducting settlement procedures inclusive of financial compensations • Ensuring service quality standards (accompanied by financial incentives and penalties when necessary)
Guidelines for other issues	• Designating a supplier of last resort (SoLR) although the SoLR has not been yet designated in Turkey • Defining new functions for meters • Encouraging introduction of new technologies enabling more sophisticated metering of consumption

Source: EMRA; Campodónico (1999), USITC (2001)

vice president, and they are appointed by the Council of Ministers, among those who hold degree in law, political sciences, administrative sciences, public administration, economics, engineering, management or finance degree as well as having had at least a ten-year experience in public institutions/organisations or private sector. The EMRA follows the government renumeration policy with some autonomy, and has not signalled any problem in attracting and, more importantly, retaining its professional staff because of it. In terms of losing staff to the regulated industry, the EMRA does not have any restriction for professional staff leaving the agency although a cooling-off period applies to the case of senior management (whilst former board members and agency heads keep receiving remuneration during this period). The Board members have a fixed term office of six years and they cannot be taken from office before the term ends (unless found guilty of breaching the terms or committed offence in relation to their duties). They are entitled to be reappointed for another term (EMRA 2018b).

During the last 18 years, there was a noticeable acceleration of change in the attitudes of both the EMRA and market players, and how they interact. Whilst acknowledging the accelerated evolution, with the prospect of further and gradual revolution it would be wise not to underestimate the independence of the EMRA or in fact market regulators in general. The EU gives highest importance to independence of NRAs whilst this issue also underpins a rising reliance on natural gas liberalisation process. The same applies to the OECD, and in its dedicated report published in 2016 it looks at how independence works in practice together with key trends and evidence from selected OECD countries (OECD 2016). Based on the OECD survey questionnaire, Table 5.7 presents key features of regulatory independence evidence from Turkey.

According to OECD (2016) it is inevitable and indeed desirable that executives and regulators interact in their daily work. For Turkey, these interactions are mainly informal although Turkey is one of those countries where government can participate in public consultations and when they do their submissions are given the same weight as other stakeholders. Generally, the Turkish government communicates with the EMRA directly (via informal contact) and indirectly (via media statements). Whilst the EMRA receives instructions/official guidance from the government on long-term strategies, it confronts equal pressures from industry, too. Their interactions are also formal (e.g. via consultations and public enquiries for the development of regulatory decisions as well as conflictual where the industry challenges the regulator's decisions through judicial review) and informal (via media, public events and informal meetings). The government issues informal statements on its expectations of the conduct of the regulator's activities and because they are non-binding it provides the EMRA a loose policy framework within which it has liberty to choose how it plans to meet those expectations. To avoid being subject to pressure and potential conflicts of interest and to institute transparency and disclosure requirements for both its staff and activities, the EMRA commits to the Public Service Ethics Code. Nomination and appointment of the EMRA's Board/Head is respectively made by the government and the Head of State without executive power. The Board/Head then becomes responsible for the final appointment of the EMRA's own professional staff. Whilst senior management is responsible to a head of professional body, they are directly accountable to the government by Law.

As mentioned before the EMRA's funding sources are collected directly from fees, other charges and fines which do not go through the national

Table 5.7 Key features of regulatory independence evidence from turkey

Instructions from executive							
Reporting and Accountability	To whom senior management is responsible to?	Board	Head of professional body	Chairperson	Board/Chair and Head of professional body	Executive	Legislature
		–	✓	–	–	–	–
	To whom senior regulator is directly accountable by law or statute?	Representatives from regulated industry	Parliament	Government	Other		
		–	–	✓	–		
Taking instructions	In which cases the regulators receive instructions or official guidance from government or parliament?	Long-term strategy	Work programme	Individual cases or decisions	Appeals		
		✓	–	–	–		
Ethic codes and Training	Use of ethics codes amongst regulators	Regulator's ethics code	Public service ethics code	Regulators and public service ethics code			
		–	✓	–			
Retention	Regulators' remuneration	Government salary policy	Autonomous salary policy	Government salary policy w/some autonomy			
		–	–	✓			
Stating expectations	Does government issue formal statements on its expectations of the conduct of the regulator's activities?	No	Yes-binding	Yes-non-binding	Yes-only for non-regulatory activities		
		–	–	✓	–		
Indicating preferences	How does government indicate its preferred position regarding regulatory decisions, if it does so?	Public consultation	Media statements	Informal contact	Official written correspondence	Indirectly via industry	
		✓	✓		–	–	

(*continued*)

Table 5.7 (continued)

Staff							
	Who appoints the regulator's staff?	Professional body	Board head	Board and professional body	Minister		
		–	✓	–	–		
Nomination	What authority nominates the board/head?	Executive	Mixed selection committee	Independent experts only	Executive and Legislature	Legislature	Up to government
		–	–	–	–	–	✓
Appointment	What authority nominates the board/head?	Executive	Head of state without executive powers	Legislature	Executive and legislature	Other regulator	
		–	✓	–	–	–	
Tour of duty	Is there security of tenure for board members/head?	Yes	No				
		✓	–				
Exit	Restriction on pre- or post-employment of professional staff	No restriction	Cooling-off period	Conflict of interest rules	Restrictions before leaving	Cooling-off for senior management and Restrictions before leaving	
		✓	–	–	–	–	
	Are there restrictions on pre- or post-employment of board members/head?	No restriction	Cooling-off period	No restriction but conflict of interest rules			
		–	✓	–			
Budget							

Funding sources	What are regulators' funding sources?	Fees and other charges/fines	Fees and general revenues	General revenues
		✓	–	–
Determining the fees	Who sets the regulatory fee?	Regulator	Minister or government	
		✓	–	
Appropriating general revenues	What is the timeline for budget appropriations	Annual	Multi-annual	
		✓	–	

Source: Compiled by author based on OECD (2016) and Interview data

treasury and a parliamentary appropriation unlike most NRAs in Europe. The fees are fixed by the regulator itself and the timeline for budget appropriations is annual. The EMRA is subject to the Public Finance Management and Control Law No. 5018 which powers the Supreme Court of Accounts for external audits of the EMRA. It gets audited for its financial activities, decisions and transactions and whether or not they comply with laws, institutional objectives and national plans, and the results are reported to the Turkish Grand National Assembly (TBMM). The Minister of Energy and Natural Resources is fully entitled to audit all activities and transactions of the EMRA whilst the State Supervisory Council and Prime Ministry Inspection Board can also do so if requested (ibid., 8).

5.3.2 Unbundling

BOTAŞ, acting on an entirely monopolistic structure up until 2 May 2001, was responsible for gas procurement, transport, distribution, storage and wholesales in the Turkish natural gas market. This very structure, as discussed in Chap. 2, makes BOTAŞ a perfect candidate for a solution called vertical separation, or unbundling, which is proposed to increase the independence of network managements and to foster network companies' direct focus on their main activities by encouraging innovations and investments in the grid (Mulder et al. 2005). Whilst academic debate over its merit continues, the EU directives have introduced unbundling regimes with different degrees of structural separations for the member states with a main goal of separating network operations from production and supply activities. The 2001 Law required BOTAŞ to keep separate accounts for each activity it is involved in from 2003 onwards and to continue its vertically integrated structure (except for distribution) until 2009. A restructuring was envisaged thereafter and according to which BOTAŞ was only to be left with the monopoly on pipeline transmission whilst other to-be-formed legal entities were to be privatised by 2011 (Temporary Art. 2). Nevertheless, in Turkey where the implementation of such a drastic unbundling regime had been long prescribed, no step has been taken towards either legal separation or ownership unbundling of BOTAŞ. Presently, BOTAŞ' transmission and commercial activities are only subject to accounting unbundling (Table 5.8).

Acknowledging the regulatory gap outlined above, the AKP government considered revising the NGML Law and consulted the Turkish Competition Authority regarding the restructuring of BOTAŞ under Law

Table 5.8 TSO unbundling regimes in Europe

Country	*NRA*	*Company*	*Unbundling model*	*Country*	*NRA*	*Company*	*Unbundling model*
AT	e-Control	Gas Connect	ITO	ES	CNE	Reganosa	OU
AT	e-Control	NABUCCO	Other	ES	CNE	ENAGAS	OU
AT	e-Control	TAG	ISO	FR	CRE	GTRgaz	ITO
AT	e-Control	BOG	ITO	FR	CRE	TIGF	ITO
AT	e-Control	TAG	ITO	FR	CRE	TIGF	OU
AT	e-Control	Gas Connect Austria	ITO	GR	RAE	DESFA	ITO
BG	DKER	Bulgartransgas	ITO	HU	HEO	FGSZ	ITO
BE	CREG	I (UK)	OU	HU	HEPUA	Magyar Gaz Tranzit	OU
BE	CREG	FLUXYS	OU	IE	CER	BGE	ITO
CZ	ERU	NET4GAS	ITO	IT	AEEG	ITG	ITO
DE	BNetzA	Bayernets	ITO	IT	AEEG	SNAM Rete Gas	ITO
DE	BNetzA	Fluxys	OU	IT	AEEG	SNAM Rete Gas II	OU
DE	BNetzA	GRTGaz	ITO	IT	AEEG	SGI	OU
DE	BNetzA	jordgas	ITO	LT	NCC	AB Amber Grid	OU
DE	BNetzA	Nowega	ITO	NL	NMa	Gasunie Transport	OU
DE	BNetzA	Terranets	ITO	NL	NMa	BBL	Other
DE	BNetzA	GASCADE	ITO	PL	URE	Gaz-System	OU
DE	BNetzA	GTG Nord	ITO	PL	URE	Gaz-System Yamal	ISO
DE	BNetzA	Ontras	ITO	PL	URE	Gaz-System Yamal II	ISO
DE	BNetzA	Gasunie Transport	OU	PT	ERSE	REN Gasodutos	OU
DE	BNetzA	Thyssengas	ITO	RO	ANRE	Transgaz	ISO
DE	BNetzA	OGE	ITO	SE	EI	Swedegas	OU
DE	BNetzA	NEL	ITO	SI	AGEN	Plinovodi	ITO

(*continued*)

Table 5.8 (continued)

Country	*NRA*	*Company*	*Unbundling model*	*Country*	*NRA*	*Company*	*Unbundling model*
DE	BNetzA	Gasunie Ostsee	OU	SK	URSO	Eustream	ITO
DE	BNetzA	Fluxys DE	OU	TR	EMRA	BOTAŞ	Accounting
DE	BNetzA	OGE	ITO	UK	Ofgem	BBL	Other
DK	DERA	Energinet-gas	OU	UK	Ofgem	Interconnector (UK) Ltd	OU
ES	CNE	Reganosa	OU	UK	NIAUR	PTL	OU
ES	CNE	SAGGAS	ISO	UK	NIAUR	BGTL	OU
ES	CNE	ENAGAS	ISO	UK	Ofgem	PTL	OU

Source: GIE; EMRA

No. 4054 on the Protection of Competition in 2012. The initial revision to the Law foresaw an ownership unbundling for the existing vertically integrated company and envisaged the establishment of two separate corporations: (1) BOTAŞ to be responsible for transmission and operations of storage and LNG facilities; and (2) Doğal Gaz Ticaret ve Taahhüt A.Ş. to take over the import, export and wholesale activities, which would eventually comply with legal unbundling. As presented in Chap. 3, it was the Third Directive that introduced the radical "ownership unbundling (OU)" of network businesses and given the fierce opposition from France and Germany it did not become mandatory but remained optional along with comparably milder legal and functional separations to go with (i.e. ISO and ITO). For various reasons elaborated upon in their official response paper, the Competition Authority of Turkey argued that the country had more legitimate reasons than France and Germany to not opt for the radical OU given its strengths and weaknesses both nationally and internationally, and suggested BOTAŞ set up a trading company, Doğal Gaz Ticaret ve Taahhüt A.Ş., as a separate legal entity only (Soysal et al. 2012).

Another concern of the 3rd Directive was the specifics of exactly what is to be unbundled at the retail level and the designation of DSOs and closed distribution system (CDS) operators as per Article 24–28. The 2001 Law has, however, not distinguished between distribution and retail, and (due to franchising) distribution is presently a monopoly in every region whilst every distributor is also a retailer (Yilmaz n.d.). When viewed from this perspective the unbundling of Turkish DSOs is still in accordance with the Second Directive, which required the effective legal and accounting unbundling of distribution companies. More than 70 distribution companies are now unbundled to a certain extent but of course the discussions held at the EU level regarding, inter alia, how to forestall DSOs' taking advantage of their competitive position on the market (not least household and small non-household customers, who bear the ultimate risk, to be the high candidate for priority) (CEER 2013) seem far away with the Turkish decision-makers and energy regulator under the current circumstances.

From the standpoint of the EU, ownership unbundling is the most effective tool to solve the inherent conflict of interests and hence free the network operator from any supply and production interests. Article 11(3b) of the 3rd Directive explicitly states that if certification is requested by a transmission system owner or a TSO which is controlled by a person(s)

from a third country or third countries, the NRA should notify the Commission and refuse the certification if it should put at risk the security of the energy supply of the member state and the Community. By that, the EU principally targets Russia's attempts to be involved in the downstream markets of European countries and aims to thwart Gazprom and all other corporations representing Gazprom's interests from acquiring transmission operators due to the "level playing field" provision that bars vertically integrated utilities from these markets. In other words, Gazprom will have to prove the compliance of its subsidiaries with effective unbundling regulations to the national regulators (Grätz 2009, 78).

This argument holds true in the Turkish case as well. As presented in Chap. 4, BOTAŞ has transferred two of its long-term gas purchase contracts to private companies, and a detailed analysis of ownership structures of these companies (Table 5.9) suggests that Russia's downstream expansion in the Turkish gas market is likely to remain the status quo.

Table 5.9 Contracts transferred to private companies and ownership structures

	Private company	*Import destination*	*Import amount (bcm)*	*Ownership structure*
Gas Release Programme 1	Shell Energy A.Ş.	Russia	0.25	Royal Dutch Shell—100%
	Bosphorus Gas Corp. A.Ş.	Russia	0.75	Gazprom Germania—71%, Tur Energy—29%
	Enerco Enerji San.&Tic. A.Ş.	Russia	2.5	Akfel Group—60%, OMV Gas&Power—40%
	Avrasya Gaz A.Ş.	Russia	0.5	Gaprombank—60%, Tahincioğlu—40%
		Total	4 bcm	
Gas Release Programme 2	Kibar Enerji Dağ. San. A.Ş.	Russia	1	Kibar Holding—100%
	Bosphorus Gas Corp. A.Ş.	Russia	2	Germania Gazprom—71%, Tur Energy—29%
	Akfel Gaz San. ve Tic. A.Ş.	Russia	2.25	Gazprom Schweiz—100%
	Batı Hattı A.Ş.	Russia	1	Eksim Group—60%, BIM—40%
		Total	6 bcm	

Source: EMRA; Rzayeva (2014)

Control of Akfel Gaz and its shares in Avrasya Gaz and Enerco Enerji were transferred to the Saving Deposit Insurance Fund (TMSF) of Turkey due to owners' involvement in the coup attempt in July 2016

Initially, in three out of the seven companies the ownerships had been largely with Russia's Gazprom, and as per the Turkish Competition Authority's decision on the case of Akfel Gaz in 2015 the number of Russian-controlled Turkish import companies increased to four.[9] The analysis in Chap. 4 presented that no import countries had the motivation to sell gas to companies other than BOTAŞ in the course of 2005 unless some of which were forward integrated into the market and made money that way (Deloitte 2012). Although one would argue that these companies do not seem to be a direct threat to the transmission operator BOTAŞ just yet, they are indeed the country's fresh suppliers brought into the sector to provide competition and better priced natural gas to customers. Most of those companies have now directly integrated themselves with the main supplier, Russia, with noticeably cheaper import prices compared to their counterparts. This grand strategy of Russia to implicitly re-sell gas to itself as a means of such importers and gaining ground in the Turkish domestic market can be considered as a straightforward illustration of Turkey's vulnerability and market players' expose to asymmetry of information, discrimination and non-transparency as acknowledged in the 2012 report of the Competition Authority of Turkey (Soysal et al. 2012).

5.3.3 Market Opening

As discussed in Chap. 4, distribution is one of the very few segments in the Turkish gas industry wherein only private entities have actively participated since 2003 if one ignores the binding provisions of the Law that oblige respective municipalities to remain in the process with at least 10% of the shares. Prior to the implementation of the 2001 Law, the gas distributors were responsible for supplying gas to customers regardless of their eligibility in so-called old regions.[10] In line with the EU Gas Directives which obliged market opening, or retail choice, for all customers from July 2007, the Board of EMRA passed the first amendment to the 2001 Law on 27 December 2002 (Decision No. 76) and distinguished the eligible customers (and customer associations) as below:

[9] The control of Akfel Gaz (and its shares in Enerco Enerji and Avrasya Gaz) was transferred to the Savings Deposit Insurance Fund of Turkey (TMSF) due to shareholders' involvement in the coup attempt in 2016.

[10] Istanbul, Ankara, Eskisehir, Izmit, Bursa and Adapazari are the old regions whereby seven privately and/or municipality-owned natural gas companies started the distribution of natural gas was between 1992 and 1998.

(1) *Gas-fired power generators*
(2) *Combined heat and power co-generators*
(3) *Natural gas producers*
(4) *Other final customers and customer associations consuming more than 1 mcm of gas* (Article 8a)

Whilst the eligibility of customers in the first three categories was independent from their annual consumption level and the 1 mcm threshold remained effective for the old region customers only, the EMRA was empowered to set and approve the eligibility limits for the new region consumers (based on regions' development, infrastructure and gas consumption levels). This was changed in 2004 however and all customers of the new regions who used more than 15 mcm per annum were entitled to eligibility according to the Board Decision No. 408. Those that informed their regional distributors about their commitment to exceed the threshold within the current year and submitted their bilateral agreements with other suppliers were also acknowledged as eligible customers. The 2006 amendment extended the opening to certain customers who owned more than one facility within the same region and allowed them to be considered as eligible by the sum of their estimated consumption at each facility if that was how they could exceed the set threshold (Dec. No. 1032).

From 2008 the eligibility limits have continually reduced from 1 mcm down to 700,000 m^3 in 2011, to 300,000 m^3 in 2013 and finally to 75,000 m^3 in 2015. The regional differences in terms of threshold levels were also removed to make the provisions applicable to all customers. Of course, that is not to say all consumers based in the new regions could just choose their marketer as they wished since the Law continued to approve the captivity of household and other small ineligible customers to distributors, who won the franchise biddings to supply the region with gas, at least for the first five-year period (Dec. No. 1808/1; 2966) (Table 5.10).

As illustrated in Fig. 5.4, the customer range with substantial market shares in 2011 spanned from eligible customers with more than 700,000 m^3 gas consumption (using 38.65% of total gas supply) to comparatively small users (61.35%), including residential users, businesses, government offices and other small-scale industrial users (EMRA 2012). The number of captive residential customers who were served by their regional distributors accounted for 78% of small customers in 2014 (EMRA 2014) and as of 2018 the share of eligible customers was 4.07% in total (EMRA 2018a). Although in a perfectly competitive market such a percentage would have

Table 5.10 The evolution of eligible consumer thresholds in Turkey, 2005–2018

Years	*No. of board decisions*	*Eligible consumer limit (m^3)*	
		Current companies and successful tenderers completing the first 5 years	*Other companies granted licences upon tenders*
2005	408	1,000,000	15,000,000
2006	629	1,000,000	15,000,000
2007	1032	1,000,000	15,000,000
2008	1438 and 1808	1,000,000	15,000,000
2009	1896	1,000,000	15,000,000
2010	2378	800,000	15,000,000
2011	2966	700,000	15,000,000
2012	3600	300,000	15,000,000
2013	4168	All consumers except the ones with less than 300,000 m^3 consumption (households) are eligible consumers	Stated in the tender notice and the licence
2014	4793	All consumers except the ones with less than 100,000 m^3 consumption (households) are eligible consumers	Stated in the tender notice and the licence
2015	5362	All consumers except the ones with less than 75,000 m^3 consumption (households) are eligible consumers	Stated in the tender notice and the licence
2016	5920	All consumers except the ones with less than 75,000 m^3 consumption (households) are eligible consumers	Stated in the tender notice and the licence
2017	6778	All consumers except the ones with less than 75,000 m^3 consumption (households) are eligible consumers	Stated in the tender notice and the licence
2018	7537	All consumers except the ones with less than 75,000 m^3 consumption (households) are eligible consumers	Stated in the tender notice and the licence

Source: EMRA (2018b, 24)

made that category of customers the most targeted for gas suppliers to compete on the landscape of the Turkish retail gas market has nonetheless closed this large section of the market to competition since 2003, due to franchised distribution regions, and residential customers having not been able to capture the benefits that an open market would purportedly bring. Theoretically, market openness in all its forms was energised in the 2001 Law in that the operation of competitive gas markets would work to further stability and socially beneficial economic outcomes. The Law foresaw

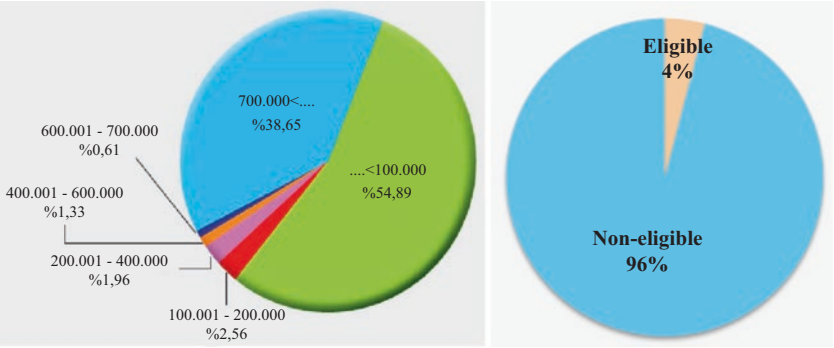

Fig. 5.4 Natural gas customer profiles in Turkey, 2011–2017. (Source: EMRA (2012, 2018a))

the materialisation of openness by reducing the market share of the sole player BOTAŞ and thus the emergence of alternative suppliers for the customers. When compared with a number of EU MSs which outperformed the provisions in the Directives and managed to realise 80% or more market openness as early as 2005,[11] it would not be incorrect to say that Turkey's aim of opening four fifths of the market has not been achieved at all and is unlikely to be so until BOTAŞ' still existing 78% market power (decreased from 100%) is further diminished.

