Liberalisation of the Turkish Natural Gas Market: A Critical Evaluation

Relatore: Prof.ssa Elena Maria FUMAGALLI

Tesi di laurea di: Doruk BEYAZGUL – Matr. 780905

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Contents

Acknowledgements ............................................................................................................................................. i
Contents.......................................................................................................................................................... ii
Figures ............................................................................................................................................................ iv
Tables ............................................................................................................................................................... v
Abbreviations .................................................................................................................................................. vi
Measurement units ......................................................................................................................................... vii
Abstract.......................................................................................................................................................... viii

1. Introduction .................................................................................................................................................. 1
   1.1 Objective .................................................................................................................................................. 2
   1.2 Methodology ........................................................................................................................................... 2

2. General Structure of the Natural Gas Markets ......................................................................................... 3
   2.1 Natural Gas Markets ................................................................................................................................. 3
   2.2 Liberalisation in Natural Gas Markets ....................................................................................................... 5
      2.2.1 Reforms in Natural Gas Markets ....................................................................................................... 5
      2.2.2 Trading in the Natural Gas Markets .................................................................................................. 9
   2.3 Stages of Development in Gas Markets .................................................................................................. 14

3. Energy in Turkey and Role of Natural Gas ............................................................................................... 17
   3.1 Energy Outlook ......................................................................................................................................... 17
   3.2 An Overview of Natural Gas in Turkey .................................................................................................... 20
      3.2.1 Natural Gas Infrastructure ............................................................................................................... 21
      3.2.2 Natural Gas Figures in Turkey ......................................................................................................... 25
   3.3 PESTEL Analysis ..................................................................................................................................... 31
      3.3.1 Political ............................................................................................................................................. 32
      3.3.2 Economical ....................................................................................................................................... 39
      3.3.3 Social ............................................................................................................................................... 42
      3.3.4 Technological ................................................................................................................................... 44
      3.3.5 Environmental ................................................................................................................................. 48
      3.3.6 Legal ............................................................................................................................................... 50

4. Liberalisation of the Turkish Natural Gas Market ..................................................................................... 52
   4.1 Regulatory Reform in Turkish Natural Gas Sector .................................................................................... 57
      4.1.1 Motivation ........................................................................................................................................... 58
      4.1.2 Causes ............................................................................................................................................... 58
4.1.3 Objectives .................................................................59
4.2 Industry After the Reform ............................................61
  4.2.1 Unbundling ............................................................61
  4.2.2 Third Party Access & Network Code ..........................62
  4.2.3 Distribution ..........................................................63
  4.2.4 Gas Release Programme .........................................64
  4.2.5 Monopoly of BOTAŞ ..............................................67
  4.2.6 Gas Prices in the Market .......................................69
  4.2.7 LNG ...................................................................75
4.3 Future Outlook of the Turkish Natural Gas Market ..........76
  4.3.1 Liberalized Market Structure and the Draft Law ..........76
  4.3.2 Main Amendments included in the Draft Law ............77
5. Critical Evaluation & Discussions .....................................81
  5.1 SWOT Analysis ..........................................................81
  5.2 Further Discussions ..................................................91
6. Conclusion ....................................................................93
Bibliography .....................................................................95
Annex ............................................................................101
Figures

Figure 2.1 Bundled value chain in a monopoly

Figure 2.2 Unbundled natural gas market value-chain

Figure 2.3 Natural gas markets in EU

Figure 3.1 Turkish power capacity by source

Figure 3.2 Power generation by source in 2014

Figure 3.3 Milestones of Turkish natural gas industry in a chronological order

Figure 3.4 Turkish transmission grid

Figure 3.5 Yearly total natural gas figures in Turkey

Figure 3.6 Import Shares in 2014 by Country & LNG share in total imports

Figure 3.7 European region yearly gas consumption (BCM) country ranking in 2014

Figure 3.8 Share of suppliers in total import

Figure 3.9 Natural gas exports to Greece (mcm)

Figure 3.10 Natural Gas Utilization, 2014

Figure 3.11 Spot LNG import ratios

Figure 3.12 Position of Turkey in the heart of hydrocarbon rich regions

Figure 3.13 Total exports of Russia’s Gazprom in 2014

Figure 3.14 Current and future pipeline projects in the region

Figure 3.15 Average annual real GDP growth 2002-2013

Figure 3.16 Annual GDP growth forecast in OECD Countries 2014-2016

Figure 3.17 Correlation of GDP growth and natural gas consumption

Figure 3.18 Turkey’s primary energy consumption by fuel (1980-2012)

Figure 3.19 Ministries responsible for Energy R&D

Figure 3.20 Projected energy capacity by source in Turkey, 2014-2030 (in GW)

Figure 4.1 BOTAŞ value-chain

Figure 4.2 Old and new structure of the market

Figure 4.3 Gas distributed regions in Turkey

Figure 4.4 Long term contracts and demand forecast

Figure 4.5 Market share of importer companies by 2014

Figure 4.6 Daily Brent oil prices and USD/TRY parity

Figure 4.7 Brent oil 6 months average for delivery period and BOTAŞ prices

Figure 4.8 Estimated contractual gas prices against domestic market prices
Tables

Table 2.1 Hubs in EU natural gas markets ................................................................. 14
Table 2.2 Four stages of liberalization process in natural gas markets ..................... 16
Table 3.1 Installed capacity in MW and plant numbers in 2014 and 2015 .................. 18
Table 3.2 Electricity Production by primary energy sources 2013-2014 ....................... 19
Table 3.3 Figures of Natural Gas Infrastructure of Turkey in 2014 .......................... 22
Table 3.4 Operative international pipelines for import .............................................. 23
Table 3.5 Storage Facilities ....................................................................................... 24
Table 3.6 Natural Gas Figures (in bcm) .................................................................... 25
Table 3.7 Natural gas amounts via Pipeline and LNG in bcm .................................... 26
Table 3.8 Natural gas figures in Turkey ..................................................................... 27
Table 3.9 Natural Gas Consumption, 2014 (in mcm) ................................................ 29
Table 3.10 Spot LNG import volumes [mcm] in 2014 by country ............................... 30
Table 3.11 Main energy research programs in Turkey ............................................... 45
Table 3.12 Planned and proposed nuclear power reactors ......................................... 48
Table 3.13 Strategic Plan at installed capacity by energy sources 2014-2030 ............. 47
Table 3.14 Energy efficiency of Turkey in years ...................................................... 50
Table 4.1 Liberalization timeline in the Turkish natural gas market ....................... 58
Table 4.2 Long-term contracts of BOTAŞ .................................................................. 64
Table 4.3 First contract release in 2007 & volumes transferred ................................ 66
Table 4.4 Second contract release in 2011 & volumes transferred ............................. 67
Table 4.5 Monthly balancing prices set by BOTAŞ in TL/MWh .............................. 69
Table 4.6 BOTAŞ wholesale tariffs for eligible consumers and distribution companies .... 71
Table 4.7 Imported gas price USD/ 1000scm ............................................................ 73
Table 5.1 SWOT Analysis of Turkish natural gas industry ....................................... 83
Abbreviations

AKP – Justice and Development Party
BOTAŞ – Petroleum Pipeline Corporation
BTC - Baku-Tbilisi-Ceyhan crude oil pipeline
CNG - Compressed natural gas
EC - European Community
EMRA (EPDK) - Turkish Energy Market Regulatory Authority
EPİAŞ - Energy Markets Operation Company
EU - European Union
FDI – Foreign Direct Investment
G-20 – The Group of 20 major economies
GDP – Gross domestic product
IEA - International Energy Agency
LNG - Liquefied natural gas
MENR - Ministry of Energy and Natural Resources
MFA – Ministry of Foreign Affairs
OECD - Organization for Economic Co-operation and Development
OIES - Oxford Institute for Energy
TANAP - Trans-Anatolian Natural Gas Pipeline
TAP – Trans-Adriatic Pipeline
TC – Republic of Turkey
TEIAS – Turkish Electricity Transmission Company
TEPAV - Economic Policy Research Foundation of Turkey
TFEU - Treaty on the Functioning of the European Union
TOBB – Union of Chambers and Commodity Exchanges of Turkey
TPA – Third Party Access
TPAO - Turkish Petroleum Corporation
TRY – New Turkish Lira
TL – Turkish Lira
TSO – Transmission System Operator
USD – US Dollars
USSR – United Soviet Socialist Republic
Measurement Units

KW – kilowatt
MW – megawatt
GW – gigawatt
TW – terawatt
KWh – kilowatt-hours
MWh – megawatt-hours
GWh – gigawatt-hours
TWh – terawatt-hours
bbl – one unit of oil barrel
mtoe - million tonnes of oil equivalent
km - kilometer
mcm - million cubic meter
scm – standard cubic meter
bcm - billion cubic meter
tcm – trillion cubic meter
t – tonne
toe - tonnes of oil equivalent
/y - per year
Abstract

Liberalisation of the natural gas markets is a fundamental step to introduce third party access and competition. Pre-reform natural gas markets exhibits monopolistic structure and government intervention; instead, characteristics of liberalised markets are transparency, low entry/exit barriers, market pricing and competition between market participants. Turkey, as an emerging country, has total dependency on natural gas with increasingly growing domestic demand, and has already set forth the liberalisation process of the natural gas market in 2001. Being in close proximity to majority of the world’s natural gas reserves, and being located in the crossroads of transit routes to EU, Turkey aspires to be a regional hub for natural gas and energy. Even though considerable steps are taken by introducing gas release programs, privatization of distribution regions, and permission of third party access to national transmission grid, the main incumbent BOTAS still holds a monopoly position in the Turkish natural gas market while not fulfilling the unbundling obligations and applying subsidized tariffs. Aim of this thesis work is to provide a critical evaluation of the progress of the liberalisation in the Turkish natural gas market, while analysing Turkey and its energy sector in general with official facts and data by applying a PESTEL framework. Eventually a SWOT analysis is performed to depict the characteristic features and aspects of the Turkish natural gas industry in a nutshell. In the light of the findings of thesis work, an in depth evaluation is undertaken to comprehend the birth, evolution and current state of the Turkish natural gas market as well as its future potential.

Keywords: Liberalisation, natural gas, unbundling, hub, third party access, BOTAS, monopoly, regulation, law No. 4646, long-term contracts
“La liberalizzazione del mercato del gas naturale è un passo fondamentale nell’ introduzione della competizione e dell’accesso di parti terze. Prima della riforma, il mercato del gas naturale esibisce una struttura monopolistica ed è soggetto agli interventi del governo; all’opposto, le caratteristiche di un mercato liberalizzato sono trasparenza, barriere ridotte di entrata o uscita dal mercato, la possibilità di determinazione dei prezzi di mercato e la competizione tra i partecipanti del mercato. La Turchia, in quanto paese emergente, ha una totale dipendenza dal gas naturale, con una domanda interna sempre maggiore, e dal 2001 ha messo in atto un processo di liberalizzazione del mercato del gas naturale. Trovandosi in prossimità della gran parte delle riserve mondiali di gas naturale, e trovandosi in un punto d’incrocio delle vie di transito con l’EU, la Turchia aspira a diventare una hub regionale per il gas naturale e l’energia. Sebbene già molti passi siano già stati fatti introducendo programmi di liberalizzazione del gas, la privatizzazione delle regioni di distribuzione e l’accesso di parti terze alla rete di trasmissione internazionale, il principale incombente BOTAS mantiene una posizione di monopolio nel mercato pur non riempiendo le obbligazioni di scioglimento e applicando tariiffe sovvenzionate. L’obiettivo di questo lavoro di tesi è di provvedere una valutazione critica del progresso di liberalizzazione nel mercato turco di gas naturale, analizzando la Turchia in generale ed il suo settore energetico con fatti e dati ufficiali applicando un paradigma PESTEL. Infine, si è utilizzata un’analisi SWOT per dipingere in maniera sistematica gli aspetti caratteristici dell’industria del gas naturale in Turchia. Alla luce dei risultati di questa tesi, si è intrapresa una profonda valutazione per meglio comprendere la nascita, l’evoluzione e lo stato attuale del mercato turco del gas naturale, come pure il suo potenziale sviluppo.”
1. Introduction

In the era of energy resources deficit, the importance of the transit countries in proximity to hydrocarbon rich regions increases. Energy is a fundamental element for the realization of sustainable development and economic growth; consequently, interdependency of countries in energy is an incontrovertible reality of global economy. Such circumstances drive Turkey to play a greater geopolitical role in the region; holding a territory extending from Europe to Middle-east, surrounded by Black Sea and the Mediterranean while controlling the straits of Bosphorus and Dardenelles, Turkey is located in a geography where the most of the world’s fossil fuel reserves are situated. In this regards, supplies and transportation of natural gas comes into discussion with a geostrategic significance.