Encouraging the active participation of consumers to influence suppliers through their choices, improvement of products and services regarding both quality and price is of high importance (UNECE 2012). Almost two decades since the momentous 2001 Law, eligible customers have made no significant switch from one supplier to another in Turkey and the switching rate in 2011 remained as low as 13.99% similar to the 14.10% rate of 2010. Not surprisingly, given their bargaining power and asymmetry of information in the market, the sale of 83% of natural gas was realised by the very large eligible customers who chose to trade with alternative suppliers whilst small eligible customers preferred to re-negotiate their terms with the local retailers (EMRA 2012). Most switching actions took place in the new regions (Fig. 5.5).

[11] Such as Austria, Denmark, Germany, Italy, the Netherlands, Spain and the UK 100%; Greece and Sweden 95%; Belgium and Finland 90%; Ireland 86% and finally Luxembourg 80% (CNE 2012).

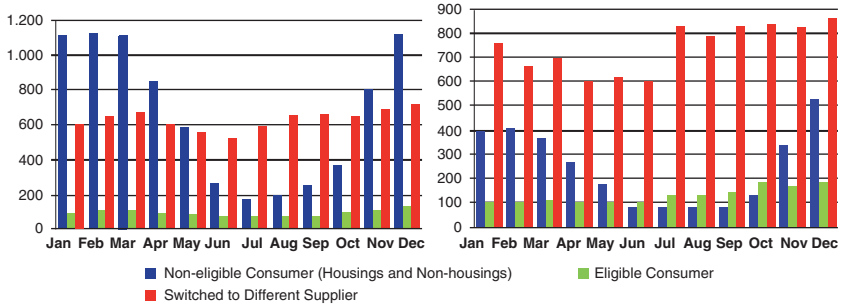

Fig. 5.5 Gas sales to eligible and non-eligible customers by distributors, 2011. (Source: EMRA (2011, 56–57))

Turkey has aimed to introduce competition into the retail segment of the industry in phases and all the amendments made to the Law have required a series of measures to provide eligible customers free choice of supplier and to enable other suppliers such as importers, producers and wholesalers to serve those eligible customers (Dec. No. 4169 Art. 13). At the end of 2017, there were ten E&P companies at the service of eligible customers and sold 59.68% their produce to these customers with the additional wholesale licences they held. TPAO and Thrace Basin Natural Gas Corporation are actually the oldest and largest E&P companies in the market collectively providing more than 80% of the supplies since 2003 whilst Park Place Energy Limited-Türkiye and Corporate Resources B.V. Ltd. are the latest entrants to the market.

According to the 2001 Law production companies must have shipping and delivery agreements with the transmission company to gain a wholesale licence (unless have their own transmission pipelines) although they are allowed to transport their gas to eligible customers through direct lines should the production fields be remote from the connection systems. There are nine import licensees[12] able to sell piped gas to eligible customers and eight of these have contracts with BOTAŞ to transport their gas both from abroad and to eligible customers through its infrastructure. In terms of importation of spot LNG, BOTAŞ and Egegaz are the only entities that own and operate their own LNG terminals whereas the other 44 companies who applied as new entrants into this large-volume LNG retail

[12] BOTAŞ alone holds seven licences for its import contracts with different countries.

segment are without one. To the contrary, transmission of LNG is fully participated in by 14 private licensees with no state participation at all.

With regard to prices, both captive residential customers and eligible customers who did not switch continue to purchase gas from their franchised distributors at regulated prices whereas other large customers and their choice of suppliers are free to determine the prices and transaction conditions between them as long as the regional distributor is notified within 15 days[13] (Dec. No. 4169 Art. 8a). In such cases, the distributor reserves the right to ask the switching customers to replace their existing meters with remote reading meters to make instant information flow reachable in real time.[14] Additionally, customers who consume 300 mbar gas (or higher) are required by the EMRA to establish an automatic volume corrector system once they gain the eligibility (Art. 7b).

The fees for the eligible customers who fail to meet the eligibility thresholds (those who continue to be supplied by their regional distributor) in any given year remain bundled with the price of transportation, unit service and depreciation charge, and the difference between the retail prices charged to eligible and non-eligible customers by the distributors. Should distributors be charged differently by their own supplier based on the number of eligible customers they have in the region, then the failed eligible customers shall also pay that difference to the distributor which is to be returned to the supplier of the distributor in the first place. The liability for paying regional distributors the retail price difference between eligible and non-eligible customers persists even when the failed eligible customers are provided gas by other suppliers (Dec. No. 4169 Art. 3).

When complaints handlings are looked at, major differences can be seen between the EU MSs and Turkey. Whereas invoicing and debt collection were the key problem throughout Europe in 2017 (by 26.8%), Turkey's EMRA received more complaints related to grid connection during the same year (by 60%), as shown in Fig. 5.6. The difference prevails amongst the type of complaints the EU and the Turkish NRAs get since priorities of the customers are currently different. European customers mainly worry about the prices because they have been all eligible since

[13] Not doing so may cause the eligible customers to be still served by the regional distributor. The timetable for eligible customers to return from other suppliers back to their regional distributor is 15 working days prior to the expiry date of their current agreements.

[14] Vice versa, the distributors are obliged to provide the eligible customers with technical information about the current counters upon written request (Dec. No. 4169 Art. 7a).

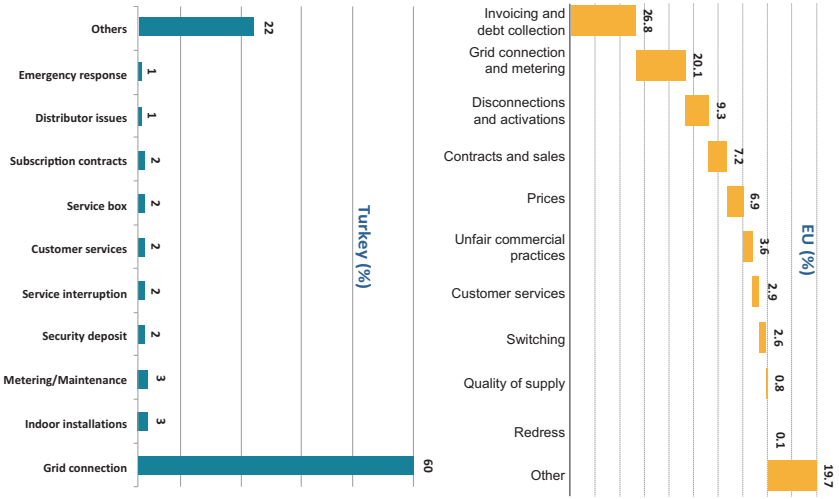

Fig. 5.6 Average shares of EU and Turkish consumer complaints addressed to NRAs, 2017. (Source: EMRA (2018b), Gence-Creux et al. (2018, 43))

2007 and perfectly entitled to switch between suppliers if they think prices or services are not right for them. Nonetheless, the Turkish customers are captive and the regulated price they pay is the same for everyone within the same category of consumer groups. Unless they become eligible or some sort of switching right is given to them we expect these differences to continue but only change forms if any. One to two months is generally accepted time period for the NRAs of the MSs to respond to a complaint although the suppliers and DSOs are expected to handle them even earlier. This period in Turkey is one month and the EMRA is responsible for handling complaints itself and forwarding them to another body if and when needed.

The complaints are expected to continue as long as the mis-selling attempts of suppliers continue in both Turkey and the EU. Indeed, between 2003 and 2008, there were continual cases against EGO (then the gas distributor of Ankara), for unfair practices such as not informing the consumers regarding their gain/loss of eligibility in writing, preventing them from switching by not informing them about their rights and more importantly charging the eligible customers by the wrong pricing formulae where the USDC rate was added to the cost of natural gas rather

than the transportation fee which, by the 2001 Law, could not be more than the USDC. In March 2003, EGO was fined by the EMRA and given 15 days to stop its unfair actions. In addition, it was decided the customers charged extra were to be reimbursed based on a monthly calculation correctly done by the company within a maximum 90 days together with their names and titles to be published both on the company's website (for 60 days) and twice in two local newspapers (Dec. No. 1537/1).

5.3.4 Third-Party Access to Transmission Network

Since the production sites and entry points for natural gas imports are concentrated in a few provinces BOTAŞ owns and operates extensive pipelines to move gas from suppliers to customers throughout Turkey. In order to curtail the exercise of monopoly power and to eliminate certain forms of access discrimination, the Turkish government issued the regulation for Transmission System Operations in 26 October 2002. Providing the legal basis for a national access regime this regulation paved the way to form the basics of the Network Operation Principles and Procedures (EMRA 2013). Incorporating this commitment into a new piece of binding legislation the BOTAŞ Network Code (BNC) was published on 1 September 2004. Nevertheless, this did not necessarily translate into immediate enforcement until the emergent request of the wholesale company, AKSA Doğal Gaz Toptan Satış A.Ş., to transmit the production of TPAO from the Akçakoca field through the BOTAŞ network in July 2007. This was followed by enquiries from other participants—Shell Enerji A.Ş. in December 2007, Bosphorus Gas Corporation, Enerco Enerji and Avrasya Gaz in 2009—to use the infrastructure for natural gas imports from Russia as a result of the contract release programme (Deloitte 2012; EMRA 2012). However, despite its exclusive ownership and operatorship in transmission, BOTAŞ has been thwarted from holding any exclusive territorial rights and hence the building, owning and operating of the new transmission systems are not in any way limited or restricted. No company has nonetheless come forward to build one thus far due to potentially large cost recovery and perhaps the avoidance of duplication of facilities.

Setting terms and conditions for the organisation of access to natural gas networks, especially in vertically integrated markets, is rather challenging with profound implications for how gas will be priced and traded domestically and internationally. Chronologically, the EU's first, second and third energy directives have introduced progressive terms regarding

the TPA to European gas systems. Whereas the First Directive allowed shippers and transporters to either negotiate the right of access to transmission networks in good faith (nTPA) or to follow a more regulated route on the basis of published tariffs and other obligations (rTPA) with regulatory oversight, the later directives eventually abolished the nTPA and the accessions now have only to be regulated. Under the provisions of the 2001 Law and the BNC, TPA to transmission networks in Turkey is regulated between shippers and the transmission system operator and EMRA sets the transmission tariffs.

According to the definitions set out by the directives and the guidelines for good TPA practice for storage system operators (GGPSSO), member states are provided with the choice of nTPA and/or rTPA to storage facilities, line-pack and other ancillary services. The 2001 Law stipulates negotiated access to storage and LNG terminals and leaves the parties to come to voluntary commercial agreements (Tariffs Reg. Art. 15). However, it is specified in the same Regulation that until the country's storage capacity reach a sufficient level the accessions may be regulated (Table 5.11) (ibid., Temporary Art. 2). This clearly bears the scars of country-specific difficulties relating especially to gas storages proving that what may be straightforward from a regulatory perspective could be much more difficult in practical terms.

Table 5.11 Third-party access regime to gas networks in selected countries

Country	*TPA to*		*Country*	*TPA to*	
	Transmission	*Storage*		*Transmission*	*Storage*
Austria	Regulated	Negotiated	Latvia	Regulated	Regulated
Belarus	Regulated	NA	Lithuania	Regulated	Negotiated
Belgium	Regulated	Regulated	Netherlands	Regulated	Negotiated
Bulgaria	Regulated	Regulated	Poland	Regulated	Regulated
Croatia	Regulated	Regulated	Portugal	Regulated	Regulated
Czech Rep.	Regulated	Negotiated	Romania	Regulated	Regulated
Denmark	Regulated	Negotiated	Serbia	Regulated	Regulated
France	Regulated	Negotiated	Slovakia	Regulated	Negotiated
Germany	Regulated	Negotiated	Spain	Regulated	Regulated
Greece	Regulated	Regulated	Sweden	Regulated	Negotiated
Hungary	Regulated	Regulated	Turkey	Regulated	Negotiated[a]
Ireland	Regulated	Negotiated	UK	Regulated	Negotiated
Italy	Regulated	Regulated			

Source: GIE

[a]EMRA continues to apply rTPA instead on the basis of country's insufficient storage level

That said, a number of rules have been brought to bear on the effects of EMRA's TPA regulations to such activities and they are published under the Basic Principles and Procedures of Use (BUPPs)[15] for LNG terminals in 2010, underground storages in 2012 and floating storage and regasification units (FSRUs) in 2017. The BUPPs are taken to mean the employment of a compulsory instrument for the implementation of indiscriminate, impartial and coordinated operating of storage facilities and are subject to EMRA's approval. Neither BUPP grants privileges to facility owners. However, at this juncture, the argument of Turkey's Competition Agency in its 2012 report is important. It literally states that unless a well-functioning liquid market is enabled and alternative unbundled products are offered to network users, the extent of TPA on networks would not be much different. Indeed, the limited use of both storage facilities and LNG terminals by private companies despite the given TPA since 2011 is a straightforward illustration of this (Soysal et al. 2012).

A further, and arguably contentious, issue all directives seem to support is the—full or partial—exemptions of the existing and major new infrastructure (e.g. interconnectors, LNG and storage facilities) from TPA. Neither the 2001 Law nor the BUPPs contains any basis for clear-cut derogations for Turkey's existing infrastructure except stating that the facility owners shall put capacities into service as long as the system is convenient and the operational reasons are justified. Again, the Competition Agency of Turkey highly advocates that an effective derogation regime would be an obvious contributor to incentivising large investments for the country's very limited storages whilst wholesalers give support to the argument for passing on the storage costs to end users on the segment basis for providing necessary market-based price signals for new infrastructure investments (ibid.; Bulut 2014).

As discussed in Chap. 4, Regulation 715/2009 of the European Parliament and of the Council required member states to establish Entry/Exit (E/E) systems for transmission networks for enhanced competition through liquid wholesale markets. Such systems are preferential simply

[15] The Regulations No. 27230 dated 16 May 2009 and No. 27954 dated 4 June 2011 put in order creation and publication of the related BUPPs for LNG terminals (Marmara Ereğlisi and Aliağa) and underground gas storage facility (Silivri), respectively. The actual BUPPs were officially published for the LNG terminals on 3 June 2010 and for the underground on 28 March 2012.

because they allow the transportation of natural gas through zones and enable network users to book capacity rights independently at different E/E points with great flexibility (Recital 19). One of Turkey's notable successes in terms of compliance with the EU energy directives is the full adaption of E/E systems. As specified in the BNC, the Turkish transmission network comprises of 14 entry points and a large exit zone covering hundreds of exit points throughout the country. Natural gas is brought into the system both at cross-border entry points including gas storages and at entry points from domestic production, and exits the system either at major exit points to distribution networks or at auxiliary exits to directly connected eligible customers at TSO level (Küsmüş 2014).

Globally, when the long used essential "physical flows" at E/E points evince structural and practical flaws—meaning low gas tradability and entry barriers or on the other hand service abandonments and destructive competition—virtual trading platforms (VTP) or virtual points (VPs) have been the usual prescription (Karan and Kazdağlı 2011). DNV KEMA (2013) elaborates on the VPs in greater detail describing them as quite a move away from the traditional trading done at specified physical locations and states that full E/E systems mostly contain at least one VP to facilitate trade of gas between network users (e.g. bilaterally transfer a title of gas or imbalance swap). In the case of Turkey, the ever-changing energy landscape with the involvement of private participants into the market has brought about an alternative (virtual) option to all players in order to offset their imbalances and to trade between themselves whilst the TSO is also allowed to enter the system as a Residual Balancer when needed. Amendments made to the BNC since 2008 incorporated provisions for a VP into the legislation, and the National Balancing Point of Turkey (NBP or UDN) (which is neither as developed nor liquid as its namesake in the UK), has started offering services which do not require capacity booking or depend on physical inputs/offtakes. There also exists a Transfer Point (TP) as part of the E/E system in Turkey where capacity bookings are strictly subject to a physical booking procedure and only a single handover is permitted for the market participants compared to the UDN's unlimited handover offering (Ünal 2014).

The crux of the matter here is that transmission is the only fully monopolistic segment of the Turkish gas market where no private entity participates and the whole ownership and operational liabilities of the grid lie with the state-owned BOTAŞ. Undoubtedly, an important wrinkle in the accession of third parties to such an infrastructure is that government poli-

cies and respective energy regulations should be driven by a transparent and open approach for fair and non-discriminatory accessions of private companies/regional distributors to the system. The scope may even be expanded to other international players should the country become part of the internal gas market once full EU membership is gained. To allow the market participants maximum representation, the EMRA has approved continual revisions to the BNC since 2007 by inviting network users to contribute to the framework guidelines on setting out clear and objective principles for development of the Code and balancing the transmission network of Turkey. The 2019 version of the BNC hence systematically establishes guiding principles for the basic and operational provisions as:

- Liabilities of shippers, transporter and operator
- Entry and exit requirements
- Capacity bookings, allocations, transfers and switching
- Dispatch control and system balancing
- Transport quantities and notification programme
- Internal gas utilisation
- Transfer of possessory rights and responsibilities
- Settlement of disputes
- Gas quality specifications (BNC 2019)

Against the backdrop of limited new entry, unbundling and competition, ensuring an enhanced and well-functioning wholesale market is of high importance to Turkey and in the next section, how capacity allocation mechanisms and congestion management procedure, gas balancing arrangement and transmission tariff structures are formed to do so are delineated in greater detail.

5.3.4.1 Capacity Allocation Mechanisms (CAM) and Congestion Management Procedure (CMP)

From the standpoint of efficient price formation and level of competition, the role of wholesale market liquidity is incontrovertible and that is mainly measured by the number and diversity of market participants, and the volume of wholesale gas trades at trading hubs (ACER 2014). When looked at Turkey, by the same token, it is probably a little early to make mention of a very well-functioning wholesale market and defining the market as still a developing one—where the number of wholesale licensees

has increased from zero in 2002 to 49 in 2017—would be more appropriate. The presence of a still vertically integrated BOTAŞ, a very high market concentration and insufficient interconnection capacity seems to be manifesting problems of liquidity and competition.

In 2015, plans were underway to establish a gas exchange within the Energy Markets Business Corporation (EPIAŞ) or in short Energy Exchange (EXIST)—which was the home for only day-ahead and within-day electricity trade at the time. Similarly, the 2014 Draft Law foresaw empowering Borsa Istanbul (BIST) with the operations of standardised gas contracts and derivatives to come (Art. 12/B). On 1 September 2018 Turkey established the Organised Wholesale Natural Gas Market (OWGM) to let the market players anonymously trade natural gas (day-ahead and intraday) on a platform operated on a continuous trade basis although most of the trades take place for balancing purposes yet (the TSO can also enter the platform and balance the gas network when needed). This being the case, alas, full interpretation of Turkey's wholesale market functioning—the size of which is estimated at €15.7 billion by Accenture (2013)—becomes rather hard.