Natural gas, apart from being considered relatively less pollutant and more efficient than other fossil fuels as an energy source, is also a broadly demanded commodity for the world’s energy supply. As a viable fossil fuel, the natural gas is already a tradable product and a major source of power generation; after oil, it has the second largest volumes traded amongst other commodities.

Dependency on imported natural gas, to meet the demand of national energy consumption, forces countries to pursue an energy policy that obligates the security of energy supplies. Therefore, energy dependent countries are seeking to have more connections with international pipelines originating from several sources and importing energy with favourable terms, while maintaining an efficient national energy infrastructure and aiming to increase their palette of energy mix. Certainly, a country lacking indigenous energy sources such as Turkey, is subject to ensure its energy supplies.

Incontrovertibly, due its geostrategic natural bridge position between Europe and Middle-east, Turkey has the aim of becoming a regional natural gas trading hub. Speaking of which is already set into motion by the enactment of reformer Law No. 4646 that had set forth the liberalisation process of the Turkish natural gas market. Moreover, there are several infrastructural projects ongoing and potential projects are in negotiation; in the meanwhile, natural gas exchange linked to EPİAŞ is under development.
In truth, realization of natural gas trading hub concept is already accomplished by many EU states. Effectively liberalized market open for third party access, full transparency, spot trading and value creation through gas exchange, uninterrupted gas transmission between states are among their common characteristics. The contribution of the natural gas trading hubs to the national economy cannot be overlooked neither. Natural gas is currently traded in several options, on long-term contracts, by spot trading on energy trading hubs and as well as LNG. Achievement of a competitive liberal natural gas market open to third party access is in Turkey’s benefit.

1.1 Objective

The main objective of this thesis work is to portray an image of general characterises and distinctive features of Turkish natural gas industry and its liberalisation process, by providing facts and data about Turkey in general and its energy sector from a broader perspective to subtle details, and emphasize the importance of natural gas in Turkey while seeking for potential business opportunities might arise in future. Liberalisation process is examined in particular, as the dynamics of the industry could be analysed thoroughly only by appropriate comprehension of such phenomenon.

1.2 Methodology

Chapter 2 describes the general structure of natural gas markets in general and reforms shaped the liberalisation of such markets is described. Chapter 3, the energy mix in Turkey and the role of natural gas in power generation is examined while giving an overview of natural gas industry supported by latest official data available. For the second part of the same chapter, a PESTEL analysis is performed to present a general view of Turkey and its energy sector overall. Afterwards, liberalisation in the Turkish natural gas market is investigated. In the last chapter, a SWOT analysis is performed for the critical evaluation of the industry.
2. General Structure of the Natural Gas Markets

This section is dedicated to literature survey investigating the natural gas markets in general, from the birth to maturity. The natural gas markets follows a similar pattern in terms of development and evolution, thus a general overview and evaluation of the characteristics of such markets is expected to be useful in order to examine the liberalisation process in the Turkish natural gas market.

2.1 Natural Gas Markets

The main distinctive feature of the natural gas sector in the international arena is the geographical variation between the areas of production and the consumption regions (Cameron, 2002). Unlike oil and other fossil fuels, storage and transportation of natural gas is troublesome due to its physical nature; once extracted from the production reservoirs it has to be immediately transported to a destination under high pressure via pipelines or cooled down to low temperatures in order to be condensed into a more compact volume (Thomas & Dawe, 2003).

Due to the limitations in means of transportation, ascension of natural gas to take a considerable role on the world’s energy stage as a commodity for power generation among other fossil fuels had been slow; transport of natural gas depends rigidly on interconnected pipeline infrastructure and long-term production which is considered uneconomic in terms of profitability as it requires capital intensive value chain (International Gas Union, 2012). Though, as stated by Bradshaw (2009) on his work investigating the geopolitics of global energy security, through the years natural gas has become the favoured fuel for power generation and industry utilisation not only because it’s a “greener” fossil fuel but also arrangements for exporting and trading natural gas are long-term and geopolitically strategic as well.

In fact, the limitations and difficulties of transportation of natural gas essentially brings into light its geopolitical aspect more evident, rather than its financial aspect in terms of high capital investment and global gas trading. The International Gas Union (IGU) emphasizes that, the energy supply and demand has increasingly become globalized; resulting in consumer countries competing especially for natural gas flows, which actually defines natural gas as a key factor in terms of international and economic relationships and interests.
between countries currently (International Gas Union, 2012). Generally, countries hosting rich natural gas reserves have an upper hand to use natural gas as a political instrument; as well as the so-called transit-bridge countries, where the transit pipelines are laid, have a strategic advantage to be crucial players in the global energy market (Cameron, 2002).

One of the difficulties in terms of financial aspect is the grand capital requirement in order to transport natural gas, it is either shipped in vessels as liquefied natural gas (LNG) or it is dependent on pipeline infrastructure (Bradshaw, 2009). A report on competition in the continental European gas markets by International Energy Agency (2008) stresses the point that significant investments in the upstream production and transmission system has to be made especially for the international supply of natural gas by exports. This fact raises the concerns over another financial aspect of natural gas, the long-term import contracts.

In order to minimise the risk of investment, these supply arrangements are concluded generally for more than 15 years, the negotiation phase often causes distress for contracting parties (Finon, 2004). As pointed out by Neumann and von Hirschhaussen (2005) the long-term contracts in natural gas industry depends on subjective assessments and pure interests of the contracting parties. Industry experience shows that, the vertical relationship between gas producer and gas consumer countries often does not reflect a true positive correlation neither an optimal risk sharing of the contracted terms (Finon, 2004). According to Finon (2004) this vertical relationship between the producer and the consumer is mainly based on the following 3 contractual terms:

i. Take or pay obligations\(^1\),

ii. Price indexation (to oil);

iii. Re-export prohibition.

In natural gas industry, even though each country has relatively a different approach to meet its own energy needs there is one characteristic in common; before introduction of reforms for liberalisation of the gas markets, every national natural gas market is initially dominated by a state-owned energy company (Duncan, 2014). Before the liberalisation of European energy markets, the vertical integration of gas companies was forming a natural monopoly over the national markets value chains as it was considered the optimal market structure. This

\(^1\) Take or pay obligations: the buyer is obliged to pay for the contractual amounts regardless of actual delivery (IEA, 2008)
value chain consists of gas production, extraction, import, transmission, distribution, storage, wholesale and retail supply. It should be distinguished that, wholesale supply is the gas sale to retail suppliers by using transmission system, where retail sales stands for gas sale to end customers by the distribution grid (Slabá, 2009).

2.2 Liberalisation in Natural Gas Markets

Liberalization, in general terms, is abolition of national restrictions that are affecting competition negatively and inhibiting the freedom of movement of the goods, services, people and capital among countries. Liberalisation includes the reduction or elimination of the barriers and determination of the number of the companies that will be allowed to operate in a market. On the other hand, behaviour oriented regulation contains the rule or restrictions imposed by state on the pricing and other behaviour of the firms in a dominant position in the market (Vickers, 1997).

2.2.1 Reforms in Natural Gas Markets

Over the past decades, reforms introduced in the natural gas markets of Asian, European and American countries has the mission to increase cost efficiency and to draw private enterprises for investing in the industry by opening a competitive wholesale gas market to new entrants. The pioneer countries, such as Chile in 1982, United States in 1985, United Kingdom in 1989 and Argentina in 1992 had initiated the reform by liberalisation and privatisation of their national natural gas industry (Karan & Kazdagli, 2011; Juris, 1998a).

Mostly driven by economic reasons, such reforms have the aim to constrain the intervention of the government’s role in the industry resulting in inefficient pricing and ineffective operations. These reforms are sought to construct a regulatory framework which allows independent market players to sustain the demand and supply in a competitive environment (Juris, 1998a; Karan & Kazdagli, 2011).

The motivation for the natural gas market reforms initiated in 2000’s in EU countries had the mutual principal reason envisioned by European energy officials as (Duncan, 2014);

“Break the monopoly in the commercial activities of supply and import, to break the barriers in the gas trade between national markets, and to enforce the free access of the third parties to gas networks.”
Investigating the natural gas market in United States Juris (1998a) observed that, monopolistic state-owned gas companies maintain the pre-reform traditional gas markets, which are structured as vertically integrated in the gas industry, therefore forming one single market. As seen in the Figure 2.1, in this type of market all the operations serving the gas industry from production to distribution are sold in a “bundle” to end users by the monopoly.

**Figure 2.1** Bundled value chain in a monopoly (Juris, 1998a)

One of the important aspects of the energy sector is that it exhibits natural monopoly characteristics of basic activities in the industry. A statement indicating the existence of a natural monopoly is as follows; if the production of a particular service or product by a single company minimized the costs; that is to say if the cheapest way to produce them is to be produced by a single company then there is a natural monopoly in the industry (Viscusi, Vernon, & Harring, 2000).

Juris (1998a) implies that in a competitive natural gas market, unless it is small in size, many companies can be active and by the market players the price of natural gas can be set independently. On the other hand, in a natural gas market dominated by a monopoly, the efficient operation of multiple companies is not possible. Subsequently, as the national monopoly entities in the natural gas industry are managing all the activities of the natural gas industry value chain, they could dictate prices in the market independently at their sole discretion (Duncan, 2014).

### 2.2.1.1 Regulatory Reform

Natural gas market, similar to other energy sectors, emerges as a market with regulatory requirements. Similar patterns stand out, once observed the evolution of the monopoly dominated natural gas markets into liberalized competitive markets worldwide; firstly, an initiative regulatory reform then follows unbundling and third party access, all contributes to the structure of the liberalisation process of a natural gas market.
Regulation in general can be defined as a legal norm, maintained by the power of governments; it intends to limit (restrict) the implemented choices of the individuals and institutions (Stone, 1982). Among the objectives of the regulations, include the following:

- Ensuring effective distribution of the services among consumers which can be called as pricing efficiency or allocative efficiency.

- Ensuring the cost efficiency of the service-producing companies in order to produce those services at the lowest cost (Joskow, 1998).

The reforms for the liberalization of the natural gas markets are led by structural and regulatory change. Research by Juris (1998b) implies the importance of deregulation, which allowed third party access in 1985 and resulted in the reform of natural gas market liberalization in United States. It is argued that, the liberalization of the natural gas industry by the introduction of open access to the transportation system drew attention of the many companies and eventually emerged into a natural gas wholesale market. On the same work Juris emphasizes structural change by the impact of unbundling as a step to complete the liberalization process allowing full market competition by 1992 (Juris, 1998b).

In regards of market liberalisation, a prominent epitome is liberalisation of European gas markets; it has the mission to create a competitive unified gas market in EU by integrating existing and potential suppliers of each respective national gas markets of EU. The first “Gas Directive” in 1998 initiated the reform of market liberalisation in EU (Finon & Locatelli, 2002). According to Finon and Locatelli (2002) the directive laid fundamental bases for deregulation of national natural gas markets of EU; as this deregulation exhibits similar characteristics worldwide, the steps that develops the liberalisation can be regarded as a generic outline.

Chiefly, the aim of the liberalisation of gas markets is to create a competitive market with open access to participants. Perfectly competitive markets are a market model, which consist of many buyers and sellers with homogenous goods, where market entry & exit freedom is ensured and there is a transparency in information flow (Aktan C. C., 2001). Competition is the most effective way to ensure efficiency in resource allocation as it leads to an increase in overall welfare by ensuring the resource allocation according to consumers desire to obtain a good and its economic value given by consumer (Yılmaz, 2001).
For instance, as stated by Cavaliere (2007) liberalisation in EU, was launched with mission of breaking vertical integration in the gas industry. Each country was required to implement the following directives to their respective national gas market:

- Unbundling,
- Third Party Access (TPA),
- Liberalisation on the demand side.

These steps are common for every gas market worldwide already experienced gas market liberalisation; where liberalisation on demand is, basically, the allowance of consumer switching, titling them as eligible customers and giving them the freedom to choose their own supplier independently (Cavaliere, 2007).

A further elaboration should be developed for unbundling and third party access, as they are the backbone of the gas market liberalisation intended by reforms.

### 2.2.1.2 Unbundling

Unbundling is the separation of competitive activities such as production, imports, wholesale and retail sale of gas of the natural gas industry from the segments of the vertical gas value chain such as transmission, storage and distribution, which are managed by a natural monopoly (Cavaliere, 2007). There are several versions of unbundling specified by Cavaliere (2007):

**Account unbundling;** the simplest approach of unbundling where only the accounts of the former integrated entity are separated.