In the Turkish gas market trades occur in two platforms. First is the Transfer Points where title transfers are carried out at E/E points and second is the UDN which enables shippers[16] to conduct balancing portfolio operations among themselves on Continuous Trading Platform (CTP) (developed by EPIAŞ) within the OWGM. Given the modest gas trade being made with Bulgaria and Greece[17] and Turkey's EU membership status (which makes Turkey not directly impacted by the harmonisation of rules for the CAM and CMP), a merger of the Turkish market with its European counterparts can be regarded as premature at this point. However, the discussions of how to increase the compatibility of Turkey's gas industry with its adjacent markets and to further develop trades with those continue at a national level. Surprisingly, the proposition of ACER for the NRAs to perform a regular self-evaluation process in each state seems to be undertaken by private participants in Turkey, and the rigorous

[16] Who are not importers but have access to the transmission network. These trades mainly happen with gas bought from private importers since BOTAŞ is not keen on its gas to be resold in a virtual environment except the 4bcm gas sold to those companies on the UND due to Russia-Ukraine-related disruptions in 2009 (Deloitte 2012).

[17] All capacity reservations are for forward flow since reverse flow at interconnection points is not allowed (Deloitte 2012).

efforts of private organisations such as PETFORM[18] pointing towards a possible development of a European equivalent gas trade centre (TRGas-Hub) should not go unnoticed. It has thus far managed many extensive consultations, studies and meetings with stakeholders to better understand the status of the market and the extent of the problems and to determine where active intervention of the EMRA is required for a better functioning market (Table 5.12).

Other developments notwithstanding, the major interest of shippers is the capacity. Turkey has applied dramatic changes to capacity allocations following the adaption of E/E systems though BOTAŞ' still bundled transmission and commercial activities as a TSO attract notable criticism from the system users, especially in terms of potential discrimination against other users. BOTAŞ grants standard transportation contracts (STCs) to import, export and wholesale companies, and all companies are required to submit the details of gas to be transmitted.[19] Almost all interprovincial gas distribution pipelines are privately owned—due to franchising—and thus the subscription of distributors to the BOTAŞ transmission system requires regulatory oversight as well.

The CAM and CMP are delineated in the BNC and respective LSO and SSO BUPPs which are approved by the EMRA. Capacity is available on an

Table 5.12 Level of implementation of NC CAM provisions in the EU (status as of April 2016) and Turkey

		Member States																							
	NC CAM PROVISIONS	AT	BE	BG	CZ	DE	DK	EL	ES	FR TIGF	FR GRTgaz	HR	HU	IE	IT	LT	NL	PL	PT	RO	SI	SK	UK	Average per Ch.	TURKEY
1	I. General Provisions	No Scorable Provisions Monitored																							
2	II. Principles of Cooperation	50%	100%	50%	50%	75%	50%	50%	50%	100%	50%	50%	50%	50%	50%	50%	60%	50%	50%	50%	50%	50%	100%	59%	100%
3	III. Allocation of firm capacit	100%	100%	70%	80%	100%	100%	80%	100%	90%	90%	90%	100%	100%	88%	10%	100%	100%	100%	90%	100%	90%	100%	94%	100%
4	IV. Bundling of Cross - Border Capacity	66%	100%	0%	100%	87%	66%	66%	100%	100%	100%	33%	66%	100%	100%	0%	100%	66%	66%	100%	33%	100%	100%	79%	0%*
5	V. Interruptible Capacity	92%	100%	22%	91%	92%	100%	92%	100%	92%	58%	58%	50%	90%	100%	73%	100%	92%	82%	92%	100%	92%	100%	85%	0%**
6	VI. Tariffs and Capacity Booking Platforms	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	####	100%	100%	100%	0%	100%	100%	100%	66%	100%	100%	100%	94%	100%
	Total Average Score	82%	100%	28%	84%	91%	83%	78%	90%	96%	80%	66%	73%	88%	88%	N/A	92%	82%	80%	79%	77%	86%	100%	82%	60%

Source: Compiled by author based on ACER/CEER (2016, 10) and interview data

[a]Not available as Turkey is not part of the ENTSOG; however, the infrastructure and all arrangements are ready.

[b]Previously specified on the NGML but not any more

[18] Standing for the Petroleum Platform Association. See http://www.petform.org.tr/?lang=en&a=1&s=5.

[19] That is, proposed date for the first entry and expected annual quantities for the following 5 years—on a monthly basis; entry and exit points to the network; and delivery requests regarding certain temperature and pressure the gas wanted at the main exit points.

uninterruptable basis in the Turkish market and all reservations made prior to the gas year are considered as yearly (BNC 2019, 24). Capacity allocations are done pro-rata (based on UIOLI arrangements [Akçollu 2006]) when capacity demands exceed the maximum allocable capacity (MAC). The TSO reserves 2% of capacity (for internal use and balancing purposes) in all entry points and the MAC is determined accordingly. The allocation programmes, announced on the booking platform—Electronic Bulletin Board (EBB)—by BOTAŞ, specify how the capacity allocation shall be handled per E/E points before the gas year begins unless the transporter is notified of any specific provisions in the shippers' gas purchase agreements.[20] Nominations are completed within a certain time period day ahead, and requests for changes in schedule are not accepted—except force majeure (Deloitte 2012; BNC 2019). Third-party capacity transfer for a minimum of one month or for the remainder of the year at any entry and major exit points is possible, whereas accession to the grid within the gas year (1 Jan 08.00–1 Jan 08.00) is possible only for the secondary market. The secondary market meant here is a market where unused or idle capacity is offered to shippers (with or without an STC obtained from the TSO earlier) for a minimum of one day (UGS facilities only) up to one month (for all other points). Although the capacity allocation system seems to satisfy market participants as it is, since there has not been any dispute over inadequate capacity (Deloitte 2012), it could be argued that the current system does not necessarily encourage small shippers and the new ones considering to enter the network. Furthermore, neither the specifics of existing and idle capacity allocations nor the unavailability of short-term products seems to totally align with the EU's NC interests.

The avalanche of TPA to the networks increased the MAC significantly (Ünal 2014) and the majority of capacity is allocated to BOTAŞ. The bookings by private companies are mainly clustered at Malkoclar, Silivri UGS, TPAO Akçakoca and TEMI Edirne entry points. The 2001 Law leaves it to the discretion of BOTAŞ to contact the bookers of unused capacity (unused for a minimum of four months[21]) if the capacity amounts to less than 20% of the respective MAC or to cancel and renominate the capacity otherwise. In terms of storage, no unbundled products are available and a minimum term for capacity booking is 12 months.

[20] Especially regarding the allocation methodology of gas to be delivered to multiple import entry points (excluding LNG terminals).

[21] Except the force majeure.

Table 5.13 Utilisation of underground storage capacity via third-party access, 2012–2016

Storage period	*Capacity bookings made by third parties (m^3)*	*Idle capacity (m^3)*
2012–2013	73,676,734	487,323,266
2013–2014	370,076,734	190,923,266
2014–2015	427,557,543	133,442,457
2015–2016	429,997,543	131,002,457

Source: TPAO

Allocations for underground storage, LNG and FSRU capacities are done on FCFS basis (and pro-rata when capacity demands exceed the MAC). A further exploration of the booking process to UGSs shows that not only the amount of unsold idle capacity continues to be high (Table 5.13) but also the allocation of unused capacity within the year is somewhat discriminatory.[22] Similarly, the existing storage users and applicants with big demand are given priority to apply for idle capacity in comparison to new entrants with comparatively smaller market share which can again be considered as an entry barrier. In summary, neither of these seems to align with the interests of either revenue-hungry UGS operators or the service receivers (not least new entrants who look forward to exercising secondary capacity rights at affordable prices), and addressing the capacity-related issues once the market share of BOTAŞ is reduced via further contract/volume release programmes looks to be the next important step for Turkey.

5.3.4.2 Gas Balancing Arrangements

Prior to the gas release programme, BOTAŞ was responsible for inputting and offtaking gas into/from the transmission system and hence the balancing of the system lay solely with it. With multiple network users now operating in the market the transmission system needs to accommodate changing flow patterns and independent input/offtake of gas at different E/E points should be facilitated. The balancing market is improving and shippers who have a balancing contract with the transporter are given access to the UDN to conduct balancing portfolio operations among

[22] For example, no temporary bank guarantee is required from the early applicants in comparison to new entrants. What is more, market participants demanding idle capacity at any time of a storage year are being obliged to pay capacity fee for the whole year regardless of the start and duration of their usage of the system.

themselves on a day-ahead and intraday basis. Marketers impairing the system are subject to various fees[23] all placed under the dispatch control tariffs. To offset imbalances at TPs gas continues to be bought from BOTAŞ by the shippers and this is considered to be a significant barrier for the market liquidity and competition. Regulation No. 715/2009 set one of the essential components of the E/E systems as the VPs and stipulated easy access for network users to VPs for clearly defined balancing mechanisms. As expectedly, in line with varied TPA frameworks to gas infrastructure existing around Europe there is no uniform preconditions for VP accessions either. When compared, aspirant Turkish shippers seem to access the country's VP (UDN) with lesser preconditions than some European countries (DNVKE KEMA 2013).

The UDN is not accessible by non-shippers and by those without a balancing contract although BOTAŞ may require non-contracted shippers to be involved in balancing in case of insufficient natural gas in predetermined entry and/or exit points, or other emergency measures. Clearly, establishing a VP is not always a direct prescription for a liquid market or plenty of participants, and like its many European counterparts the Turkish gas market remains predominantly national given the historic development of the industry and the promotion of national incumbents (EC 2013). Although its connection to the European gas market is presently trivial and the vast majority of gas trading takes place at physical points, Turkey's full integration to the European gas markets requires (1) transposing the EC's harmonised balancing rules into the Law; and (2) addressing the obstacles deriving from national arrangements accordingly.

As detailed in Article 4(4) and 7(b) of the 2001 Law, appropriately provided information by the TSOs as well as other market participants regarding their market operations is central to maintaining the network system within safe operational limits in Turkey. BOTAŞ' Dispatch Control Centre in Ankara monitors and controls the transmission network through SCADA systems used between stations, and the EBB provides an online data exchange between the parties. The BAL NC foresees a number of provisions regarding the frequency of information that TSOs should be providing to shippers, including non-daily, intraday and daily metered offtakes[24]

[23] That is, imbalance, disorder, excess capacity and service interruption fees.

[24] NC BAL defines the daily metered offtakes as measuring and collecting the gas quantity once per gas day; intraday metered offtakes as repeating the measurements two times within the gas day and non-daily metered offtakes as less frequently than once per gas day (Art. 3(10–12)).

(Art 33–36); these upgrades are applicable to the systems used in Turkey, although further improvement and fine-tuning of the technical elements in both SCADA and the EBB are always and regularly needed. Together with Bulgaria, Hungary, Slovenia and the Netherlands, Turkey uses Variant 1 model information system—where the information for non-daily metered (NDM) and daily metered (DM) offtakes is based on apportionment of measured flows during the day—whereas majority of the MSs go for Base Case model[25] (ENTSOG 2017).

Turkey applies daily balancing to keep its system within operational limits during the day (Table 5.14) and financially settle for deviations accumulated over the course of the preceding 24 hours as the BAL NC envisages (ENTSOG 2018). Article 25 of the NC requires MSs to impose specific within-day obligations (WDOs) relating to shippers' imbalances during the day (e.g. system-wide and portfolio based) and a common characteristic of the proposed WDOs is incentivising shippers to balance their flows more frequently by providing them with hourly information about their balance positions instead of delegating TSOs to take residual balancing actions (EC 2013). In Turkey, an entry-exit WDO is used by which incentives are provided for shippers to limit the gas flow or the gas flow variation under specific conditions at specific entry-exit points. Also as said above, BOTAŞ facilitates a purely daily balancing regime and which is probably ideal from the new entrants' point of view and shippers are required to reset their imbalance positions to zero when their flows go beyond predefined "tolerance levels" since not every risk of imbalance can be obviated. The idea behind harmonising the balancing periods across Europe is clearly to preclude arbitrage/abuse opportunities for network users between markets and different balancing regimes (ERGEG 2010; EC 2013). When more cross-border trades take off between Turkey and other EU members, where network users are incentivised to balance on an hourly basis, flows in may be exposed to inefficiency and within-day charges would be affected if Turkey postpones the full harmonisation.

The balancing mechanism of Turkey relies entirely on financial settlement and the imbalance fee is based on the balancing gas buy and sell price. There is a tolerance system provided (Table 5.15) and shippers who impair the system depending on whether or not within the tolerance level are subject to a "balance participation fee" which consists of three parameters: (1) daily imbalance charge (DIC); (2) locational commitment charge; and (3) scheduling charge, which is applicable for imbalances

[25] Where the information for non-daily metered (NDM) offtakes consists of a day-ahead and within-day forecasts.

Table 5.14 Implementation of balancing network code in EU and Turkey

	EU countries			
I. General provisions	No scorable provisions monitored			
II. Balancing system				
Lead-time of submitted trade notification	≤30 min BE/LU, CZ, DE, ES, FR, HU, IE, IT, LT, NL, PT, UK-NI	≤2 hours AT, BG, DK, EE, HR, LV, PL, RO, SI, SK, UK-GB, EL	>2 hours SE, Turkey	
Allocation rules of quantities in case of mismatches of trade notifications	Lesser rule AT, BE/LU, BG, CZ, DE, DK, EE, FR[a], IT[b], LV, NL, PL, PT, SE, SK, EL, Turkey	Reject both trade notification ES, HR, IE, RO, SI, UK-GB, UK-NI	No allocation rule HU[c], LT[d]	
III. Operational balancing				
STSP offered in own balancing zone	Merit order AT, BE/LU, BG, CZ, DE, DK, ES, FR, HR, HU, IT, LT, LV, NL, PL, SK, SI	Merit order with balancing services only EE, EL, IE, PT, RO, UK-NI, Turkey	Use of balancing services BG, CZ, DE, EE, EL, HR, IE, LT, LV, PLH, PT, RO, SI, SK, UK-NI	
Trading platform, trading in adjacent zones and cross-border cooperation	Trading platform in place AT, BE/LU, CZ, DE, DK, ES, FR, HR, HU, IT, LT, LV, NL, PL, SI, UK-GB, HR, PT	NRA approval for TSOs trading STSPs in adjacent zones CZ, DE, PL, SK	Cross-border TSOs cooperation when establishing new STSP LV, Turkey	Incentive mechanism in place AT, ES, IT and UK-GB
IV. Nominations				
Nomination and re-nomination provisions for bundled capacities at IPs	Single nomination implemented CZ, ES[e], FR, IE, IT, NL, PL, PT[e], SI, SK, UK-GB, UK-NI	Cooperating w/ adjacent TSO(s) to implement AT, BE/LU, DE, DK, HR, RO, Turkey		

(*continued*)

Table 5.14 (continued)

	EU countries		
Hourly re-nomination cycle and standard re-nomination lead-time of two hours at IPs	Yes AT, BE, BG, CZ, DE, DK, EE, EL, ES, FR, HR, HU, IE, IT, LV, LT, NL, PL, PT, RO, SE, SI, SK, UK-GB, UK-NI, LU (2 hr15'),	No Turkey	
Agreed default nomination with adjacent TSO in the absence of a valid nomination	In place AT, BG, BE/LU, DE, DK, EE, EL, ES, FR, HR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SI, UK-GB, UK-NI	Not implemented CZ, SK, Turkey	
V. Daily imbalance charges			
Type of imbalance charge	Daily imbalance charge AT, BE, LU, CZ, DE, DK, ES, FR, IT, NL, EL, HU, LT, SI, Turkey	Interim imbalance charge BG, HR, LV, PL, PT, IE, RO, SE, SK	
DIC includes TSO sell/buy prices, weighted average price (WAP) of gas and a small adjustment.	Yes BE/LU, CZ, DE, DK, ES, FR, HR, HU, IT, LT, PL-H, PT, SI, UK-GB	No AT, BG, EE, EL, IE, LV, NL, PL-L, PL-T, RO, SE, SK, UK-NI, Turkey	
Reduction of shippers' daily imbalance quantities to zero each day	BE/LU, BG, CZ, DE, DK, EE, EL, ES, FR, HR, HU, IE, IT, LT, LV, PL, PT, SE, SK, SI, UK-GB, UK-NI, Turkey	–	
VI. Within-day obligations			
TSOs implement	System-wide WDO	Portfolio-based WDO	Entry-Exit WDO
Within-day obligations (WDOs)	AT, BE/LU	DE and NL	Turkey

VII. Neutrality				
TSOs shall publish the aggregate neutrality charges for balancing at least monthly.	Implemented BE/LU, BG, DE, EL, ES, FR, HR, HU, IE, IT, NL, PL, PT, SK, SI, UK-GB, UK-NI, Turkey	Partially implemented CZ, LT	Others DK, EE, SE, RO	
VIII. Information provision				
During gas day (D), TSOs provide info on (1) overall status of transmission network; (2) their balancing actions; and (3) network users' inputs/ offtakes for gas D	Fully Implemented AT, BE/LU, BG, CZ, DE, DK, EL, ES, FR, HR, HU, IE, IT, LV, NL, PL, PT, SK, SI and UK-GB, UK-NI, Turkey	Partially implemented EE, LT, RO, SE		
Information Model	Base Case model AT, CZ, DK, ES, FR-PEG NORD, FR-TRS, IE, IT, LT, LV, PL-HGAS, PL-LGAS, SE, UK-GB, UK-NI	Variant 1 BE/LU, BG, HU, NL, SI, Turkey	Variant 2 DE, PT	
Provision of Final Allocation Data	No later than end of D+1 AT, BE/LU, BG, CZ, DE, DK, EE, EL, ES, FR, HR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SI, SK, UK-GB, UK-NI, Turkey			
Cost Benefit Analysis (CBA)	Complete CBA AT, EE, FR, LT, NL, PL and UK-GB	Others BE, BG, CZ, DE, DK, ES, HR, IT, PT, SI, UK-NI, Turkey		
Establishing a Forecasting Party	TSO BE/LU, DK, FR, HR, IE, Turkey	DSO IT, PT, SI, UK-GB, UK-NI	Third Party AT, CZ, ES, NL (4)	Under discussion EE, RO (2)

(*continued*)

Table 5.14 (continued)

	EU countries			
Cooperation of DSO(s) &Forecasting party(-ies) w/TSO	Yes AT, BE/LU, CZ, DE, DK, ES, FR, HR, HU, IE, IT, LT, LV, NL, PL, PT, SE, SI, UK-GB, UK-NI, Turkey	No BG, EE, EL, RO, SK		
IX. Line-pack flexibility service (LFS)				
TSOs offer LFS	CZ, FR, NL, PT, SE, Turkey			
X. Interim measures				
Interim Measures	Balancing platform DE, PL, SE, SK, EL, Turkey	Alternative to a balancing platform BG, EL, IE, LV, RO, SK, UK-NI	Interim daily imbalance charge BG, EL, IE, LV, PL, RO, SE, SK, UK-NI, Turkey	Use of Tolerences BG, EL, IE, LT, PL, RO, UK-NI, Turkey

Source: Compiled by author based on ENTSOG (2017) and interview data

[a]In France, in case of mismatch of notification quantities, the lesser rule is applied. When the re-notification quantities are still not equal, they are rejected.
[b]In Italy, in case of mismatch of notification quantities of OTC trading, both trade notifications are rejected, while in case of mismatch of notification quantities of a trade on a gas exchange, the lesser rule is applied. Curtailments or rejections are also possible in case of lacking financial guarantee coverage.
[c]Hungary stated that a mismatch is not possible in case of trades. Offer/accept method is in use.
[d]Lithuania stated that a notification is provided by seller, which is registered in NRA and has to be agreed with buyer.
[e]The TSO cooperation ended up with the establishment of single nomination at both France and Portugal interconnection points after the survey period.

Table 5.15 Permitted tolerance levels for balancing in Turkey

Entry range (m^3)	*A*	*B*	*Permitted tolerance (C)*
0–500,000	0	Entry amount	+/− 0.15 (15%)
500,001–1,000,000	+/− 75,000	EA-500,000	+/− 0.12 (12%)
1,000,001–2,000,000	+/− 135,000	EA-1.000,000	+/− 0.10 (10%)
2,000,001–4,000,000	+/− 235,000	EA-2,000,000	+/− 0.09 (9%)
4,000,001 and above	+/− 415,000	EA-4,000,000	+/− 0.07 (7%)
Exit range (m^3)	*A*	*B*	*Permitted tolerance (C)*
0–100,000	0	Exit amount	+/− 1.00 (100%)
100,001–250,000	+/− 100,000	EXA-100,000	+/− 0.12 (8%)
250,001–1,000,000	+/− 118,000	EXA-250,000	+/− 0.10 (6%)
1,000,001–2,000,000	+/− 193,000	EXA-1,000,000	+/− 0.06 (5%)
2,000,001 and above	+/− 253,000	EXA-2,000,000	+/− 0.04 (4%)

Daily Exits T (Permitted Tolerance Quantity) = A + (B ∗ C)

Source: BNC (2019)

(beyond tolerance levels) caused at entry points of storage facilities, LNG terminals and production facilities, and other E/E points. The cumulative invoicing is made monthly (based on daily accruals).

The BAL NC envisages that the DICs should be based on marginal prices (e.g. marginal sell price where the daily imbalance quantity is positive and marginal buy price where the daily imbalance quantity is negative),[26] plus a small adjustment to incentivise shippers for timely balancing without penalising new entrants applied across Europe, in the Turkish system imbalance charges based on similar parameters that are proposed by the TSO, approved by the EMRA and published on the EBB. Additionally, the NC requires TSOs to remain cash neutral with regard to balancing activities and pass any cost or revenues that arise to the shippers (Art. 29–30). It is the task of EPIAŞ, operator of the OWGM, to ensure the TSO (BOTAŞ) remains clear of both the costs arising from network users' imbalanced positions and financial incentives to intervene the market where it must not. The BUPP clearly sets the rule that any costs or revenues stemming from balancing activities shall be passed to

[26] A marginal sell price is the lower of the lowest price of any trades in title products in which the TSO is involved in respect of the gas day; or the weighted average price (WAP) of gas in respect of that gas day, minus a small adjustment. And a marginal buy price is the higher of the highest price of any trades in title products in which the TSO is involved in respect of the gas day; or the WAP of gas in respect of that gas day, plus a small adjustment (NC BAL, Art. 22(2)(a);(b)).

network users with no exception and EPIAŞ uses Residual Reset Amount (RRA) methodology for calculation of the neutrality charges to do so (again approved and published by the EMRA). The operator invoices the respective parties on a monthly basis (based on daily accruals), and if end of the month balance is positive, BOTAŞ is entitled to maintain 10% of the balance for risk management of its balancing-related market activities (OWGM BUPP, 7.4).

Another key feature of the BAL NC is the provision of operational balancing and nominations. The use of short-term standardised products (STSPs)—for example, title, locational, temporal and temporal locational that are bought and sold on a dedicated balancing or trading platform by TSOs and shippers—is foreseen by the NC in order to facilitate (cross-border) natural gas trading. Since the Turkish market participants already do balancing activities on the CTP, Turkey seems to have passed the interim measures and is ready to focus predominantly on the liquidising side of the wholesale business. Of course, in line with normal expectations, the pursuit of more cross-border natural gas trading implies more market integration with adjacent market areas and for the liquidity this means trades in STSPs of which the Turkish gas market does presently lack.

5.3.4.3 Transmission Tariff Structures

With respect to the transmission tariffs structure, Regulation 715/2009 highlighted two concerns: separate tariffs to be set for each E/E point into/out of transmission network based on cost-allocation mechanisms; and no contract paths to be used for network charge calculations. Accordingly, the TAR NC requires the MSs to apply NRA-set reference price methodologies (RPM), that apply to all E/E points (or cluster of E/E points) including interconnection points (IPs) and non-IPs (other than multi-TSO E/E systems), in order to calculate the reference price for standard firm capacity and interruptible capacity products. The NC requires the RPM to: (a) enable network users to reproduce the calculation of reference prices and their accurate forecast; (b) take into account the actual costs incurred for the provision of transmission services considering the level of complexity of the transmission network; (c) ensure non-discrimination and prevent undue cross-subsidisation including by taking into account the cost-allocation assessments; (d) ensure that significant volume risk related particularly to transports across an E/E system is not assigned to final customers within that E/E system; and (e) ensure that the resulting reference prices do not distort cross-border trade (TAR NC, Art 7).

As the tariffs set in one country can have an impact on access regimes in adjacent countries, the issues regarding tariff structure need to be considered in the context of the integration of gas markets across the EU (DNV KEMA 2013, 67). For this, the TAR NC has been developed to remove the "patchwork of different tariff structures" currently the case for Europe and requires member states to apply a primary reference price methodology (either postage stamp [PSM] or capacity-weighted distance methodology [CWDM]) and secondary adjustments (equalisation, benchmarking and storage adjustment) towards the calculation of a reference price. This price is for a firm yearly capacity product and is expected to be uniformly applicable at all E/E points in all E/E systems.

On account of creating a level playing field the TAR NC favours explicitly equalised revenues (50:50) from the sale of entry and exit capacity, but entry-exit split is yet to be implemented in Turkey. Since capacities are decoupled, the TSO prices them at both entry and exit points[27] whilst its allowed revenue is subject to "revenue cap" regulation (EBRD; ERRANET 2013). The tariffs include a capacity and commodity component, and a higher percentage of revenue is recovered by the capacity charge (55%) than by the commodity charge (45%), reflecting a higher share of fixed costs in comparison with the variable costs in Turkey. The basic contract duration for capacity tariffs is three to ten years. Transmission and Dispatch Control Tariffs are set up ex ante—according to Accounting Methodology which relies heavily on setting allowed revenues based on recognised costs under the relevant accounting standards and therefore by mapping revenues to audited financial statements—and are approved by the EMRA prior to tariff periods. The transmission tariff includes capacity and service charges derived from CAPEX and OPEX whilst the dispatch control tariff consists of system balancing participation and interruption balancing fees (BNC 2019) (Table 5.16).

The price methodology used in Turkey is postage stamp as Deloitte (2012) terms it and it seems to align with the primary price methodology requested by the NC to be used for annual firm products. Nonetheless, due to lack of both short-term and interruptible capacity products unlike other EU countries this price is not being used as a base for calculating the reserve prices for such capacity products but the OWGM is expected to help in creation of the market-based reference prices.

[27] Like France, Ireland and Portugal the Turkish TSO applies locational tariffs for different entry points and a uniform tariff for all exit points (DNV KEMA 2013).

Table 5.16 Methodologies and parameters used to determine target revenue of TSO in Turkey

Regulatory, market and policy framework		
Regulator	EPDK	
TSO(s)	BOTAŞ	
Customer mix	Residential	25.09%
	Industrial	24.83%
	Power generation	38.13%
Ratio of transit to national flows	0.013%	
Network age and length	Pipeline length	Original
	14,000 km (as of 2016)	operation 1987
Regulatory governance and process		
Entity that establishes the methodology and sets allowed/target revenues	EMRA	
Length of revenue-setting process	Three months	
Parties that can appeal NRA-determined revenues	TSO, network users	
Overall framework for setting allowed revenues		
Type of regulation	Revenue cap	
Approach to assembling the cost base	Accounting methodology	
Duration of regulatory period	3 years	
Determining and setting operating expenditures		
Methods and approaches to assessing and setting OPEX allowances	Cost accountings from previous year and cost projections for the next four years	
Inclusion of efficiency or productivity improvements	Yes	
Efficiency factors used in most recent regulatory period	Determined by EMRA	
Determining and setting capital expenditures		
Methods and approaches to assessing and setting allowances	Financial statements	
Inclusion of efficiency or productivity improvements	No	
Regulatory asset base		
Method used for setting the opening asset value	Financial statements	
Depreciation		
Asset lives (for major asset groupings)	Pipelines	22 years
	Compressors	22 years
	Controllers/metering stations	22 years
	SCADA, telecoms	22 years

(*continued*)

Table 5.16 (continued)

Cost of capital and financeability		
WACC method	Before tax real	
WACC value set in the two most recent regulatory periods regulatory periods	Previous regulatory period	Current regulatory period
	10.53%	11.42%
Regulatory reporting		
Requirement for and frequency of regulatory reporting	Annual	
Coverage of regulatory reports	Sectoral statistics	
Purpose of regulatory reports	To inform sector	
Requirement for reconciliation w/audited financial statements	Yes	

Source: Compiled by author based on ECA (2018); EMRA and Interview data

In terms of revenue reconciliation, as stipulated in Articles 27–30 of the TAR NC, BOTAŞ has not yet given any regulatory account for aggregating the under- and over-recovery of transmission services revenue originating from the E/E points. Likewise, no mechanism has been kick-started to use earned auction premia towards the reduction of physical congestion or decrease of transmission tariffs for the next tariff period in Turkey.

5.4 Conclusion

IEA (2006) discussed that in many countries prior to reform, energy markets were historically organised as a single vertically integrated utility, exclusively owned and operated by the governments. In the case of the Turkish gas market this duty was undertaken by the state-owned BOTAŞ. The extensive review of the evolution of the Turkish gas market, provided in the preceding pages, reveals that the 2001 Law has affected change to the original structure of monopoly although a great deal of challenges and implementation issues still remain as of 2019 especially in the context of the EU energy legislation. This last section attempts to extract the early discussions on the compliance of the 2001 Law with the EU natural gas directives into a concise guide for action and the first research question is intended to be answered. The question asked was, "What are the characteristics of the legal framework that has been created to ensure natural gas market liberalisation in Turkey and how effective is it?"

The characteristics of the legal framework created in order to liberalise Turkey's natural gas market is comprehensively given at the beginning of this chapter and the issues that are now central and thus dominate the behaviour of all gas market participants are previously outlined. The effectiveness of the legislation, as the question continues, is where a little something further should be said. As this analysis has shown, Turkey cannot really succeed in its ambitious liberalisation targets without reducing the excessive gas market power of BOTAŞ, and the question of "how effective, or successful, the 2001 Law has been" cannot really be answered without answering "has the market power of BOTAŞ been really restricted by the 2001 law?" As of 2019, the ownership of Turkey's natural gas sector is still largely with the state, the infrastructure is owned by BOTAŞ and despite the Law precluding BOTAŞ from executing further gas purchase contracts until its import share was gradually reduced to 20% of the national consumption pre-2009 (and minimum 10% volume transfers to private companies every year), BOTAŞ controls about 80% of the market today. Therefore, in reality, the aim of properly restricting the market power of BOTAŞ has not really gone beyond a slight reduction of BOTAŞ' power which has been over the course of 18 years. Also given that the provision of the Law that strictly prohibited the sale of gas (more than 20% of Turkey's yearly gas consumption) by a single company has not been so far materialised, it would not be inaccurate to call the realisation of the NGML's competition commitments a failure to some extent.

Similarly, the reasons for the delay in attracting private participants into the supply segment, which later led to Russia's downstream expansion in the Turkish gas market, seem to be manifold and the role of the 2001 Law is not trivial in the final outcome. First, laying obstacles in the way of allowing private entities to import gas from the countries that BOTAŞ does not have unexpired contracts with, and subsequently switching this to a contract release programme with extra complications at the expense of new entrants, has not only slowed down the liberalisation process of Turkey but also paved the way for companies to associate themselves with Russia to obtain the requested documents from the EMRA. In defence of BOTAŞ, this is partly because of the long-term ToP gas purchase contracts BOTAŞ has with various countries which perhaps force the EMRA to condone the monopoly status of BOTAŞ which has been criticised by many liberalisation apologists. However, our ex parte discussions here would not convey sufficiently the breadth of this issue, especially from points of

view of BOTAŞ and the EMRA, and so this is delineated with the members of respective organisations during the interviews for further clarification.

The effectiveness of the 2001 Law can also be considered from the standpoint of the EU energy directives. To begin with, market opening and the notion of an eligible customer which did not exist in Turkish markets before 2001 was introduced by the Law following the First Energy Directive. Although some progress appears to have been made in this regard Turkey's progress remains limited. Contributory factors may be listed as: (1) still existing eligibility thresholds (though reduced greatly from 15 mcm to 75,000 m^3) since the Second Directive removed customer differentiation and all consumers independent of their use of gas are now regarded as eligible in Europe since 2007; and (2) the long captivity of numerous non-eligible customers to regional gas distributors. The distribution companies in Turkey are under the watchful eyes of onlookers since most of these companies came to the end of their eight-year fixed tariff period and the EMRA regulates the tariffs to prevent abusive behaviour of these regional monopolies. Of course, due to the exclusive rights to all non-eligible customers that were guaranteed to such companies during the franchising process, this subject should not be interpreted per se and thus further investigation with the regulators, taking into account all factors involved, is made during the interviews and discussed in following chapter. Developments notwithstanding, the most highly visible measure to check how effective is the market opening is the "switching rates" of eligible customers which are, in line with other EU countries, quite low in Turkey. Including the GFPPs—one of the largest customer groups—the eligible customers do not really switch to other suppliers and the examination of this issue from different perspectives also increases the chances that this case study will be exemplary.

In the EU, average switching duration is approximately 12 days (although a three-week limit as per the Third Directive is generally respected) and the final bill is received within six weeks (ACER/CEER 2017). This duration in Turkey is around 15 days and consumers are notified about whether or not they comply with eligibility thresholds (both on invoice and on distributor's website). However, the bills cannot really be classified as simple given that there is much information which are somewhat unclear and confusing to consumers. There is also a lack of a "reliable comparison tool" which provides transparency of price and non-price elements by enabling consumers to filter out additional services or offers on the platform.

According to early reviews of the OECD on Turkey's regulatory reform, before liberalising the country's energy market and the start of well-functioning gas market some party had to be responsible for creating competitive energy markets and building the regulatory framework as they would not be evolved naturally. Therefore the responsibility for realising such a gas market for Turkey was sitting wholly with the EMRA and it had to fulfil its functions in a clear, objective and unbiased, stable and predictable way according to the law by communicating with the market prior to issuing regulations (OECD 2002, 111). Turkey's EMRA does not appear to be completely consistent with the European principles concerning general competition and antitrust policies, and what the future plans are to truly create and maintain the independence of the EMRA from both the government and the regulated gas industry interference are discussed with the respondents. The situation of the EMRA needs to be improved when examined from the point of independency indexes which are listed in the OECD (2016, 22) as the most frequent dimensions, for example: (1) budget independence; (2) conditions for dismissal of the head of the regulatory agency; (3) accountability and reporting to government, legislature, or representatives from regulated entities; and (4) power to set tariffs or price-setting (Table 5.7). For example, the Turkish government delivers statements of expectations through various channels, but such expectations always have the risk of becoming a "shopping list" which could then easily be perceived as heavy-handed and be counterproductive as the report puts it. Likewise, consultations can be hijacked by powerful lobby groups leading delayed and/or blocked decisions which go against their interest. Therefore, particular precautions should be taken with regard to how formal and informal consultations with government and industry are conducted and used.

In terms of financial independence, OECD (2016, 2017) and Koske et al. (2016) argue that if budgets of regulators are part of the national, budget transparency and accountability of regulators to citizens are more guaranteed and can strengthen independence. However, the EMRA's funding sources come from fees; hence, it is essential that an appropriate cost-recovery mechanism should be in place so the "right" fee can be set in order to guarantee adequate accountability and to minimise risk of conflict of interest and undue influence. Independence of EMRA leadership (president and vice president) is also a critical point where undue pressure and influence can be exercised. When examined in this respect, it is seen that the final nomination and appointment of the senior management are

conducted by the president of Turkey and Council of Ministers, respectively. Because the nomination process mostly leads to the final appointment in Turkey and given the importance of board head's decision making power (for which the regulator will be held accountable) appropriate safeguards should be put in place for transparent and unbiased selection and appointment processes. Salary scales and (non)financial benefits of the regulator's staff are equally important. The EMRA's remuneration is based on government salary policy (with some autonomy) and ensuring that the staff are rewarded commensurate with the salaries of employees in the regulated industry would help them to avoid potential undue influence.

Another impediment to competitive market development in Turkey is the lack of an unbundling regime. With the onset of the natural gas liberalisation process the Turkish government required BOTAŞ to keep separate accounts for each activity it is involved in and not to continue its vertically integrated structure post 2009. The accounting unbundling of the transmission and commercial activities of BOTAŞ was realised shortly after, but despite the EU's continuous prescriptions of even more drastic unbundling regimes as the years went on (i.e. ownership), the restructuring of BOTAŞ requested by the 2001 Law is yet to be realised. Similarly at the retail level, the difference between distribution and retail is not distinguished in Turkey and hence unbundling is still in accordance with the First Directive. Although all distribution companies are now accounting unbundled, the designation of neither DSOs nor CDS operators as per Articles 24–28 of the Third Directive is currently available. The situation is compounded by the fact that Russia has now expanded its activities in the Turkish market and this makes the proper unbundling of such companies as significant as the unbundling of state-owned BOTAŞ.

In Turkey, entities belong to same sector/industry generally operate under single public body or ministry, so diversity lacks. And according to Deloitte and DNV GL (2017) this fact makes the adoptability of already available unbundling models of the EU (especially OU) for the Turkish gas market uneasy. For example, if Turkey opts for the OU model it means supply and transmission operations will need to be transferred to new owner(s). Whilst the MENR exercises control over, let us say, one of the entities, another public body/ministry will still be needed to claim ownership and control of the other. Both parties will then have to satisfy the EC that they have no decision making powers in common and on top of that the legal structure of Turkey's state administration and regulations determining the competences of ministries must be supporting such a struc-

ture. The report also argues that both the MENR and BOTAŞ had reached the consensus that ISO option was not appropriate for the Turkish gas market given its rare application in the EU itself as well as its arguable usefulness in complying with the unbundling requirements and practicality in following the certification process. Likewise, the ITO model is not easy to apply given the disadvantages it carries (e.g. it gathers supply and transmission entities under single body [EMRA] which means both public ownership and a vertically integrated unit will still persist, high-level administrative burden for compliance requirements will be dealt with, rendering of services will be limited and the competition environment will be weaken) as the report further argues. To combine the advantages of both the ITO and the OU, a new unbundling model called ITO+ is recommended to be formed. The new model, according to the report, would perfectly place supply and transmission branches of BOTAŞ under the same ministry (MENR) as two stand-alone entities, and to ensure independency of the TSO, a compliance programme could be established with an appointed compliance officer and an assigned supervisory body to go with it. Without a doubt the brand value of BOTAŞ and the continuation of its (inter)national influence are of high importance whatever the new model would be. Hence, it is suggested that the name of BOTAŞ could remain for the supply side (retaining the existing contracts and liabilities), whilst transmission part of the business could be named as BOTAŞ Transgas (Deloitte and DNV GL 2017, 92–95). In either scenario, however, restriction of main market activities of BOTAŞ to import, export and wholesale after removal of its transmission assets and their transfer to newly established TSO looks inevitable.

With regard to TPA, the transmission network in Turkey is now open to new entrants who want to build, operate or simply use the pipeline systems. One of the most notable successes of Turkey in terms of compliance with the EU energy directives is the full adaption of E/E systems containing the virtual point, the UDN. The 2001 Law requires regulatory oversight for the accession to networks in line with the directives and the only issue which was the accession to storage facilities, line-pack and other ancillary services—that was, by the Law, left negotiable between parties but due to insufficiency in the storage level the EMRA continued to apply regulated TPA—up until 2016 seems to be dealt with. The BUPPs of all new LNG terminals, FSRUs and underground gas storages are prepared in compliance with the network code. However, the uncertainty as to full or partial exemptions of the existing and major new storage infrastructure

from TPA has not been reduced since there are no clear-cut derogations stated in the 2001 Law about Turkey's existing infrastructure. As detailed in Chap. 4, due to the lack of storage and other infrastructure which still undermines confidence in Turkey's future commitment to effectively manage the risk of supply disruption and considering the ongoing construction/enlargement of storage facilities, a further clarification on this issue would help setting the basis for robust market-based price signals for the new infrastructure investments.

The subject of establishing a regional cooperation amongst TSOs has also been given attention in the Third Directive. It is required from the ENTSOG to adopt a non-binding community-wide ten-year network development plan (TYNDP), which specifies modelling of the integrated network, scenario development, a European supply adequacy outlook and an assessment of the resilience of the system, every two years (Art. 8, 10(b)). Accordingly, every MS is expected to contribute to ENTSOG tasks by publishing regional investment plans and actually take investment decisions based on those plans (Dir. 2009/715/EC Art. 12). The rationale behind this is simply supporting the TSOs to promote operational arrangements so they can ensure: (1) optimum management of their network; (2) development of energy exchanges; (3) coordinated allocation of cross-border capacity through non-discriminatory market-based solutions; (4) well-managed specific merits of implicit auctions for short-term allocations and (5) integration of balancing mechanisms throughout the EU. NRA supervision in elaboration of the TYNDPs is necessary as always and they are powered to monitor and make recommendations or even amendments if needed (ibid., Art. 8; ERGEG 2010). There is no publication of such a report in Turkey, however, apart from a ten-year natural gas transmission capacity projection report BOTAŞ had been asked by the EMRA to publish on an annual basis (EMRA Regulation on OWGM, Art. 10).