**Ownership unbundling;** the strongest type of unbundling which is the discomposure of different activities of the gas chain. All activities therefore are to be managed by separate companies.

**Legal unbundling;** activities of the value chain are separated and new corporations are founded for each activity, though the shareholders for each new company are the same of the former vertically integrated entity.

**Functional unbundling;** only the separation of the management units for each respective activity is present within the same company.
According to Juris (1998a) unbundling in context, is referred as an initiative to open access/third-party access to gas transportation grid/pipelines by the market participants; in truth unbundling, in terms of privatization or liberalization of the gas industry, is the step to create a distinctive gas market where natural gas is traded as a commodity for mitigating the price and supply risks. Unbundling is theoretically regarded as the provision of greater competition in the market, as competition increases in the market allocation of scarce resource becomes reasonably efficient (Duncan, 2014). A simple diagram demonstrating a natural gas market activities separated due to unbundling in the Figure 2.2.

### 2.2.1.3 Third Party Access

Third Party Access is the definition for the non-discriminatory access by third parties to essential facilities of the gas value chain which are operated by dominant players of the market. TPA is not limited only with access to transmission and distribution networks but also the LNG terminals and storage facilities as well. It also brings into discussion of tariffs due to utilisation of such facilities and the principles of TPA which are to be implemented by an independent regulator ensuring the non-discriminatory access to the facilities (Cavaliere, 2007).

### 2.2.2 Trading in the Natural Gas Markets

In the natural gas markets natural gas is traded as a commodity between market participants. These trades are bounded by contracts; mainly conducted under two types, these contracts can be traded as physical and financial in respective markets.
2.2.2.1 The Physical Gas Market

The contracts traded on the physical gas market can be categorized in two aspects; the target segment of the contract and the duration of the contract for the physical delivery of the natural gas. The target segment can be considered as wholesale gas market, where transactions are undertaken between the suppliers, producers, traders, distribution firms; as well as a retail market, where gas is traded directly between the supplier and end consumers such as industrial and households. The duration of the contracts, determines the relevant period to supply the customer; whereas these contracts are classified as short-term, mid-term and long-term (AEMC, 2015; Juris, 1998a).

Natural gas markets are traditionally founded on long-term supply contracts. These contracts are preferred as because it is granted a reduced risk of supply and risk by concluded fixed price and volume of gas for a certain period. Though, these sort of contracts are found to be inflexible to respond to the changing market conditions affecting the economic value of the natural gas, especially in the cold seasons when there is a peak demand for natural gas (AEMC, 2015; IEA, 2008).

2.2.2.2 The Financial Gas Market

Financial gas markets are formed by the contracts traded financially as forward contracts, swaps, options and futures just as in the commodity exchange markets. Typically negotiated between trading parties, these type of contracts have two objectives; minimization of the price risks due to price volatility in the market and minimisation of risks due to discrepancies between the prices of physical and financial gas contracts (AEMC, 2015; Juris, 1998a).

Financial gas markets emerge as a result of deregulation progress for the liberalization. Once a physical gas market of a country achieves a certain maturity, it is most likely that a spot market emerges eventually where financial contracts are traded (AEMC, 2015).

2.2.2.3 Spot Markets

Traditionally long-term supply contracts plays a great role in the supply of the natural gas markets; though deregulation of the industry allows flexibility for the market participants and obliges the balancing of supply and demand both in short-term and long-term. The balancing of the demand and supply can be achieved by a spot market for short-term trading. Eventually trading in short-term spot markets alters the dependence on long-term contracts.
by high liquidity. In liberalized markets, under the long-term contracts there is an abundant volume of quantities unsold, attracting many players to trade such quantities in a short notice.

Spot markets emerges in mature gas markets where there is a saturation of market participants; resulting in high competition between buyers and sellers (Juris, 1998a). This competition benefits the gas industry by high liquidity and better pricing by stimulating the trading of natural gas between participants; an efficient well-established spot markets tend to reflect the economic value of the natural gas for a given period (Neumann & von Hirschhausen, 2005).

Reference spot markets are mainly situated in a geographically central position well supplied from various sources, and well connected to pipelines, in other word where sources of supply and demand interconnect. These markets form a market place where the natural gas is traded for immediate delivery or for a specific time slot in near future. Prominent examples for natural gas spot markets could be Henry Hub from USA, Zeebrugge from Belgium and NBP from UK (Neumann & von Hirschhausen, 2005).

2.2.2.4 Hubs

The ultimate mission of the market deregulation policy for the natural gas industry is, achieving a sustainable environment that attracts external investments which provides efficient service to market participants. Spot markets is a result of a complex market liberalisation process, which requires an environment allowing the actualisation of gas supply and demand, and requires a platform for exchange of trades; all these aspects eventually refers to a natural gas trading hub (ten Kate, Varró, & Corbeau, 2013).

A natural gas trading hub represents a location where the exchange for the title for natural gas between market participants happens by trading of both contracted and traded gas; in other words, transfer of ownership and pricing of physical gas occurs in a gas hub (AEMC, 2015). Hubs host a spot market and a futures market functioning in a harmony, where natural gas can be traded for a limited time or a delivery of gas can be actualized several years in future (ten Kate, Varró, & Corbeau, 2013). Spot markets develops around gas hubs, and these hubs in general have the following objectives:

- Ensuring supplies in a lower price. Less expensive gas is a subsequent outcome, as the rents on the supply chain is eliminated due to the competition in the market.
• Supply security and stability, which is maintained by infrastructural and trade links between different markets.
• Increase of spot exchanges, reduction of obstacles encourages gas flow between other hubs.
• Market entry freedom, no barriers for TPA.
• Price discovery, hubs allow many contractual transaction to be traded and increase liquidity in market. Eventually creates an environment for gradual establishment of reference prices (Finon & Locatelli, 2002).

A successful natural gas trading hub depends on the development of a liberalised wholesale market. A fully liberalised market is essential as it generates competition between suppliers and give the opportunity to consumers for demand compelling pricing. A mature and effective hub allows the participants using such marketplace to secure their trades in order to meet the risk management of their portfolios. All hubs are used for balancing as well; market participants physically balance their traded position according to their portfolios on a daily basis (Heather, 2015).