The EC (2013) stated that Europe has committed itself to the building of an integrated and interconnected gas market allowing all market players to compete on a level playing field whilst gas is generated, transported and consumed as efficiently as possible, avoiding losses along the value chain. For Turkey to be part of this internal market its gas transmission networks (and storage facilities) need to be able to facilitate trade and accommodate changing flows patterns. Our analysis has implied that the Turkish gas market is currently not fully compliant with the EU's single gas market framework. Turkey surely needs to make a considerable effort to harmon-

ise its regulation criteria, especially to promote a liquid wholesale market and an efficient price formation across the gas value chain. At a more specific level:

There is no well-functioning wholesale market, and the presence of a still overly powerful BOTAŞ, high market concentration and insufficient interconnection capacity are the leading contributors to this. As a result of a non-liquid market and mainly due to ToP contracts, the natural gas volumes of Turkey are tied to the gas prices of BOTAŞ, which dominates the market as the largest importer. As the 2001 Law was prepared on the basis of BOTAŞ' annual volume transfers pre-2009, its provisions relative to, for example, distributors which require them to procure no more than 50% of their gas from a single supplier or to purchase gas from the most economic source do not really count for much today (unless alternative suppliers and sufficient rivalry between them—over price and non-price elements—exist in the market). There is room for improvement in the market architecture and the development of market centre(s) based on a gas trading hub in Turkey, and consulting the regulators' views in imparting "how to ensure a well-functioning market" and "what lessons can be learnt from the European experience" can be a pathway.

Turkey's small level of cross-border cooperation with Greece and Bulgaria has been mentioned earlier, and once full EU membership is gained the harmonisation of particular rules, that is, gas balancing and transmission tariff structures, will gain more importance in Turkey. With regard to gas balancing arrangements, firstly, the STSPs are not sufficiently offered in the Turkish market which is instead substituted more with the use of balancing services. The UDN has been set and integrated into the E/E system, and Turkey has managed to lessen the prerequisites for the VP access similar to those of the so-called perfectly liquid Dutch and British gas markets. Not impressive as these achievements are, though, Turkey needs to define a standardised CAM in the form of an auction procedure via which the SCPs (yearly, quarterly, monthly, daily and within-day) can be made available to all network users registered on the booking platform (CTP) instead of pro-rata allocation method. Trade notifications, redesign of (re)-nomination processes, within-day obligation, trading possibilities within an adjacent market for balancing purposes, investment in new IT equipment and metering changes (ACER/ENTSOG 2014) are other important issues, but as no capacity trading takes place as of yet Turkey needs to improve its balancing mechanism further within the BAL NC framework.

In terms of transmission tariffs, as this analysis has shown Turkey's current regime is broadly consistent with the ENTSOG's TAR NC, given that the postage stamp is already being used as a primary price methodology. However, neither the secondary adjustments towards the calculation of reference price for annual capacity products nor an explicitly equalised revenue (50:50) from the sale of entry and exit capacity (entry-exit split) is implemented in the Turkish market. Two critical issues—namely, revenue reconciliation and cash neutrality of the TSO—were dealt with in September 2017, the details of which are now published in the OWGM BUPP. However, the absence of a mechanism aimed at facilitating the use of earned auction premia for reducing the physical congestion or to decrease the transmission tariffs for the next tariff period, still continues to be an issue Turkey needs to tackle.

In this chapter, considerable effort has been made to review the most relevant elements of the work that had thus far been carried out on Turkey's natural gas sector reforms and the issues identified here are addressed with governmental officials, policymakers and market players to draw out key policies and to make recommendations in Chaps. 6 and 7.

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PART III

Transition From Monopoly to Liberalisation: Barriers to Efficient Market Integration

CHAPTER 6

Diagnosis of Challenges Affecting the Liberalisation of the Turkish Natural Gas Market

6.1 Introduction

Natural gas is a strategic sector for Turkey and its control, which has been mandated by the state for so long, is shifting. Due to the sector's direct and indirect impacts on economic/social development and growth, the issue of how to restructure the Turkish gas market by reducing, if not fully removing, the dominance of the state monopolist, BOTAŞ, and how to handle the concerns regarding the structural changes being imposed on BOTAŞ such as splitting down its activities into different legal entities remains one of the main interests of the Turkish regulators and the policy-makers. Clearly, the participation of private and foreign suppliers in the Turkish gas supply chain poses commercial risks and challenges for BOTAŞ, and a new roadmap for creating stimulated import prices with marked reductions; developing infrastructure for imports, transmission, storage and distribution; and setting appropriate tariffs for the use of different components of gas infrastructure holds crucial importance in the time of the reforms and market developments in Turkey designed to encourage all market players.

The existing NGML of Turkey has, undoubtedly, delivered some significant results and the market has witnessed high levels of investment and a certain level of competition since 2001. However, the recent gas market liberalisation history of Turkey demonstrates many of the measures that have been initially considered for adaption are now either postponed or have never been adapted especially during the last decade when the

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liberalisation of energy markets was thought to be the answer for the sectors' most problems. Also, it has been observed that there is some uncertainty over future developments in the Turkish gas market and more importantly the pursuit of reforms within. A review of the Turkish gas market from the operational and legal aspects has already been undertaken in Chaps. 4 and 5, and a number of institutional factors existing in the market which reduce its effectual operation have been discussed. To address these factors and to analyse the barriers to efficient market functioning this chapter utilises the third and distinctive part of the primary data collection technique of this study "interviews" to provide an in-depth understanding of the stakeholders' views and opinions of Turkey's liberalisation experience. The range of interviewees who responded included representatives from the vertically integrated incumbent, the regulatory authority and the new entrants. The opinions that were expressed were divergent especially on BOTAŞ' past, present and future, although the focus was generally on the best way forward.

This chapter intends to answer the question "What are the major obstacles encountered by Turkey so far during its reform process and how should Turkey's progress towards liberalisation and competition proceed?" and begins with presenting the findings from the results. It delves into three problematic areas that the respondents referred to, namely barriers to efficient market functioning and liquidity, key challenges in pricing and attracting investments, and technical infrastructure and market/trade operations. The final section concludes.

6.2 Findings from Interviews

As highlighted in both the introduction and literature review chapters the patterns of institutional change across countries and the performance and/or willingness of countries to adopt liberalisation in the natural gas markets have been widely diverged despite the European Commission guidelines to conduce uniformity in regulatory instruments. In the case of Turkey in this book, the aim is to pose extensive and more compelling evidence. The analyses in Chaps. 4 and 5 set out a number of developments and issues that are now central to the Turkish gas market. Evidence in those chapters indicated that albeit Turkey intended to introduce liberalisation through the NGML of 2001 and since then has been trying to pursue the reforms, a great deal of challenges and implementation issues still remain which inevitably result in gaps in the sector's future progression.

Since this book concentrates on the four main instruments of the EU energy directives, enacted by the member states at the discretion of the European framework regulation, the aim here is to critically review Turkey's progress towards natural gas liberalisation in order to explore why the completion of the gas market reforms has been prolonged, and what are the major challenges standing in the way of complete liberalisation and a well-functioning wholesale market in Turkey. With the emphasis of this book on how natural gas liberalisation has been implemented in Turkey and what challenges have hitherto been experienced in different segments of the market during this ongoing process, interviewing technique offers a valuable and powerful tool to better understand the liberalisation issues where the respondents' understanding and weighing of the information can give the book a real context.

To understand the opinion of each participant[1] regarding gas market liberalisation (based on their experience) the views of the informants from these critical institutions have been particularly vital for the authenticity of this book given their tasks for the former to operate a very large part of the regulation apparatus and for the latter to hold the monopolistic position with its price-setting power. Together with private sector players asking those key individuals, as insiders, directly for their views on the reasons why liberalisation has so far been successful or unsuccessful in Turkey, why the differences in adopting liberalisation model do still persist amongst different segments of the Turkish gas market and what the optimum way is for Turkey to proceed towards liberalisation carry a lot of weight especially in an environment where the natural gas policies of Turkey have been little discussed in academic literature. It is also expected to further illuminate the energy market liberalisation phenomenon and help us to understand the mechanisms in which individuals and institutions interact.

This book will contribute to knowledge by bringing to light the market players' views on the sector's past, current and potential future problems that have been identified in the preceding chapters, and aim to provide stakeholders and regulators in Turkey with a useful reference and policy recommendations. To distinguish specific themes that are central to the respondents, the question asked is, "What are the major obstacles encountered by Turkey so far during its reform process and how should Turkey's progress towards liberalisation and competition proceed?" The chapter

[1] The participants identified as stakeholders taking an active part in the Turkish gas market (namely EMRA, BOTAŞ and private companies).

presents the informants' views and self-concepts regarding the problems of the sector and potential solutions to increase the ability of the Turkish gas market to respond in a way that best meets the interests of stakeholders, consumers and the wider society. Given the myriad of information collected through the interviews, the most relevant comments, which interviewees chose to provide on specific issues, are embodied in three sections, each of which defines a number of hurdles that Turkey must overcome for a properly functioning gas market and fully implemented liberalisation, that is:

1. Managing the transition from monopoly to liberalisation: barriers to efficient market functioning and liquidity
2. Key challenges in pricing and attracting investments
3. Technical infrastructure and market/trade operations

The interviewees were categorised into three groups for expository convenience and identified as:

A: Representatives of EMRA
B: Representatives of BOTAŞ
C: Representatives of Private Gas Companies in Turkey

6.2.1 Managing the Transition from Monopoly to Liberalisation: Barriers to Efficient Market Functioning and Liquidity

In this section, the main controversial issues the respondents commented on regarding Turkey's liberalisation process are presented and many of them will be revisited in the concluding chapter. However, before moving to a brief summary of each, it is worth mentioning that the Turkish government has been carrying out some revisions to the 2001 Law and there have already been two official drafts of the Law presented to the Council of Ministers and the Parliament in 2013 and 2014. Since no definitive information regarding the possible timeframe for the passing of the draft(s) Law from the parliament has been obtained (there is also a chance they never will be passed or will be further postponed), they will not be discussed in detail at this stage. Occasional references are made to the most recent draft Law (2014) when it is relevant in later sections of the chapter.

6.2.1.1 Cause for Concern: The Market Dominance of BOTAŞ and Its Unbundling

The literature review chapter delved into the concept of natural monopoly from the traditional regulatory perspective and reviewed the body of regulation literature that focused on the dynamic evolution of monopolistic industries. The review presented that there had been suggestions from scholars that the introduction of competitive reforms for naturally monopolistic industries was feasible and they were believed to provide long-term benefits to society and to ensure a reasonable share of these benefits is passed on to consumers through market prices which, in other words, would reflect the efficient economic cost of gas and service quality attributes that echo consumer valuations as Joskow (2008) discussed in his paper. Whilst the likelihood of reasonable sharing of these benefits, particularly on the basis of the economic cost of gas, and their passing onto consumers through market prices are left to the next section, the focus of this section is on whether the introduction of (competition) reforms to Turkey's naturally monopolistic gas industry was really as feasible and effective as it was thought to be.

Almost all the respondents (A, B, and C) ascribed Turkey's somewhat unsuccessful attempts to finalise the gas market reforms to the general reluctance to reduce BOTAŞ market dominance and its restructuring. This may have been part of the problem, but the lack of success was generally also taken by many to demonstrate the weakness and partiality of the regulator to solve these issues across time. For the majority of respondents the failure to unbundle BOTAŞ or to reduce its market dominance was the explicit outcome of political manoeuvrings in the country, whilst (C) respondents delineated the main reasons for being unsuccessful in diminishing BOTAŞ' market power as the political will that uses BOTAŞ as an instrument to intervene in the gas market and again its reluctance to rescind the Statutory Decree No. 233 of the state economic enterprises that allows a legal entity like BOTAŞ to handle at least ten different market activities. For others, particularly those who represented the interests of the incumbent (B), keeping BOTAŞ' unbundled status and (its) high market share had just been the necessity which was guided by their good fit with the national context. Undoubtedly, market arrangements for industries, especially those to be liberalised, are in great need of refinement to reflect increased competition to ensure that all competitors have access to the market and are served the opportunity for the delivery of market price

signals and consumer choice as significant tools to match supply and demand. In achieving this in Turkey the implementation failures of the 2001 Law were the most complained about issues throughout the interviews. Not least in this regard, an informant from private sector stated, for them an understanding of the possible conflicts between stakeholders especially regarding neutrality in decision-making, lack of clear transparent reporting to third parties (such as unsorted balance sheets due to absence of unbundling) and adverse effects caused by the dominance of BOTAŞ were particularly essential. The sector's main problems, he continued, should particularly be considered on the grounds that prevalence of BOTAŞ' terms of gas sales which were being taken as reference hindered the formation of a well-functioning market. Likewise, due to being subject to legal and political restrictions BOTAŞ followed uniform gas sale and supply policies which again stood in the way of market liquidity in Turkey.

For many years, the main argument of BOTAŞ and the Turkish politicians has been that unless there is really a valid reason to do otherwise BOTAŞ' high market share should be retained or it will be subjected to stringent ToP provisions of its long-term gas purchase contracts. However, some (C) respondents drew a sharp distinction between BOTAŞ' and the private sector's views on this and by refuting this main theory of BOTAŞ they argued that the long-term contracts could always be renegotiated. Respondents argued that the most important ingredient of these contracts open to renegotiation was price when certain terms and conditions occurred. If they occurred, and the gas became uncompetitive when compared to its substitutes, then the buyer had the right to return to seller and ask for a price revision. In fact, receiving the revision right away could be highly unlikely but then the buyer could go and seek international arbitration. It was all about being confident about the uncompetitiveness of the gas being bought, and if one was ineligible to sell it, then he would most likely win the arbitration anyway, they went on.

As a matter of fact, Turkey won arbitration against Iran more than once and if it went against its other suppliers the likelihood it would win again is high. That is not even something specific to the gas market. ToP-involved agreements are everywhere, in every sector, at every level. ToP is nothing—and certainly not a penalty—but a combination of risks reciprocally undertaken by both sellers (price risk) and buyers (volume risk). Nevertheless, this is the very fact, the respondents acknowledged, that they had failed to explain it to politicians for so long. They were certain

that this was something that could be solved at the negotiation table and Turkey had actually done it with Russia and Iran during the 2001 crisis, as it was force majeure.

Confirming this, another private sector representative expressed his burgeoning dissatisfaction with regard to the import/export restrictions placed on private companies by EMRA and said that the second big mistake made by the law-makers, subsequent to withholding BOTAŞ' power, was to put a restriction on the import and export of gas in the interests of the local monopolist rather than in the national interest. For them, the legislator mentioned a liberal market but blocked free entry/exit of the main commodity of that market into/from the country. Vis-à-vis import, the legislator initially thwarted new entrants from signing purchase contracts with suppliers that already sell gas to BOTAŞ as there are tens of other gas-rich countries around Turkey. In fact, for them, that was the main market entry existing in Turkey. Then EMRA was empowered to issue procedures and principles of gas importation and its memorable Board Decision (No. 725) made import licencing conditional on tendering procedure. Phrased differently, this meant there were limits to who could bring gas into the country and anybody could win the tender for which one had made all the arrangements for. Hence, this was the legal barrier put in front of private companies, they argued. A similar approach towards exportation had also shaken the confidence of the private sector in EMRA since there was no standard licensing procedure for exporting gas and thus licences issued by the regulator differed according to export destinations, they continued.

Admittedly, finding a balance between the restrictive rules set, which are clear illustrations of the decades-long monopolistic structure, and the adoption of a liberal framework for countries/sectors is not easy. Taking into account the international experience and the existing contractual obligations of BOTAŞ the private sector foresees more frequent use of gas release programmes, particularly in the form of volume transfers, as the most appropriate way of easing the effects of concentration at hands and ensuring liquidity in the Turkish market. On the contrary, one interviewee representing the incumbent (B) has made his mark on the discussion by his entirely different view about reducing BOTAŞ' market power. He stated that the plans to further diminish its market share (via either contract or volume transfers) were no longer on the agenda of BOTAŞ given the current political landscape in and around the country. Due to reasons based on past experience, the political situation of Turkey's gas suppliers and the

national priorities which outweigh the overall gains to be obtained from the gas market liberalisation, BOTAŞ was reconsidering being the single competent authority to handle gas importation as before and by drawing back from trade segment of the industry completely it plans to ensure that liquidity of the market is secured by private sector only. Without a doubt, this is an important piece of information for all stakeholders in the market since there has been no indication of such a plan in neither drafts Law, and if it is indeed to happen, it will have a wide range of profound and intricate consequences for the different groups of market players.

6.2.1.2 Market Opening and Eligible Customers

As discussed in the preceding chapters, liberalisation is generally expected to serve the interests of household and industrial customers positively as long as such consumers are fully aware of their options and the benefits that they can reap from switching between alternative suppliers. The picture that emerged in Chap. 5 showed, however, that due to the landscape of the Turkish retail gas market which was introduced to franchising via "the competition for the market" approach in 2003, the residential sector of the market is closed to competition and only eligible customers with certain amounts of gas consumption are allowed to choose their suppliers. Despite EMRA's trials to continually reduce the eligibility limits and to remove the regional differences in terms of threshold levels, household customers are still not able to capture the benefits that an open market would purportedly bring unlike other European countries wherein a full market opening or retail choice for "all" customers was required as early as July 2007.

Thus, in Turkey both captive residential customers and eligible customers (who do not switch) purchase gas from their franchised distributors at regulated prices whereas other large customers and their choice of suppliers freely determine the prices and transaction conditions between them as long as the regional distributor is notified within 15 days (NGML, Art. 8a). It is worth reiterating that the actual switching experiences of Turkish industrial customers remain low in line with European MSs and the rate of switching amidst them has rarely exceeded 15% since the entry of eight private suppliers into the market. Whilst varying in type, formidable barriers that preclude the possibilities of the expansion of market opening in Turkey are manifold according to each of the respondents. One of the (C) respondents argued, for example, that for them, the transportation and delivery contracts—being compulsorily signed between distribution companies and switched suppliers—and the restriction of a two-week distributor notification period had been and still were the two unsolved issues

between all parties, and posed an obstacle to switching in Turkey. Another went further that respective provisions of the Law, as they were, raised many possibilities that distribution companies impeded new suppliers during the switching process even if an agreement was reached between eligible consumers and suppliers (them). They quite often paved the way for the addition of extra terms and conditions put on switching customers by the distributors which were not even within the scope of the Law or secondary legislation such as use-or-pay clause for capacities. Other (C) respondents stated that they found the lack of unity in terminology, standardisation and minimum required gas pressure levels between the contracts, and confusing definitions (entry and exit points, judicial delivery point, commercial delivery point, station, etc.) discouragingly rampant in the market. They argued that they found themselves, most of the time, tackling with these least important problems to clarify their liabilities and commitments rather than concentrating on the main issues.

What is more, they noted, switching contracts that were based on "calendar year" by Law thwarted both their and their consumers' ability to materialise short-term, periodic and/or spot purchases when needed, like their counterparts in more liquid markets elsewhere. They strongly believed that removal of such restrictions would contribute greatly to the liquidity of the market. A (C) respondent did exemplify the barriers as he observed that there existed also another contractual issue that the consumers willing to switch had to undertake the burden of proof to demonstrate their indebtedness (to their prior gas suppliers) to the new suppliers. He suggested that this should be restricted to due debts only. And as per NGML Art 16 they should not be held liable (just like distributors) for supply disruption in the case of emergency/difficult day situations. In fact, in their view, preparation of a dedicated "Eligible Customers Regulation" to establish standard mechanisms for switching customers would not only help the removal of the current uncertainties and confusions the Law creates but would also prevent distribution companies from abusing their dominant positions.

Another important barrier to switching, (C) respondents suggested, was that the investment burden on switching customers to replace their meters with remote reading meters[2] and to establish an automatic volume correc-

[2] It is left to the discretion of distributors to require switching customers to replace their existing meters with remote reading meters to make instant information flow reachable in real time.

tor system (if they consume 300 mbar gas or higher). They first discussed this issue from customers' point of view and stated they found these investments unnecessary and by far outweighing the profit customers could have made by switching when specifically compared. The second factor, they argued, was the difficulties created for distributors in making bulk supply agreements with more than one supplier. Thus, distributors who were also considered eligible would rather sign voluminous agreements with a single supplier (preferably BOTAŞ) due to the absence of daily-measurable meter use amongst eligible customers that makes the identification of their daily supplies hard and so does daily gas allocation of residential customers. As a result, that limits their supply options, they argued.

Not all (A) respondents from the regulatory authority shared, however, the view that the above was a complete list of reasons for fewer switching since one of them argued that most suppliers (and wholesalers) in the Turkish gas market already had a number of affiliations and subsidiaries in varying sectors. So they, by preference, prioritise regular supply of their companies over others by pushing the liquidity concerns of the market into the background.

6.2.1.3 Storage Requirement

It is stressed throughout the book that storage sites are referable as a rescuer under difficult/emergency circumstances. But, needless to say, they are capital intensive, prohibitively costly to build and Turkey, alas, has only a few of them. Acknowledging the absolute need for further investment in storage capacity, respondents (new supplier entrants in particular) drew attention to the hardship of assuming the compulsory storage liability the 2001 Law requires classifying it as another entry barrier. They were critical saying that it was neither fair nor realistic to expect from them or future newcomers who assume the market risks to fulfil this obligation in an environment where principal applications of the NGML were still not fully performed and the dominant player, BOTAŞ, itself was failing to meet this requirement occasionally. This argument will not be resolved quickly since this particular provision was not revised in the draft Law and the mandatory natural gas storage requirement looks to remain imposed upon private suppliers for some time.

Respondents from BOTAŞ and EMRA tended to take the view that some regulatory changes in relation to storage would be due once the lack of storage stops being a problem for Turkey and most regulations applicable today could be either softened or lifted, so that access to storage

facilities could be under negotiated terms. They envisaged storage-related decisions to be taken according to market needs and not what the incumbent or the Law or other country-specific reasons required. However, as expected, this is not envisaged in the very near future.

6.2.1.4 Stamp Duty

All stakeholders, without exception, agreed on the stamp duty requirement for all contracts made in the natural gas market (based on the financial regulations) on having by far the most detrimental effect on the market's development and liquidity independent of all other elements. (C) respondents said that in Turkey, stamp duties were applicable to (even) compulsory systemic contracts signed between shippers and transporters and that brought about a 1% cost burden on the sector. Indeed, ICIS' special Turkey presentation termed the stamp duties in Turkey as a "market killer" which not only jeopardises security of supply and deters investors but also fractures the market, driving financial trading to other jurisdictions that are not covered by the tax. Most importantly, perhaps, they seriously affect Turkey's ambition to become an energy and financial hub (Boddy and Sabadus 2013, 29).

Stakeholders were in agreement with the importance placed on the removal of the duties from contracts signed in the transmission and distribution segments of the industry as an initial step and then gradually full abrogation of them for all types of gas contracts. Especially (C) respondents claimed that this would raise the handover ratio of gas significantly.

6.2.1.5 Off Spec Gas

As explained by the (C) respondents, there have been occurrences of planned repairs and maintenance in networks outside the national transmission system resulting in entries of contingent "off spec" gas to the national network. According to one respondent this was being occasionally considered as a serious problem or in contrast ignored by the transporter (BOTAŞ) depending on the demand by the market. Anyhow it led to alterations in their daily contract quantities (DCQs) and used to get them fined.[3] They expected the transporter, BOTAŞ, to address these problems and ensure a healthy network by taking a set of currently avail-

[3] Between April 2009 and February 2013, shippers were exposed to pressure-related penalties 198 times and its cost to private sector was TRY111.4 million in total (PETFORM DIVID, 2013).

able technical measures. More importantly, they wanted the responsibility of BOTAŞ to be clearly specified in the network code as a rule.

BOTAŞ tended to take the view, however, that the transporter was only responsible for ensuring operation of the network by providing a standard set of services[4] and obtaining predetermined income in accordance with the tariff legislation. Required service, in their view, was beyond the standard services outlined to be given and they believed information flow regarding any off spec gas occurrence had to be carried out between relevant shippers, suppliers and system operators. Taking this into account and the comments and prioritisation of the stakeholders, this frequentative incident certainly deserves further analysis in greater detail but is presently beyond the scope of this book.

6.2.1.6 Electricity-Gas Sector Interactions

Although the review in Chap. 5 showed that the natural gas demand of Turkey is predominantly satisfied via imports and thus running the GFPPs does not only become relatively expensive, but also contradicts the country's mid- and long-term strategic targets, most respondents did not comment on all relevant sections of the review but focused instead on the issues they considered were a priority. Private sector members agreed that there was lack of coordination between gas and electricity markets, especially a misalignment between the industry timelines (before and after gate closures). There were also differences in nomination periods resulting in exposure to imbalance charges. Many stakeholders also highlighted the importance of the completion of contracts between BOTAŞ and GFPPs on BO and BOT basis from 2019, and the development of a strategy to accommodate demand increase these plants would create. Whereas (A) respondents were confident that the BO and BOT plants would consider alternative suppliers once their contract with BOTAŞ ended and this would, in turn, force BOTAŞ to find alternative sales channels, (B) respondents argued the opposite that, under the current political and economic landscape, those plants would continue to buy gas from BOTAŞ for some time.

As of 2019, the GFPPs buy about 80% of their supply from BOTAŞ and the rest from private companies.

[4] Starting from the national entry points and finishing at the domestic exit points (determined as per Standard Transportation Contracts).

6.2.1.7 Supplier of Last Resort

The last issue linked to the market's efficient structuring is who should be the supplier of last resort (SoLR).[5] This is a question that, according to the respondents, has important implications, particularly in situations when there is uncertainty for distribution companies in knowing exactly from whom and under what terms they will buy the gas. There is no designation of SoLR in the existing Law except a single Board Decision (No. 4169) which indirectly confers the responsibility of serving eligible customers who do not have a supplier to distribution companies. Some private sector respondents confirmed that they supported the notion that the responsibility of being the SoLR of distributors should be with BOTAŞ and not them because of BOTAŞ' dominance and the existing market realities in Turkey. BOTAŞ respondents did not comment on this.

In the draft Law, however, this issue seems to be dealt with and the selection of SoLR(s), their duties and the tariffs to be used are left to the regulatory authority's decision.

6.2.2 Key Challenges in Pricing

Undoubtedly, one of the essential characteristics of competitive markets is cost-based pricing. It was discussed in Chap. 5 that BOTAŞ adapted cost-based pricing for energy products following the High Planning Council (HPC) decision[6] of 14 February 2008; however, this practice was discontinued from the last quarter of 2009. BOTAŞ presently uses an all-inclusive pricing which, according to the respondents, undermines the goal of developing a competitive gas market. As the segments of Turkey's gas industry are at very different levels of development this affects the market players' ability to manage this pricing method. There are three pricing-related issues considered to be major barriers to the development and liberalisation of the Turkish gas sector during the interviews:

[5] In the event that customers' gas suppliers fail to maintain normal conditions of gas supply, the designated Supplier or the SoLR ensure(s) continuity of gas supply for non-domestic and domestic customers connected to the gas network (Utility Regulator 2012).

[6] Based on the High Planning Council Decision No. 2008/T-5 "Procedures and Principles of Cost Based Pricing Mechanism to be Applied by the State Economic Enterprises of Energy" to be effective from 1 July 2008.

6.2.2.1 Predatory Pricing of BOTAŞ

The most frequently referenced argument regarding the obstacles that have been standing in the way of Turkey's gas market achievements was the BOTAŞ' predatory price policy. (C) respondents argued that despite its invitation to private participants into the sector in 2005, BOTAŞ had not been reflecting the real costs and differences in exchange rate to its gas prices. And thus, it leaves the other market players confronting today with serious challenges, if not almost inoperability. As noted in Chap. 4 it is now known that the Russian, Iranian, Algerian, Nigerian and Azerbaijani gas to Turkey are contracted under long-term oil-indexed agreements by the ToP principle. BOTAŞ attains the monopoly of purchase of gas from these countries that have typically more stringent and high ToP commitments in comparison to, say, the high-swing contracts the UK and the Netherlands[7] have (Melling 2010). As of 2019, eight private companies have the right to import natural gas along with BOTAŞ and the only way they can compete with the incumbent is by offering their customers lower prices. The crux of the matter here, again according to the respondents, is that although the wholesale tariffs have been left to sector players to set freely since 2008 (Board Decision No. 1439/2), the market prices have been kept artificially low by BOTAŞ being the biggest player with its 80% market share. They argued that it was due mainly to its all-inclusive pricing, which hardly reflects the true costs of storage and transmission/dispatch control, and there was no way that (new) supplier entrants could compete with such prices. Additionally, discussions with the interviewees reflected many uncertainties on pricing; for example, BOTAŞ prices remain stable even though the storage and transmission tariffs change over the years (Fig. 6.1) and the gas prices bear very little relevance to seasonal balancing costs, which leads to uneconomical and infeasible storage utilisation of the private sector.

As it is in China natural gas demand is chiefly supply-driven (IEA 2006) in Turkey, and although differences exist between sectors and regions, the industry sector is given a particular importance in terms of prices due to their overall impact on the economy. When compared with European prices, the Turkish gas prices are not very low and actually could be criticised for being relatively high by using the purchasing power standard

[7] For example, the Dutch local Groningen sales contracts in return for a substantial capacity charge payable regardless of the gas consumed and UK high-swing contracts from the fields developed for seasonal supply (Melling 2010, 128).

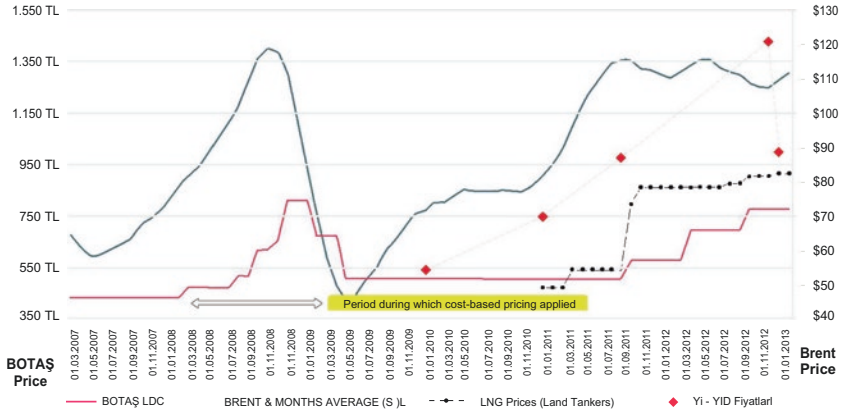

Fig. 6.1 BOTAŞ prices versus Brent six months' average (Source: Accenture 2013, 26)

as illustrated in Table 6.1. Most European countries, apart from Croatia and Turkey, support their industrial consumers with lower prices than their household consumers, and between 2014 and 2018 European industrial consumers paid gas prices ranging from €0.027/kWh to €0.043 kWh in developed countries, whilst Turkish customers paid the lowest prices (€0.018–€0.026) after Romania. When considered in the context of the PPS, however, the final price of gas for the Turkish industrial consumers has almost always been high with respect to prices prevailing in other EU countries. A similar picture can also be drawn for the household prices which have been amongst the lowest in €/kWh terms but amongst the highest in PPS terms.

According to the interviewed market players BOTAŞ does not pass the competitive advantage it has in the international market onto final consumers. It was articulated in Yardımcı (2012) that the cost components of BOTAŞ' average national gas tariff include gas price and wholesalers' margin aggregately accounting for 74.3%, average transmission and dispatch control fee (3.2%), average distribution fee (2.9%), storage fee (0.8%) and taxes and levies (18.9%). This being the case, some (C) respondents said that they found it hard to offer lower prices to their customers with respect to the incumbent except for the fall in transmission and storage costs resulting from regulation' as similarly argued in Cavaliere's (2007) paper. Based on views expressed as well as on other information collected, the private sector proposes a pricing reform to be implemented in a way that

Table 6.1 Gas prices for domestic and industrial consumers in Europe, 2014–2018

	Domestic Consumers[a]*—2018S2*						*Industrial Consumers*[b]					
	EUR/kWh			*Purchasing power standard*			*EUR/kWh*			*Purchasing power standard*		
	Small	*Medium*	*Large*	*Small*	*Medium*	*Large*	*2014S2*	*2016S2*	*2018S2*	*2014S2*	*2016S2*	*2018S2*
Austria	0.078	0.0514	0.0426	0.0708	0.0467	0.0387	0.0334	0.0274	0.0277	0.0302	0.0257	0.0251
Belgium	0.0722	0.0495	0.0429	0.0653	0.0448	0.0388	0.0276	0.0233	0.0231	0.0248	0.0218	0.0209
Bulgaria	0.0381	0.0364	0.0362	0.0791	0.0756	0.075	0.0331	0.0182	0.0279	0.0703	0.0392	0.0578
Czech Rep.	0.087	0.047	0.0434	0.1245	0.0673	0.0621	0.0293	0.0246	0.0254	0.0459	0.0389	0.0364
Denmark	0.0536	0.0417	0.0381	0.0402	0.0312	0.0286	0.0263	0.0215	0.0288	0.0195	0.016	0.0216
Germany	0.0776	0.0451	0.0403	0.0724	0.0421	0.0376	0.0361	0.0291	0.0275	0.0347	0.0281	0.0257
Estonia	0.0364	0.0306	0.0287	0.048	0.0404	0.0379	0.0354	0.0206	0.0277	0.0474	0.0289	0.0366
Ireland	0.0792	0.0634	0.0552	0.0709	0.0567	0.0494	0.038	0.0305	0.0352	0.0341	0.0283	0.0314
Greece	0.0677	0.0565	0.0569	0.0823	0.0687	0.0692	0.041	0.0228	0.0312	0.0487	0.0276	0.0379
Spain	0.0926	0.0699	0.0501	0.1025	0.0774	0.0554	0.0369	0.0254	0.0293	0.0412	0.0285	0.0324
France	0.1289	0.0553	0.0438	0.1177	0.0505	0.04	0.036	0.0333	0.0316	0.0328	0.031	0.0288
Croatia	0.0367	0.0288	0.0272	0.0569	0.0445	0.0421	0.0396	0.0271	0.0278	0.0626	0.0429	0.043
Italy	0.1039	0.0621	0.0491	0.105	0.0629	0.0497	0.0324	0.0256	0.0277	0.0323	0.0262	0.028
Latvia	0.0566	0.0355	0.0354	0.0821	0.0515	0.0514	0.0342	0.0231	0.0312	0.0498	0.0348	0.0452
Lithuania	0.053	0.0297	0.024	0.0836	0.0469	0.0379	0.0374	0.0245	0.0342	0.0611	0.0412	0.0539
Luxembourg	0.0403	0.0385	0.0382	0.0329	0.0315	0.0312	0.0388	0.0317	0.0328	0.0326	0.0269	0.0268
Hungary	0.0273	0.0273	0.0273	0.0463	0.0463	0.0463	0.0373	0.0255	0.027	0.0663	0.0451	0.0457
Netherlands	0.0898	0.0416	–	0.0801	0.0371	–	0.029	0.0225	0.0234	0.0265	0.0208	0.0209
Poland	0.0427	0.0364	0.0344	0.0743	0.0633	0.0599	0.0359	0.0256	0.0304	0.0621	0.0472	0.0529
Portugal	0.0733	0.0586	0.0529	0.09	0.072	0.065	0.0437	0.0271	0.0288	0.0562	0.0346	0.0354
Romania	0.0297	0.0297	0.029	0.0594	0.0594	0.0579	0.0211	0.0179	0.0281	0.0409	0.0369	0.0561

Slovenia	0.0429	0.0406	0.0339	0.0519	0.0492	0.0411	0.0385	0.0276	0.0296	0.0481	0.0353	0.0358
Slovakia	0.0882	0.0383	0.0371	0.1298	0.0563	0.0546	0.0363	0.0299	0.0295	0.0545	0.046	0.0434
Sweden	0.1286	0.0707	0.071	0.1065	0.0586	0.0588	0.0356	0.0299	0.0399	0.0277	0.0241	0.0331
Turkey	**0.0177**	**0.0174**	**0.0177**	**0.0572**	**0.056**	**0.057**	**0.0257**	**0.0218**	**0.0185**	**0.0462**	**0.045**	**0.0597**
UK	0.0703	0.0464	0.0404	0.0637	0.0421	0.0366	0.0332	0.0235	0.0264	0.031	0.0311	0.0265

Source: Eurostat

Note: Excluding taxes and levies

[a]Small: Annual consumption < 20 GJ, Medium: 20 GJ < Annual Consumption < 200 GJ, Large: Annual consumption > 200 GJ
[b]Annual consumption: 10,000 GJ < consumption < 100,000 GJ

the minimum selling price of BOTAŞ (excluding transmission and dispatch costs) will not risk both the commercial sustainability of other market players and the security of supply. Following BOTAŞ' renouncement of all-inclusive pricing, (C) respondents advocated that each customer should bear the cost they cause to the system and that, in turn, should require explicit reflection of storage, balancing and capacity costs on the selling price of each profile.

6.2.2.2 Energy Subsidies

The second most referenced discontent was BOTAŞ' subsidised prices which again tend to be more politically based in Turkey. Perhaps the most competent comment regarding subsidies and its consequences for the Turkish market came from one of the (C) respondents. He delineated that everybody complained about BOTAŞ' cheap subsidised prices but not many were aware that the situation had been exactly the opposite especially until 2016. Even at the time when gas prices were globally on the decline depending on decreasing oil prices, the sales prices of BOTAŞ had remained the same with those of some years ago.

He continued arguing that Turkish consumers were using the world's most expensive gas, and this aroused the question of how would industrial companies survive if their most important competitive advantage lay in the input of energy? Nonetheless, according to him, when these companies were heavily manufacturing, say, iron/steel in furnaces with cheap gas and electricity (ultimately subsidised by the Turkish tax-payers) and exported to countries like Libya and Iraq between 2010 and 2014, this issue was not worthy of attention. Actually, those manufacturing companies seriously thought that they were competing with China. So, that was where we were with subsidies in Turkey and sadly the same was true with the GFPPs, he went on. The GFPPs were those who bought cheap BOTAŞ gas when gas purchase prices were expensive elsewhere and when they were exposed to comparably higher prices they looked for ways to sell their plants to other countries.

So in sum, he summarised, interventions into a liberal market would always erupt if not today then would tomorrow or ten years later. And then the market's reaction to it—or its losses—could be much more than its gains in the past. Whilst (B) respondents did not want to comment on this issue, most (A) respondents simply commented that the political will sets natural gas prices in Turkey.

6.2.2.3 Price Signals for Investments and TPA Exemptions

Given its size and demand which nears 55 bcm, Turkey is already one of the largest gas markets in Europe. As is presented in Chap. 4, however, the minimum storage requirements of the 2001 Law can hardly be met, and unless the issue of new storage capacity is dealt with, Turkey's gas industry would neither take off nor the seasonal gas demand fluctuations could be easily compensated. As expected, lack of investment incentives and right price signals for investors in storage was, too, quoted by the interviewees and the issue was articulated from two main perspectives.

The first is the absence of new investments. Apart from the constructions of Tuz Gölü UGS and the capacity expansion of Silivri UGS which were done a year ago, there is no investment in storage[8] (including LNG) to complement Turkey's existing facilities to meet the demand fluctuations and to offset the disruption of gas imports although geographically UGS potential of the country seems to be plenty (Sect. 4.4.7.1). According to one of the (C) respondents the question of why there is a weak (if not no) storage investment in Turkey was closely linked to the investors' lack of confidence regarding recovering their costs and securing an agreeable return on their investment. This was coupled with the absence of adequate market set-up in which prices could be better kept in line with costs.

For most (C) respondents lack of price signals due to BOTAŞ' limited price differentiation (that also stems from BOTAŞ' all-inclusive price policy) constitutes one of the problems. Those who commented on lack of storage were of the view that limited price differentiation did preclude the right price signals to storage investors and Europe's wide range of gas prices (by type of user) was a useful example to look at. To put this in context, BOTAŞ has three categories presenting natural gas prices charged to final customers: Category 1 eligible customers (who are chiefly industrial customers consuming more than 300,000 m^3 gas),[9] Category 2 eligible customers (consuming less than 300,000 m^3 gas) and organised industrial zones. In the EU countries, on the other hand, household and

[8] It is highlighted by the interviewees that despite the 30-year underground natural gas storage licence issued by EMRA to Bendis Enerji on 2 February 2014 towards the Tarsus UGS project no nail has been pounded to the project as of 2019 and it's not clear whether the project will be realised.

[9] This can be subject to another criticism that BOTAŞ still classifies the customer groups based on their use of gas being more or less than 300,000 m^3 although the eligibility levels, as of 2018, are reduced to 75,000 m^3.

industrial gas consumers are divided into at least four categories in themselves (Table 6.1). This represents an efficient framework to create adequate price signals for investors and should be promptly adapted by BOTAŞ. Designing efficient and cost-reflective pricing systems is truly not an easy task and regulatory reforms in this area seem to be still some time away for Turkey. Whilst this needs more work, the 2014 draft Law aimed at supporting LNG investments in particular and introduces an 85% reduction as to real property (e.g. authorisation, lease and easement) to be applied for the first ten years of investment and operating period.

The second is the absence of exemption from third-party access to storage facilities. Article 22 of the Third Directive allows, upon request, cost regulation obligations and the full/partial TPA exemption to major new gas infrastructures and significant increases of capacity in existing infrastructure. That clear-cut derogation for Turkey's existing and prospective infrastructure is, however, not provided under the provisions of the 2001 Law (and the BUPPs) and the lack of control under these options makes investing into Turkey's infrastructure unattractive for potential local and foreign investors, as many comments pointed out. Whilst a number of interviewees suggested that such investments could be made jointly with a contribution from both state and private entities, an interesting criticism came from certain (A) respondents regarding the dilatory and reluctant proceedings of the state towards the financing of such investments itself. One of them argued that if the state was able to finance some major disruptions abruptly caused by technical-/price-/terror-related conflicts by supplier countries since 2004 (which cost the government million dollars a day in return for emergency LNG imports from abroad) that amount should have been directed to storage investment in the first place. So, Turkey would have already been in the centrepiece of energy world today.