According to Heather (2015) there is a confusion whether a hub is an actual geographical location or a virtual location. Though globally, two types of hubs is accepted for natural gas trading, which are regarded as physical or virtual hub (ten Kate, Varró, & Corbeau, 2013).

Physical hub, refers to an actual specific location or a physical point on a transit pipeline where many other gas pipelines interconnect (IENE, 2014). A physical hub enables the title transfer of gas exchanged at a certain location on the whole pipeline grid and it includes only a particular section of the transmission pipeline; this particular section enables the balancing of the system and may include storage facilities as well (AEMC, 2015). According to ten Kate et al. (2013) a physical hub is a geographical point in the gas transmission network, and the price for natural gas is set in that certain location and points out Henry Hub of United States as an example where the benchmark price of natural gas for all North America is set.

Virtual hub is regarded as a trading platform where the title transfer, financial transaction and pricing of gas occurs on large geographical areas encompassing generally an entire country or a trans-regional zone (AEMC, 2015; IENE, 2014). It allows access of a wide number of market participants, also enables injection on any point through the entire transmission system or on a defined region within a pipeline system of a national grid regardless of the extraction point (AEMC, 2015; IENE, 2014).
Stated by ten Kate et al. (2013) in European gas markets, the recent developments of gas markets favour the virtual hub due to simplified gas transmission grid entry/exit arrangements.

Positive aspects of virtual hubs can be listed as follows;

- Virtual hubs allow all gas gained access into the transmission network can be traded, on a physical hub, only the gas physically flowing through a precise location can be traded only which is considered risky (IENE, 2014).
- Title transfer of gas can be handled anywhere within the definition of a virtual hub, allowing market participants more flexibility than on a physical hub
- By covering a zone, a virtual hub avoids the situation where trade of natural gas is split over different physical locations, it provides favourable environment for the liquidity of a spot market (AEMC, 2015).

In categorization based on the development of EU gas hubs, the Oxford Institute for Energy Studies (OIES) has a different point of view (Heather, 2012; IENE, 2014). From OIES, Heather (2012) on his work investigating the continental European gas hubs, he specifies three distinctive type of hubs:
Trading hubs; these hubs are mature virtual hubs allowing market participants to manage gas portfolios. Heather (2012) classifies only National Balancing Point (NBP) of UK and Title Transfer Facility (TTF) of Netherlands as a trading hub among other European gas markets.

Transit hubs; represent a physical transit point where natural gas is traded physically. The main purpose of these hubs is to allow and assist in further transportation of gas in the interconnected gas grid. Austrian Central European Gas Hub (CEGH) and Belgian Zeebrugge (ZEE) was established to operate with this purpose.

Transition hubs, they are virtual hubs relatively not yet mature enough, though for their own respective national gas markets benchmark prices can be set within. Transition hubs etc. can be seen on Table 2.1.

Table 2.1 Hubs in EU natural gas markets (Heather, 2012; IENE, 2014)

<table>
<thead>
<tr>
<th>Hubs</th>
<th>Abbr.</th>
<th>Country</th>
<th>Hub type</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical hubs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central European Gas Hub</td>
<td>CEGH</td>
<td>Austria</td>
<td>Transit</td>
<td>2005</td>
</tr>
<tr>
<td>Zeebrugge</td>
<td>ZEE</td>
<td>Belgium</td>
<td>Transit</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Virtual hubs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Balancing Point</td>
<td>NBP</td>
<td>United Kingdom</td>
<td>Trading</td>
<td>1996</td>
</tr>
<tr>
<td>Title Transfer Facility</td>
<td>TTF</td>
<td>Netherlands</td>
<td>Trading</td>
<td>2003</td>
</tr>
<tr>
<td>Punto di Scambio Virtuale</td>
<td>PSV</td>
<td>Italy</td>
<td>Transition</td>
<td>2003</td>
</tr>
<tr>
<td>Points d’Echange de Gaz Nord</td>
<td>PEG</td>
<td>France</td>
<td>Transition</td>
<td>2004</td>
</tr>
<tr>
<td>Gaspool</td>
<td>GSP</td>
<td>Germany</td>
<td>Transition</td>
<td>2009</td>
</tr>
<tr>
<td>Net Connect Germany</td>
<td>NCG</td>
<td>Germany</td>
<td>Transition</td>
<td>2009</td>
</tr>
</tbody>
</table>

2.3 Stages of Development in Gas Markets

Gas market liberalisation is a long process transforming a domestic market structure on a national scale into a competitive gas market. Taking into account the experience gained by countries during the eve of national natural gas markets, it is perceived that along with the construction of transmission grids to supply gas to consumers, privileges to import natural gas are granted to the monopoly enterprises, already managing both wholesales and transmission activities. Subsequently, it can be concluded that natural gas markets are initiated by the state privileges and by operations of a public monopoly, which eventually goes through a dire process of liberalization to evolve into a competitive market (Stern & Rogers, 2014).
Estrada et al. (1996) describe the liberalization process of natural gas markets with a four stages development, on a study concerning the development of future EU gas markets. Furthermore, Estrada et al. (1996) distinguished significant characteristics through the liberalisation process and categorized the progress of a natural gas market in four stages in terms of the organisational structure of the industry as follows:

- Initiation – Infancy;
- Growth – Childhood;
- Development – Adolescence;
- Maturity.

Competition Authority of Turkish Republic (Rekabet Kurumu, 2012) considered the stages of development categorised by Estrada et al. (1996) as a framework to investigate the liberalisation process of the Turkish natural gas market. As concisely described in Table 2.2, the model defines the following statements: the role of the state during the birth stage of the liberalization process of the natural gas markets; the expansion of the demand and infrastructure while the growth phase; and the assessment of the competitiveness of wholesales market through the development phase (Estrada, Moe, & Martinsen, 1996; Rekabet Kurumu, 2012).