The interviewees from EMRA were in consensus that although almost all the existing storage capacity in Turkey was integrated into BOTAŞ' other infrastructure (and thus still bundled) and the regulated TPA were applied to these facilities, the regulations would be softened or removed once the country had enough capacity. Whilst this would lead to commercial terms/conditions to be agreed freely between facility operators and their primary capacity holders, it would also make passing on the storage costs to end users on the segment basis for providing necessary market-based price signals for new infrastructure investments relatively easier.

6.2.3 Technical Infrastructure and Market/Trade Operations

To complete the analysis of Turkey's transition from monopoly to liberalisation, having already commented on the particular features of the market, an important step was also to look at Turkey's technical infrastructure in this regard and comprehend how Turkey could improve its technical ability including data collection and analysis. These clearly have broad repercussions for the supply/demand developments and smooth market/trading operations.

In this vein, a (C) respondent summarised why the harmonisation of Turkey's gas legislation with Europe's has lagged behind for so long. He argued that from the beginning, Europe had realised that gas was in fact a commodity. With this "commodity" philosophy in mind, the EU had been constructing a system by removing the demarcation between its members so that the commodity could freely flow, say, from Germany to Belgium, to the Netherlands, to France or from France to Germany. He acknowledged that Europe had encountered resistance from the big statist companies (French in particular), but especially after 2008 almost all of Europe except Germany realised the significance of setting up a liberal gas market against the political games Russia started playing with gas through Ukraine. By establishing gas trade centres/hubs they saw the potential of consuming cheaper gas (e.g. US$7–9 million British thermal unit [MMBtu]) despite other prices impacted by rising oil prices elsewhere (e.g. US$12-US$14 MMBtu). In Turkey, however, the gas market had never been thoroughly understood, he continued. In fact the commodity phenomenon had not really been understood either in its gas sector or in the electricity. Hence, the electricity crisis in 2006 was a result of the government's resistance (or perhaps populist approach) to pass the rapid rise in international energy prices to the domestic market. He was positive that the severe impacts of that crisis forced Turkey to establish a balancing power market and therefore today it had a comparatively more liberalised electricity market than gas. For him, having experienced Russia-Ukraine-related gas supply issues every year since 2009, especially after the downing of a Russian warplane in Turkey,[10] the country finally had the opportunity to see the hazards it was exposed to. According to him, the problem was that Turkey legislated quite a liberal NGML in May 2001 but sadly put a

[10] On 24 November 2015, Turkey shot down a Russian warplane in response to violation of its airspace, whereas Russia said the plane was over Syria. See http://www.bbc.co.uk/news/world-middle-east-34912581 [accessed on 9 April 2019].

full stop there. That dot still stood there today as Turkey had not fixed the failures/shortcomings in the law whereas the EU learnt from its mistakes and went remarkably further with its second- and third-generation directives.

In order to align Turkey's natural gas sector reforms with the country's new market framework, adequate technical infrastructure and properly functioning EBB have already proven their value during the interviews. Almost all respondents noted that the Turkish natural gas market evolves and so do its needs, and emphasised the importance of incorporating new market structure and sufficient technical infrastructure. (C) respondents, on the other hand, argued that they expected a constant evolution from the market which, in this context, called for a more open exchange of information. Moving to what needs to be done for a smooth operation of the market in Turkey, removal of information asymmetries which prevented them to be aware of potential risks and opportunities in the market due to BOTAŞ dominance/non-unbundling, overcoming deficiencies in the SCADA system used in both distribution and transmission segments of the industry for measurement/communication purposes, and to further improve the EBB to provide good quality real time information were to name but a few.

6.3 Analysis of Findings

This book has attempted to investigate some of the key challenges persisting in Turkey's institutional landscape, regulatory reforms and gas pricing mechanisms that have impacted the country's natural gas market liberalisation and its integration to the EU's single energy market. Following the findings of Chap. 1, this book has firstly discussed that the drivers behind natural gas reform programmes have been widely divergent between developed and developing countries, and between those who produce/export gas and those who do not. As shown in later sections of the book, in Turkey the primary push for natural gas market reforms came from the fiscal crises in the 1990s so that investments to provide the country's vast population with access to energy resources were (inevitably) seen as a huge burden on the state budget whilst private participation in the energy sector through liberalisation was considered to be the remedy.

The deployment of liberalisation in energy markets induces changes which impact the way energy (re)sources are handled, traded or offered to consumers. As is frequently advocated by bodies like the World Bank, the

IEA and the EU, harnessing the right liberalisation and competition tools is crucial to, inter alia, contribute to the protection of final consumers and for elimination of potential discrimination in gaining access to infrastructure. In Chap. 2, both political and economic arguments for the liberalisation phenomenon were reviewed, and in order to objectively gauge the underpinnings of the controversial approaches towards this phenomenon, three theoretical perspectives within the institutional literature were discussed: the public choice theory, the natural monopoly theory and the economic theory of regulation.

From the standpoint of natural monopoly theory, the discussion and surveying of the "natural monopoly concept" laid out the consideration that these monopolies had generally been caused by government interventions via franchises, protectionism and other means due to the large-scale production and economies of scale as DiLorenzo (1996) stated. The Turkish gas market, within this context, is monopolistic nevertheless, the industry has been also introduced to liberalisation through different avenues since 2001 and now private companies import, store, distribute and sell natural gas along with BOTAŞ, although limited in numbers. Although the tasks and objectives defined in its 2001 NGML constitute Turkey's formal baseline today the AKP government has not yet managed to fully implement either the provisions of the country's first and only Law or the EU natural gas directives. Therefore, a fully fledged liberalisation is not yet a reality and the overshadowing role of the government is obvious as a means of regulation. Thus, using the "natural monopoly," "public choice" and "economic theory of regulation" as the theoretical construct of this book has offered a useful way to understand the country's liberalisation progress from controversial perspectives and to establish a level playing field for the liberalisation research on the Turkish gas market to be built upon.

The use of monopoly can be daunting since it may be considered to be for the public benefit, or otherwise, involve economic/social disadvantage to it. According to Gunton (1888, 388): "If by monopoly is meant merely the exclusive power to produce a commodity, this exclusive power may be either an evil or a great benefit, depending entirely upon the way it is obtained. If it is procured through the arbitrary exclusion of competitors, it will surely be an evil; but if derived from the capacity to make the article more cheaply than others, through the use of large capital and superior methods, then it is a positive advantage to the community." A notable degree of vertical integration and foreclosure on upstream and down-

stream activities has been seen in the Turkish gas market, and it is confirmed by the interviewees that due to long-term gas purchase contracts, severe ToP restrictions and political circumstances of the supplier countries, the incumbent, BOTAŞ, is not yet totally willing to abandon its historical monopolistic position for the years to come. This being the case, it is appropriate to question the magnitude and strategic significance of the natural monopoly theory, as advocated by its extant apologists, that economies of scale cause declining average costs or market prices would really be achieved without governmental subsidies. Due to lack of data and transparency, any assessment of the cost and potential for development becomes almost impossible in the Turkish gas market. Notwithstanding the limitations in publicly available data, however, approximate prices for BOTAŞ gas imports are available which are linked to oil prices and claimed to be high compared to other countries that use market or hub-based prices. It is also known that private companies strive to compete with BOTAŞ prices by constantly negotiating with Russia to get lower prices than the ones BOTAŞ is given. There is also the question concerning what the private companies' contribution is to the market or competition if they are not able to bring cheaper gas to the country.

Gunton is also against the notion that a large concentration of capital tends to destroy competition, and he argues, "the reverse is true. It tends to raise the plane and increase the intensity of competition, and minimise the margin of profits" (1888, 390). However, this analysis has shown that some of the new entrants have chosen to associate themselves with Turkey's principal gas supplier, Russia, to solve their price issues and due to the extent of the relinquishment of equity in their companies to Russia (up to 70%) they have become the subject of another concern for the market as this research argues. The monopoly's predatory prices continue to cause serious concerns among private companies and they are claimed to have destructive impacts on the wholesale market, implying numerous limitations over the way natural gas is sold and bought. As Michael Porter discussed in his seminal book, *Competitive Strategy: Techniques for Analysing Industries and Competitors*, that is because skills, resources, technological developments and orientation of firms—either existing or considering entry into the industry—are very vital to industries' evolution towards competition, competition may not always translate into structural change in the industry. And he continued, "because no firm happens to discover a feasible new marketing approach; or potential scale economies may go unrealised because no firm possesses the financial

resources to construct a fully integrated facility or simply because no firm is inclined to think about costs" (Porter 1980, 163). In the Turkish case the private firms may be aware of the costs but not necessarily be resourceful or financially able to construct a mechanism via which they can compete with BOTAŞ.

The Turkish gas industry is inherently monopolistic and like other markets, where competition within the market is not possible/desirable, its distribution segment has adopted an alternative administrative principle "competition for market" to keep the existing monopolistic structure and allocated the running of the services to private firms through franchise bidding. As Harstad and Crew (1999) discussed, franchising in network industries arguably provides attractive efficiency properties that, for example, price-cap regulation or rate of return could not achieve. Or as Demsetz (1968), Braeutigam (1989), Dnes (1995) and Joskow (2007) argued, franchise bidding is appealing since it suggests competition into the industries where substantial economies of scale prevail, and is free from the usual regulatory apparatus and regulation-related incentives for firms to behave in an economically inefficient manner. At this point, almost all regions are being distributed gas by private companies in Turkey and it is hard to establish benchmarking between the state- and privately distributed areas in terms of tariffs, service quality and efficiency measures in Turkey. IGDAŞ is the only remaining public gas distributor (partially serving Istanbul) and although it is not quite comparable with other small distribution companies, due to its size, it has not stopped some of the respondents from commenting about IGDAŞ more positively than its private counterparts, particularly in terms of service quality and prices.

As shown in Chap. 4 there was fierce competition for the franchise of certain regions that resulted in bids with zero unit service and depreciation charges and connection fees, and it was attempted to uncover what may possibly bring the potential franchisees to accept investing into infrastructure and to supply gas in return for no cost recovery or any profit for the first eight-year period. The latest analysis of Okan Yardımcı about distribution tariffs, at this juncture, has aided this book in understanding how the natural gas tariffs evolved after the compulsory fixed-tariff period for end users and the study showed that the distribution tariffs have increased for all regions but the growth rate has so far been less strong in Istanbul (Sect. 4.4.5). This is coupled with the outcomes of Yardımcı's other study "Efficiency and Service Quality Analyses of the Natural Gas Distribution Companies: A Case Study of Turkey" proving that neither

the service quality nor efficiency measures the private distribution companies have taken thus far properly met the early expectations of Turkey regarding gas market liberalisation (Yardımcı 2015b). It is illustrated in Chap. 4 that today franchisees like Aksa Gaz Dağıtım A. Ş., Enerya Gaz Dağıtım A. Ş and Akmercan Group hold distribution licences for up to 20 regions and this couples with the findings of Viscusi et al. (2005) that certain advantages of the current franchisee(s), that is, readily made necessary capital investment, better knowledge in technology and better information on market demand, can disincline other firms to compete with the incumbent realising the trivial chance of winning the competition. Whilst confirming Paul Klemperer's (2001) study which investigated the case of collusive bidding and opportunistic behaviour of single firms that enjoy strategic advantages for franchise competition, the interviews with EMRA staff also indicated that complexity of contractual arrangements were ignored at the outset of franchising and today the regulator occasionally faces some difficulties such as accountancy ambiguities and the possibility of a franchisee exploiting the accounting data as a threat of bankruptcy to disincline the franchising agency to fail him as argued by Williamson (1976). In summary, although franchise or competitive bidding has been used as an effective tool to construct, enhance and operate distribution networks in regions wherein no access to natural gas existed in Turkey, their final implications on the Turkish market have not been free of flaws contrary to what was expected.

Overall, this fragmented structure causes the Turkish gas market to be caught between the old monopolistic structure and a new liberal approach without direction and no clearly articulated strategy. Both the analysis undertaken in this book and the interviews conducted show that Turkey's gas market policies have been mostly shaped by political incentives (including Turkey's official candidacy to the EU and a range of other factors including strategic energy security considerations, geopolitical factors and the politicians' own initiatives), although it began with economic objectives. According to public choice theorists, the apologists of the natural monopoly theory fall short of covering the relationships between expanded roles for governments and their impacts on entry barriers and social costs whilst Chang (1997), for example, drew attention to the deadweight welfare losses that stemmed from allocative and productivity inefficiency due to lack of competitive pressures, high likelihood of predatory pricing or pre-emptive investments. Chang articulated how governments protect the natural monopolies and decide to operate

the services at a price equal to marginal cost by providing a lump-sum subsidy to keep the incumbent company in operation since allowing otherwise would create Pareto inefficiency and negative profits (ibid. in Kim and Horn 1999, 2). The careful assessment of the industry has showed that political actors in Turkey have indeed had a critical role in retaining BOTAŞ' monopolistic position thus far.

It is worth taking a brief sideways glance at international experiences here, and as expected, Turkey is not the only country that has failed to work out its decades-long structural immobility in its energy sector. In nine EU MSs[11] incumbents were controlling between 90 and 100% of the gas market up until 2007 (EC 2007), but due to the full EU membership of those countries, the abilities of political actors to keep the incumbents as powerful were mitigated and the EU legislation (and so the directives) remained as the prevailing framework over their national legislations. Germany is perhaps the country Turkey could be most likened to, although some numerical differences in the ownership of incumbents exist.

The main difference was that the German gas market comprised of three tiers and each tier had more than one incumbent in power. Whilst on the top tier, at the outset of liberalisation, there were five importing companies (also involved in wholesale trading and operating interregional transmission network) and six main producers (some were also importers), the second tier was formed by ten transmission companies (also able to trade gas). The third tier consisted about 700 distribution companies, many of which were also selling gas to other distributors as well as end users. Germany's gas market liberalisation process started in 1999 with no ground-breaking results up until mid-2006 after long negotiations with the EU (Lohmann 2006, 7–8). This was firstly due to the difficulties in breaking up the gas market's "family structure" backed by demarcation and long-term contracts and, second, the absence of a clear political commitment to market liberalisation in the country. That is, although there had been a few changes in market structure, the established ties and interconnections of the German gas industry were strong enough to prevent any substantial change in the traditional business model unless forced to do so by the EU (ibid., 178). Since the Turkish government has already signalled its intention to postpone for too long particular reforms that are key to the finalisation of the liberalisation, the obvious solution to provide

[11] Austria, Belgium, Czech Republic, Denmark, France, Germany, Hungary, Poland and Slovakia.

the necessary push to its crucial structural reforms seems to be facilitating the EU as an imperious agent of change in the same direction (via its compelling acquis). Approvingly, one respondent from EMRA stated that should Turkey found itself under such obligations (i.e. by the EU) then they (EMRA) would stand ready to take required legal and technical actions just within months, not years.

Taking over the market dominance of BOTAŞ would definitely help Turkey in encouraging vertically integrated BOTAŞ' unbundling, too. Presently, only the accounts of BOTAŞ' transmission and commercial activities are unbundled, and since no action has been taken over the last 18 years to change this despite a few revisions proposed to the existing Law, it would not be wrong to say that the authorities are satisfied with the current situation, thinking perhaps there is not necessarily any legal basis for a radical, let us say, ownership unbundling. And thus an efficiently implemented legal unbundling, at the most, should be enough for a market like Turkey's.[12] Again, this view reiterates the general perception of the European stakeholders in 2007, when they expressed their views on the energy directives in the DG COMP's Energy Sector Inquiry questionnaire. It argued that the expected impacts of ownership unbundling on more competition, a higher degree of transparency and network optimisation were not empirically proven since the countries that adopted such unbundling were those with already large gas resources and well-developed distribution networks. So, the negative effects of separation were not felt as much, let alone the cumbersomeness and uncertainty it would create in the market (EC 2007, 211). Although the reaction to ownership unbundling was more negative, the respondents, in particular those speaking on behalf of the incumbent, were positive about the legal unbundling of BOTAŞ. They did not see it as a major problem as long as all legal entities to be established (i.e. transmission, wholesale, storage) worked under one holding company and was run by BOTAŞ. Conveying the views of Turkey's Competition Authority on the subject matter, Soysal et al. (2012) rightly underlined, however, that concentrating only on the unbundling of BOTAŞ' transmission and wholesale activities and ignoring BOTAŞ' position, which runs the risk of competitive advantages in the wholesale market, would not solve the market's urgent problems, and quite the contrary to the order of unbundling routines elsewhere. They recommended the authorities to prioritise the separation of BOTAŞ' import and wholesale

[12] Legal unbundling is yet to be realised at the time of writing.

activities, and limit the type of customers the new wholesale entity (to be established) could sell gas to eligible customers only for the most effective results. Meanwhile, they foresee BOTAŞ, as an importer, to continue gas sales to distribution companies and GFPPs (BO- and BOT-based) some more time given its ToP obligations.

Chiming with the descriptions of the Energy Sector Inquiry of EC (2007) regarding how the concept of vertical foreclosure could impact the competitiveness of a market, it was found that most customers in Turkey meet their entire demand, or a large part of it, on the basis of long-term contracts with BOTAŞ and this may thwart new entrants from finding suitable outlets for their products. Cavaliere (2007, 35) argued that incumbents could obtain supplementary markup if they choose to import gas themselves benefitting from a lower cost of imports[13] and sell gas to new entrants whose profit margins are much lower. Polo and Scarpa (2002, 17) looked at the issue at the retail level and asserted that because the retail suppliers buy gas directly from the producers/importers also under long-term contracts with ToP clauses, which modify their cost structure confronted with a zero marginal cost and a huge fixed cost up to the ToP obligations,[14] it makes the firms' competing for the same customers very unprofitable. They provide a way to tackle this issue by recommending the creation of a wholesale market where the suppliers, burdened with ToP obligations, sell the gas and a single pool price for the aggregated demand side (i.e. eligible customers and retailers) is determined. This way, they stated, their marginal cost could reflect all the cost components and the equilibrium price if competing for the same costumers allowed them to cover costs and make profits. But as said above, competition at the retail level does not really exist in Turkey and no attention seems to have been devoted so far to this problem in the policy debate.

The views of informants from the private sector and the EMRA have been vital for this book and these interviews have particularly helped us to realise how centralised the power structure in Turkey is—meaning almost no part of government is truly independent of others—and in fact how little genuine independence the energy regulator of Turkey actually has. It is observed that not only the regulator acts as another branch of the government with remarkably little autonomy indeed, but also more astonish-

[13] Due to their first mover advantage in the international market.

[14] Or, phrased differently, their (zero) marginal cost does not reflect the total cost for the purchase of gas.

ingly, how inured EMRA staff have actually been to this widely accepted "new regulatory culture" which is becoming increasingly prevalent in the country. As one respondent from the EMRA frankly summarised that today, no private sector was 100% independent from the state. This shall bring us to a deeper reflection on the nature of these processes that we could not really expect an administrative authority to operate independently in an environment where no sector/company was truly 100% independent from the government. So, there (EMRA) they encountered what any institutional structure in Turkey was experiencing, nothing more, nothing less. He stressed, however, that it was about a conjuncture that could not be considered separately from internal and foreign policy affairs. Although it would be an ideal situation to have it otherwise, Turkey was currently far away from it.

In light of these revelations, it is useful to look at the traditional view of the economic theories of regulation which holds that regulation tackles market failures and externalities. Glaeser and Shleifer (2003) argue, however, that the theory is unable to explain why neither contract nor tort law successfully addresses these problems in the first place. Along similar lines, the findings of this book show that regulation has been and still is an efficient strategy of law enforcement in Turkey but not necessarily an efficient solution to the problem of market failure given its vulnerability to special interest groups and political pressure. The absence of the EMRA's detectable effect on the reduction of price discrimination is a clear illustration of this. It was stressed during the interviews that institutions like the EMRA were under pressure from interest groups, private companies and the government itself. And that is to say, in other words, the policymakers concerning particular sectors face strong pressure from well-organised special interest groups in Turkey in line with the study of Olson (1965) "The Logic of Collective Action," which considers the behaviour of interest groups from the perspective of rational choice theory into the focal point within the public choice literature.

Since many stakeholders see the EMRA as nothing but as an institution that inspects enforcement of the secondary legislation only, this book suggests that something more significant and urgent than developing/changing the legal framework is the restructuring of governance institutions to ensure the stakeholders and the EMRA itself grasp the role of a fully independent authority in moving Turkey away from the old monopolistic traditions for development of competition and in establishing a strong set of

sector players in the Turkish market. The regulatory authority seems to be picking and choosing the implementation of the minimum requirements of the EU directives, and according to some respondents it is under pressure from both political actors and stakeholders. When the literature concerning why regulation of markets was needed and what should be regulated was reviewed in Chap. 2, the economic theory of regulation provided useful insights about the fact that regulation was directed by the exchange for political support chiefly for the attainment of re-election of politicians who set up income transfers in favour of the industries (Den Hertog 1999). In fact the literature as to both theory of public choice and economic theory of regulation has made its mark on academic analysis by their experiments of introducing rational actor models into the study of politics and emphasised that individuals—whether voters, politicians or regulators—would facilitate political mechanisms in accordance with their own self-interest since it is electoral votes that count in the political process. It is known that the period of fully monopolistic Turkish gas market has now passed, the national champion—being responsible for all operational activities within the entire market—has become remote, and there has come a regulatory authority eventually evolving the market into a movement of regulation. But, has the evolution finished?

The answer is certainly not and the regulator's growth in experience may go a long way to creating a well-functioning market and effective competition. Whilst the interviewees were generally in favour of the EMRA and its works, on the one hand, some were undecided as to whether the conditions were right for providing distribution franchises the way it was done. For example, at the time of which, they commented, neither party was aware of what they were getting into, nor were they informed of long-term consequences of the whole process. This was seen with the increasing distribution tariffs once the first wave of "liberalisation" excitement was over and the market regulator is now thought to be under growing pressure regarding how to ensure that both distributors and customers are kept satisfied with appropriate tariffs. There are also long-term exclusivities guaranteed to franchisees to serve non-eligible customers which efficiently foreclose new entrants from this market and has made the residential customers' switching rights go unused. Equally important, since transparency is not entirely in place in the Turkish gas industry pointing out specific reasons for the gap in the current rules regarding the designation of both

distribution system operators[15] and closed distribution system operators (as required by the Third Directive), for example, is also as hard.

At this juncture, it was stressed by a respondent that the EMRA attempted to collaborate with the Public Procurement Authority to insert a "public service" provision into the Public Procurement Law in 2009–2010[16] which they believed should be sufficient to regulate forms of procurement in natural gas market (whether by BOTAŞ or by private companies) in terms of service quality, value for money, industrial relations and investment shortfall. This, if happened, would have perfectly coincided with the discussion of Morton (2012, 5) that "the role of public procurement goes to the very heart of both public service provision and the economic goals of market-making so central to the Single European Market." However, the attempts of both institutions were suppressed and eventually stopped. This may, as has been suggested, indicate the shape and scope of lobbying activities and bureaucratic obstacles exist in Turkey.

As comprehensively reviewed in Chaps. 3 and 5, Turkey's energy relations with the EU grow in importance and cross-border cooperation with individual European countries provide a strong rationale for promoting harmonisation of the gas regulation criteria and thus ultimately integration of the gas markets. For that, however, there has not been full preparation and commitment on the ground despite significant potential economic benefits of regional cooperation. Against this backdrop, the harmonisation of particular rules, not least gas balancing and transmission tariff structures, could make a significant contribution towards creating a level playing field for the Turkish stakeholders to generate, transport, sell and consume gas (with minimum losses along the value chain possible) together with the rest of Europe. Another factor inhibiting the effective harmonisation of the gas market rules seems to be to the fact that there are still inadequacies in technical resources to meet the EU standards. To tackle this, improvement and fine-tuning of both the SCADA system and the EBB platform need to be finalised. To consider the broader strategic issues of integration since the magnitude of potential gains from it is substantial, harmonisation of the EU gas market rules should be extended to

[15] Distribution system operators are generally responsible for metering their customers' consumption, and therefore in competitive markets often have a vital role in ensuring the availability of accurate consumption data and in ensuring a smooth customer transfer between suppliers (Energy Sector Inquiry 2007, 234).

[16] Which is still a gap in the legislation of Turkey.

other specific points including use of short-term standardised products for trade and the use of TSO's earned auction premia towards reduction of physical congestion or decrease of transmission tariffs for the next tariff period which, as of 2019, lack in the Turkish market. Finally this book suggests, unless addressed promptly, these challenges (together with the lack of promotion coming from the BOTAŞ side) will most likely delay Turkey's aim to be a trading hub for at least three to five years.

6.4 Conclusion

This chapter has presented the main factors influencing both functioning of the Turkish natural gas market and the success of its liberalisation. Although examined from historical and legal perspectives in the preceding chapters, semi-structured interviews were conducted with the stakeholders to gauge participants' views on their experience with gas market liberalisation. Also in regard to the second question, "What are the major obstacles encountered by Turkey so far during its reform process and how should Turkey's progress towards liberalisation proceed?", the interviews informed a large part of the analysis in order to answer this question. The main conclusion reached in this chapter is that there exist clear distinctions between the main stakeholders (EMRA, BOTAŞ and private sector) who interpret the "liberalisation" phenomenon in Turkey. As described, Turkey's gas market liberalisation has been far from successful and based on this analysis, the essence of the liberalisation challenge is that the enthusiasm to go ahead with the remaining gas reforms is no longer there. Instead of from the regulator, strong encouragement for further reforms/liberal market comes from the country's private sector, and this does not sit alongside the fact that National Regulatory Authorities must ensure non-discrimination, effective competition and the efficient functioning of markets as the EU energy directives have required. BOTAŞ remains silent or extremely economic with words to comment about the failures in the gas market, and unless some changes take place, a five- to ten-year future perspective on the functioning of gas market (and in fact on security of supply) may provide a pessimistic picture.

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CHAPTER 7

Towards an Effective Market: What to Do Next?

One of the main objectives of this book was to examine the liberalisation process in the Turkish natural gas market and to understand the limitations and key challenges the country has encountered in its transition from monopolistic to (semi)liberalised gas market. Based on evolution of the gas market that has been examined in the last three chapters this book argues that although the reform process, which officially started in 2001, has delivered considerable achievements it has somewhat deviated from its main purpose. Therefore, Turkey has not gone to the end of the process although it could have via carefully managed strategy. The political will in Turkey has predicted a deliberate and controlled liberalisation instead of a rapid one extending it over a period of time. Interviewing the stakeholders who have been, and are still being, impacted by Turkey's liberalisation experience and gathering their interpretation of why the country is still far from having a fully liberalised and competitive market despite a better success in the electricity market liberalisation has certainly contributed greatly to the understanding of how and why the (Turkish) government's actions to natural gas reforms have differed.

For a strategically important country like Turkey, energy plays a key role both economically and politically. With remarkable consumption rates, it is perhaps the only member of the OECD that foresees over 80% increase in its TPES by 2023, and despite other fuels, natural gas is expected to supply a quarter of the energy used in the country. Not only does gas continue to be the backbone of energy supply within Turkey, but

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it also offers Turkey the opportunity to be a potential major transit country for the energy markets of the West. Sitting at the crossroads of Europe, Central Asia and the Middle East Turkey's role in international relations is not negligible, too. Most important of all is the Turkey's 55-year-old relationship with the EU. An Association Agreement links the country to the EU since 1964, and Turkey was given the status of candidate country in December 1999. Accession negotiations were opened in October 2005 and Turkey continues to be an important ally to the EU, especially in the framework of the G20. The European Commission's latest reports confirm that Turkey continues to be the EU's fifth largest trading partner whilst the EU is Turkey's largest. Two out of five goods traded by Turkey come from or go to the EU and over 70% of FDI in Turkey originates in the EU. This confirms the fact that Turkey is a key partner to the EU in terms of not only security, defence and foreign policy on the global stage but also for trade. Consequently, allowing the deterioration of relations beyond a certain point does not seem to be affordable to either party.

For Turkey, which sees the EU membership as the project of the republic as emphasised in its official National Programme, another important milestone has been the establishment of a customs union with the EC in March 1995. With Decision No. 1/95 of the Association Council, the Customs Union covers adoption of Common Customs Tariff of the Community and confirms abolition of customs duties and all other measures having equivalent effect. It also stipulates the abolition of all distortive mechanisms that results unfair advantage over the other party. Accordingly, Turkey has been obliged to approximate its laws to the EU acquis in competition, intellectual property and common trade policy areas as well as free movement of goods area. Although the EU's share in Turkey's two-way trade has always been high it reached record levels during the last two decades of EU-Turkey bilateral preferential trade framework era. Trade between both parties grew enormously and between 1996 and 2014 alone Turkey's exports to the EU increased by about 400% (from about EUR 8.5 billion to EUR 42 billion), whilst the growth of Turkey's exports to the world was almost 570% (from about EUR 18 billion to EUR 118 billion). Likewise, the EU exports to Turkey are significant. They were highest in 2017 (EUR 85 billion) and lowest in 2009 (EUR 44 billion) according to Eurostat statistics. These figures confirm the importance of EU-Turkey relations and why both parties should reaffirm and update their strategy for further cooperation in all aspects.

Thus far, Turkey has become well advanced in the areas of company law, trans-European networks and science and research, and it has achieved a good level of preparation in the areas of free movement of goods, intellectual property law, financial services, enterprise and industrial policy and financial control. Not as advanced, though, Turkey has been moderately prepared in the area of, among others, free movement of capital, economic and monetary union, taxation, regional policy and energy where further efforts are needed across the board. Within the framework of accession negotiations, 16 chapters (out of 35) have been opened to date, one of which was provisionally closed. For the potential opening of Chapter 17, High Level Economic Dialogues are being held since May 2018 to prepare Turkey for participation in multilateral surveillance and economic policy coordination as part of the EU's Economic and Monetary Union. Regarding its ability to assume the obligations of membership, Turkey continues to align with the acquis, albeit at a limited pace. Although energy is not one of the opened chapters Turkey has made some progress and has a good level of preparation to cope with competitive pressures and market forces within the EU. So, overall Turkey is making concentrated efforts towards its European path and holds a good potential of becoming the EU's strategic partner in various aspects.

To exemplify, contributing greatly to both its and Europe's security of supply is the most important part of these efforts. Turkey considers security of supply from three dimensions (i.e. supply, demand, infrastructure) and believes in inseparability of one another. In order to bring its energy infrastructure—namely, transmission, distribution and reliable storage of natural gas (and electricity)—into a strong and reliable level, Turkey follows the EU's internal energy market measures. In this juncture, the first logical achievement came from the Turkish Electricity Transmission Corporation (TEIAŞ) in 2016. TEIAŞ signed an agreement to become the European Network of Transmission System Operators for Electricity's (ENTSO-E) first observer member since its creation in 2009. With inclusion of Turkey the number of customers served by ENTSO-E members increased by 15%. Turkey's endeavours towards participation to the ENTSO-E equivalent organisation for natural gas (ENTSO-G) continue by complying with the rules common to the other gas transmission system operators of the continent.

As natural gas dependency in the EU reached an all-time high of 77.9% in 2018 (which was 74.4% in the preceding year) Europe is definitely looking for ways to vary the range of import sources it has. Therefore, another

factor that should be mentioned is the effect the diversification of gas supply sources can have on supply-demand balance in Europe's gas industry. Turkey's continued works are significant in this respect. By holding shares in TANAP project and exploring the Shah Deniz gas field in Azerbaijan Turkey is consistently moving from being a simple transit country to having part in each stage of gas value chain spanning from producer to an end consumer. The 3500-kilometre TANAP project opens up a new gas supply corridor from Azerbaijan to Europe and will have a total capacity of carrying up to 31 bcm gas per annum (16 bcm to start with as of June 2018). With Turkey's massive involvement in the project Azerbaijani, hence Caspian, gas will be introduced to the world energy markets and energy geopolitics will most likely be reshaped. Turkey is expected to gain a substantial momentum for years to come whilst contributing greatly to the EU's security of supply and fostering gas-to-gas competition. Similarly, the TurkStream project holds much of an importance in terms of ensuring the reliability of energy supplies to both Turkey and Europe. It also contributes to Turkey's target of becoming a successful energy hub with sufficient liquidity. Construction of the project's offshore section across the Black Sea—over 930 kilometres—was completed in November 2018, and the pipeline is now ready to provide 31.5 bcm gas equally shared between Turkey and south and southeast Europe. Overall evidence shows that there is a great potential in how Turkey could contribute to the EU achieving its long-awaited gas supply diversification whilst integrating into its internal energy market.

One fact that has become increasingly clear in recent years is that Turkey's full membership to the EU strictly lies with the success of the transposition of EU laws into the national law and the delivery of real and sustained reforms with strong political will. Also, its readiness to start accession negotiations on the energy chapter is closely linked to its successful management of the energy sectors at home, gas in particular. To do this, it needs to fully address the challenges in the implementation of gas market law, exploiting the potential of barriers to efficient market functioning and liquidity as a development enabler, and ultimately strengthen its cooperation with other European countries. Thus, first the characteristics of Turkey's legal framework that has been created to ensure gas market liberalisation based on the *acquis* and its effectiveness need to be looked at. This is a topic upon which energy literature surprisingly rarely touches upon and Chap. 5 has revealed much about the structural limitations of Turkish natural gas policy and the tools at its disposal.

It was found that the NGML is the outset of transition for Turkey's gas sector governance and institutional framework with which the liberalisation reforms started to be predominantly driven by the EU energy directives. The NGML was a liberal law under conditions of the early 2000s and targeted to revoke governance of the sector consecutively from state-owned BOTAŞ authorisation. Although it succeeded to a certain extent and it initially precluded BOTAŞ from executing any more gas purchase contracts until its import share was gradually reduced to 20% of the national consumption by 2009, via various amendments BOTAŞ has been reinstated. Presently, new entrants are prohibited from importing gas from countries with which BOTAŞ has unexpired gas sales agreements. The NGML also made storage of 2% to 6% of imported gas in the national territory for five years compulsory for all importers (depending on whether the gas is piped or in liquefied form), although lack in storage/other infrastructure undermines confidence in Turkey's future commitment to effectively manage the risk of supply disruption.

The answer to whether the Law has been fully effective is somewhat no. The NGML's compliance with the EU directives has been examined and it has been found that market openness remains to be problematic given the market power of BOTAŞ has not been effectively restricted. Eligibility limits are yet to be removed and switching rates maintain low. In addition, Turkey's energy market regulatory authority does not appear to be consistent with the European principles concerning general competition and antitrust policies. There is a lack of unbundling regime that impedes competitive market development since the restructuring of BOTAŞ requested by the Law is yet to be implemented. Although full adaption of E/E systems (including VPs and TPA) to transmission networks is a notable success, uncertainty as to full/partial exemptions of the existing and major new storage infrastructure from TPA still persists.

Before leaving the NGML's alignment with the directives, it would be appropriate to mention the need for considerable effort to harmonise the NGML with the EU NCs, especially to promote a liquid wholesale market and an efficient price formation across the gas value chain. In summary, there is a strong rationale for a well-functioning wholesale market in Turkey, but the legal barriers pave the way for the presence of overly powerful BOTAŞ, high market concentration and insufficient interconnection capacity. Improving the level of cross-border cooperation with other EU countries is critically important for Turkey but total harmonisation with particular NCs of the EU—namely, capacity allocation management, con-

gestion management procedures, gas balancing and transmission tariff structures—lacks at present. Likewise, short- and long-term policy responses are needed to solve Turkey's security of supply issues but the NGML thwarts private companies from importing gas from the nearest sources. These challenges partially generate the answer to the question of what the major obstacles encountered by Turkey so far during its reform process are and how Turkey's progress towards liberalisation and competition should proceed. The immediate answers to this question came from the interviewees which included politicisation of the Turkish energy market and state interference in market activities; lack of transparent and cost-based gas pricing mechanism; lack of devoutness to curtail the exercise of monopoly power and to eliminate forms of price discrimination; power of interest groups in the political decision-making process; and lack of investment and full technical ability.

In reality, Turkey cannot succeed its assertive goals without further improvements and reforms in its gas sector. Despite significant reforms and notable investment in electricity sector over the last decade, Turkey's gas sector still grapples with delays in implementation of regulations and failures in expected improvements. This book presents two major findings. The first is that Turkey's interpretation of natural gas market liberalisation has been somewhat different from that of other European countries and there is still less clarity in the country regarding how to make certain reforms happen and the speed at which the transition needs to be finalised. Deeper understanding of the Turkish gas market and how to relate it to the EU energy market (and legislation) was thus particularly vital and that was one of the key reasons for developing this book. The second is the timely creation of a liquid well-functioning wholesale gas market. Moving further with a consolidated reform strategy sooner rather than later appears to be compellingly needed should Turkey genuinely want to take a leadership position in the regional race to be the gas hub. It is still not too late for Turkey to become one if the challenges identified in this book are overcome together with some fresh thinking by the AKP government, the EMRA and the Competition Authority.

Vis-à-vis how Turkey's progress towards liberalisation should proceed and how to address the challenges encountered, a set of policy recommendations have been listed. First and foremost, the regulator's impartiality needs to be ensured as requested by the EU energy framework. After 18 years of experience as a regulator in the market, the EMRA must now move directly to a fully independent authority expediting the development

of primary functions of effective regulation like NRAs of other countries that faced similar reform challenges. Having guaranteed its independence from the government in particular, the EMRA's liabilities, powers and institutional features need to be properly established since the EMRA reports directly to the Council of Ministers. With almost 500 personnel at its disposal the EMRA is a well-staffed institution; however, its board members currently do not include any industry or consumer experts. Whilst this gap should be filled as soon as possible, legal actions should also be taken to rest the responsibility of selection and recruitment procedure of EMRA's senior management on the Grand National Assembly of Turkey for ultimate transparency. By the same token, the EMRA's new independent role, capacity and enforcement power as an energy market regulator and well-defined mandate need to be communicated to all stakeholders in the Turkish gas market.

Another important point is that Turkey must allow an adequate price formation for natural gas by going back to the application of cost-reflective pricing methodologies that was tried in 2008. Inclination to determine politically biased gas prices must also be stopped. Cost-based prices should be adapted for the best prospects for enhancing demand-side management[1] and creating additional financial resources for the incumbent to increase its (much needed) grid investments which act as a barrier to the construction of a competitive/liquid market. In fact, currently gas networks of most European countries have capacity that is three to five times more than their maximum (realisable) peak demands (e.g. the UK), whereas Turkey's remain considerably limited, and thus best and most relevant experiences should be reviewed and adapted. The EMRA's strong role in the development of gas pricing policy and methodology should also be expanded to enforcement of pricing regulation and implementation of the legally mandated methodology.

For accountability purposes, (when needed) the EMRA's decisions should be made challengeable with appropriate safeguards laid out against its misuse attempts. The EMRA and the Competition Authority of Turkey must be fully equipped with special expertise on technical/managerial issues to deal with anti-competition disputes when an agreement cannot be reached between parties. Similarly, the work of the authorities must be complementary to one another and they need to provide the maximum

[1] By enabling customers to reconsider their gas consumptions.

degree of policy guidance possible towards reduction of BOTAŞ' market share with careful reviews of Turkey's specific circumstances.[2]

For market formation and regional effectiveness, strong and reliable energy infrastructure is vital for countries, and more private sector involvement and foreign investment must be encouraged in Turkey. Investments are needed for storage facilities in particular and for which not only institutional framework and investment environment should be strengthened but also risks should be minimised by complied tariffs, legislation and incentives. Options as full and partial TPA exemption to major new gas infrastructures should also be considered once the investments reach optimum levels. Investments in technical infrastructure must be given the utmost importance and all challenges identified throughout the book which do not ensure long-term support must be worked through. Whilst the institutional design needs amendment in order to give support for collection of statistics that cover all relevant aspects of the gas system in the long term, further investments in skills will need to be also indispensable.

To mitigate/eliminate public funding from the sector, subsidies must be either phased out or made targeted which would thus shift the Turkish gas sector away from paying for all, towards a system that protects only the poor and vulnerable members of the society. This is vital for a healthy gas sector and for this, inserting definition of a "vulnerable customer" notion to the current natural gas legislation may be an initial step. Prevalence of inefficiency, dissatisfaction of (certain) customers and the wide divergence in the prices paid by geographically segmented customer groups (not least after the fixed tariffs period) must be supervised by the EMRA at all times[3] and intervened when necessary.

Alternative less costly metering investments need to be actively explored and offered to market players in order to remove barriers to switching. It is important that the distinction between retail and distribution of gas is made and residential customers are allowed and encouraged to switch. Relevant experiences elsewhere may be useful to draw on. There is another

[2] If not 20% as the NGML requested, around 50% mark should be reached and it is the view of this book that this level would not only boost confidence to existing sector players and newcomers but will also unlock the potential which exists for a moderately competitive market.

[3] Although simultaneously, gasification of all of Turkey via franchise biddings ("Competition For Market") since 2003 can be considered one of the stable and successfully executed projects in its own right.

need to ensure that the lack of coordination between gas and electricity markets, and underdeveloped data flow between them, is mitigated. Thereby, market participants are bolstered to better optimise their operational decisions. Most importantly, stamp duty must be fully removed from the natural gas sector of Turkey.

Lastly, instead of focusing solely on its transitional role between Europe and other gas-rich regions, Turkey's main focus should be on becoming a natural gas trading hub itself and to be involved in bidirectional capacity trade with other European hubs.