In other words, the 4 stages determined by Estrada et al. (1996) have different attributes in terms of role of the state intervention, demand structure of the market, infrastructure of the pipeline grid and wholesales of natural gas. This model assumes that, there is progressive advancement from an initial pre-existing monopoly to a liberal, developed, competitive gas industry with diversity of suppliers, consumers and distributers. This liberal market could only be achieved through; legally by deregulation, financially by privatization of operational assets and technically by the expansion of the infrastructure and by the surge of consumption. Potentially, transition from long-term contracts to short-term contracts and providing diversity of supply sources would be enhancing the market dynamics (Rekabet Kurumu, 2012).
<table>
<thead>
<tr>
<th>Birth</th>
<th>Growth</th>
<th>Development</th>
<th>Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demand</strong></td>
<td><strong>Demand increases exponentially</strong></td>
<td><strong>Decline in demand growth</strong></td>
<td><strong>Supply meets the demand</strong></td>
</tr>
<tr>
<td>- Demand is low</td>
<td>- Long-term contracts still in effect/charge</td>
<td>- Consumers with short-term demand start to take place in market</td>
<td>- Prices are totally set on the market</td>
</tr>
<tr>
<td>- Vertical integration</td>
<td>- Urg of flexibility needs due to various profile of consumers</td>
<td>- Prices are set in the market</td>
<td>- Transparent tariffs formulation</td>
</tr>
<tr>
<td>- Long term Contracts</td>
<td>- Reports of market condition is provided</td>
<td></td>
<td>- Consumers are able to select supplier</td>
</tr>
<tr>
<td>- Cost-plus pricing</td>
<td></td>
<td></td>
<td>- Transparent market data is present</td>
</tr>
<tr>
<td>- Non transparency for market conditions, tariffs &amp; pricing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Customers purchasing in high volumes with a steady demand</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Infrastructure construction is on project level</td>
<td>- Number of projects are increasing</td>
<td>- Active secondary capacity market and transmission</td>
<td>- An advanced infrastructure is established</td>
</tr>
<tr>
<td>- Under control of monopoly</td>
<td>- Expansion of infrastructure in terms of transmission, distribution, geographical reach and access to consumers</td>
<td>- Advanced level of 3rd party access to the transmission system</td>
<td>- Advanced storage means are present</td>
</tr>
<tr>
<td>- Economies of scale is present</td>
<td>- 3rd party access is permitted to the transmission system</td>
<td>- TSO is focused on system balancing and gas flow optimization</td>
<td>- A trading hub is present</td>
</tr>
<tr>
<td>- Expanded only to limited geographical market</td>
<td>- Monopoly of transmission system operator (TSO) is still present</td>
<td>- Infrastructure enhancement is crucial for operating the transmissions</td>
<td>- Ease of 3rd party access</td>
</tr>
<tr>
<td>- Limitation to joint access</td>
<td></td>
<td></td>
<td>- Sophisticated network code is applied</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wholesale</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Hardly any market participants are present</td>
<td>- Market participants are increasing</td>
<td>- Consumers are enabled to choose suppliers</td>
<td>- Vertical unbundling of the supply chain, financially and legally</td>
</tr>
<tr>
<td>- Under control of the monopoly</td>
<td>- Competition among market players is intensifying</td>
<td>- Delimitations to dedicated market areas</td>
<td>- Presence of substantial number of market players</td>
</tr>
<tr>
<td>- Under strict regulation</td>
<td>- Long-term contracts are still in effect</td>
<td>- Many fully operational market players</td>
<td>- Profit margins are relatively low</td>
</tr>
<tr>
<td>- Wholesales market is theoretically possible</td>
<td>- Oil indexed pricing</td>
<td>- High interest of financial players in the gas market</td>
<td>- Considerably high churn rate</td>
</tr>
<tr>
<td>- Almost none churn rate</td>
<td>- Limited market of wholesales</td>
<td>- Price formulation is indexed to other fuels</td>
<td>- Prices are completely liberalized</td>
</tr>
<tr>
<td></td>
<td>- Average churn rate</td>
<td>- Churn rate is considerably increased</td>
<td>- Short-term contracts in charge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Establishment of spot markets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Ample liquidity in the market</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Supply sources are selected by short-term contracts and by tenders</td>
</tr>
</tbody>
</table>
3. Energy in Turkey and Role of Natural Gas

In this chapter, an overview of the role of natural gas in Turkey is investigated with the most current data provided mainly from the latest reports of the regulatory authority EPDK (EMRA) and the main entity in the sector BOTAŞ. Following, PESTEL, a macro analysis regarding the aspects of Turkey and its energy sector, is performed in order to identify the actors and balances in the market, and comprehend the actual dynamics of the sector and potential causes having an impact on the natural gas industry of Turkey.

3.1 Energy Outlook

In this section, the general outlook of energy production and consumption characteristics in Turkey is examined. The current energy mix by fuel types is distinguished for national power generation. Eventually, total energy consumption and the natural gas demand and supply of Turkish energy sector is further evaluated.

Turkey's primary energy mix includes hydropower, geothermal, lignite, hard coal, oil, natural gas, biomass, solar, and wind energy. Nuclear energy will be added into the mix as an energy source by 2020. Most of Turkey's imported energy is in the form of fossil fuels, natural gas in particular. Broadly, the 98 percent of total natural gas consumption and 92 percent of oil is being imported every year; as a matter of fact, in 2012 the cost of such imports were accounted to more than $60 billion (World Nuclear Association, 2015).

Most of Turkey's electricity production is mainly credited for fossil fuel-fired power plants. Fossil fuels contributed around 60 percent of the total energy consumption of Turkey in the 1970s. This ratio reached 88 percent in 2011 by use of natural gas, 32 percent in first place, followed by coal 29 percent and oil 27 percent (Uzlu, Kankal, Akpınar, & Dede, 2014).

In 2014, the demand for electricity increased by 4.1 percent compared to 2013. According to MENR, natural gas fired power plants sourced a significant share of 48% in total national power generation. The second largest source was coal (29%), followed by hydroelectric plants (16%) and wind tribunes (3%) (Santos, 2015).
Table 3.1 Installed capacity in MW and plant numbers in 2014 and 2015 (TEIAS, 2015)

<table>
<thead>
<tr>
<th></th>
<th>Installed Capacity</th>
<th>Share %</th>
<th># of Plants</th>
<th>Installed Capacity</th>
<th>Share %</th>
<th># of Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>End of 2014</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>By 30 November 2015</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel oil + diesel</td>
<td>659.8</td>
<td>0.9</td>
<td>18</td>
<td></td>
<td>742.2</td>
<td>1</td>
</tr>
<tr>
<td>Hard coal + lignite</td>
<td>8'573.4</td>
<td>12.3</td>
<td>23</td>
<td>8'723.4</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Coal (Import)</td>
<td>6'062.6</td>
<td>8.7</td>
<td>8</td>
<td>6'064.2</td>
<td>8.4</td>
<td>8</td>
</tr>
<tr>
<td><strong>Natural gas + LNG</strong></td>
<td><strong>21'476.1</strong></td>
<td><strong>30.9</strong></td>
<td><strong>230</strong></td>
<td><strong>21'331.9</strong></td>
<td><strong>29.4</strong></td>
<td><strong>232</strong></td>
</tr>
<tr>
<td>Renewables + Waste</td>
<td>288.1</td>
<td>0.4</td>
<td>58</td>
<td></td>
<td>335.9</td>
<td>0.5</td>
</tr>
<tr>
<td>Mix Fuels (Coal+Liquid)</td>
<td>667.8</td>
<td>1</td>
<td>9</td>
<td></td>
<td>653</td>
<td>0.9</td>
</tr>
<tr>
<td>Mix Fuels (Liquid+Gas)</td>
<td>4'074.0</td>
<td>5.9</td>
<td>42</td>
<td></td>
<td>3'734.2</td>
<td>5.2</td>
</tr>
<tr>
<td>Geothermal</td>
<td>404.9</td>
<td>0.6</td>
<td>15</td>
<td></td>
<td>614.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Hydropower - Dam</td>
<td>16'606.9</td>
<td>23.9</td>
<td>77</td>
<td>18'157.6</td>
<td>25</td>
<td>89</td>
</tr>
<tr>
<td>Hydropower - Stream</td>
<td>7'036.3</td>
<td>10.1</td>
<td>444</td>
<td>7'515.6</td>
<td>10.4</td>
<td>467</td>
</tr>
<tr>
<td>Wind</td>
<td>3'629.7</td>
<td>5.2</td>
<td>90</td>
<td>4'365.6</td>
<td>6</td>
<td>115</td>
</tr>
<tr>
<td>Thermic (not licensed)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>45.7</td>
<td>0.1</td>
</tr>
<tr>
<td>Solar (not licensed yet)</td>
<td>40.2</td>
<td>0.1</td>
<td>112</td>
<td></td>
<td>203.1</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>69'519.8</strong></td>
<td><strong>100</strong></td>
<td><strong>1'126</strong></td>
<td><strong>72'486.4</strong></td>
<td><strong>100</strong></td>
<td><strong>1'410</strong></td>
</tr>
</tbody>
</table>

Note: Data from Turkish Electricity Transmission Company, 2014 Activity Report (TEIAS, 2015)

By the end of July 2015, the total installed generation capacity was 71,908 MW of which the state still holds 29.6 percent of the assets (Energy Community Secretariat, 2015). As of November 30, 2015, the installed electricity generation capacity in Turkey has increased to 72,486 MW (TEIAS, 2015). The role of natural gas in terms of power generation capacity is 30% of the total power generation of Turkey, there are 232 power plants using natural gas as a fuel for electricity generation.

![Figure 3.1](image_url) Turkish power capacity by source (Bloomberg New Energy Finance, 2014)
**Table 3.2** Electricity Production by primary energy sources 2013-2014

<table>
<thead>
<tr>
<th>Fuel Sources</th>
<th>2013</th>
<th>Share (%)</th>
<th>2014</th>
<th>(%)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>63,786.1</td>
<td>26.6%</td>
<td>76,263.7</td>
<td>30.27%</td>
<td>19.6%</td>
</tr>
<tr>
<td>Liquid Fuels</td>
<td>1,738.8</td>
<td>0.7%</td>
<td>2,145.3</td>
<td>0.85%</td>
<td>23.4%</td>
</tr>
<tr>
<td><strong>Natural Gas</strong></td>
<td><strong>105,116.3</strong></td>
<td><strong>43.8%</strong></td>
<td><strong>120,576</strong></td>
<td><strong>47.85%</strong></td>
<td><strong>14.7%</strong></td>
</tr>
<tr>
<td>Renewables+Waste</td>
<td>1,171.2</td>
<td>0.5%</td>
<td>1,432.6</td>
<td>0.57%</td>
<td>22.3%</td>
</tr>
<tr>
<td>Hydropower</td>
<td>59,420.5</td>
<td>24.7%</td>
<td>40,644.7</td>
<td>16.13%</td>
<td>-31.6%</td>
</tr>
<tr>
<td>Geothermal</td>
<td>1,363.5</td>
<td>0.6%</td>
<td>2,364</td>
<td>0.94%</td>
<td>73.4%</td>
</tr>
<tr>
<td>Wind</td>
<td>7,557.5</td>
<td>3.1%</td>
<td>8,520.1</td>
<td>3.38%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Solar</td>
<td>-</td>
<td>-</td>
<td>17.4</td>
<td>0.01%</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>240,153.9</strong></td>
<td><strong>100%</strong></td>
<td><strong>251,964</strong></td>
<td><strong>100%</strong></td>
<td><strong>0.049%</strong></td>
</tr>
</tbody>
</table>

Note: Data from Turkish Electricity Transmission Company, 2014 Activity Report (TEIAS, 2015)

In 2013, Turkey’s electricity production was 241 billion kWh gross generated from 57 GW of installed power plant capacity. 105 TWh, 44 percent, was generated from natural gas fired power plants, 64 TWh from coal, and 59 TWh from hydropower plants. Net import was 6 TWh. In 2014, the role of natural gas has increased in power generation by 15 percent, and natural gas fired power plants generated 48 percent of the total national power production; where coal and hydropower remained as main sources as seen in Figure 3.2.

**Figure 3.2** Power generation by source in 2014 (TEIAS, 2015)
In 2014, electricity production was amounted to 251.96 TWh and increased by 4.06 percent compared to 2013. On the other hand, the consumption has reached to 257.2 TWh with 3.58 percent of increase. Within produced amount of energy, 48 percent was generated from natural gas, 16 percent from hydroelectric sources, 16 percent coal and lignite, 14 percent from exported coal, 3 percent from wind and the rest comes from other sources. In 2014, the imported electricity has increased by 7.06 percent to 7.96 TWh in comparison to 2013. The total exports has increased significantly by 119.7 percent to 2.7 TWh in comparison to previous year (TEIAS, 2015).

### 3.2 An Overview of Natural Gas in Turkey

Discovery of natural gas in Turkey dates back to 1970, in Hamitabat & Kumrular field by Turkish Petroleum Corporation (TPAO). Though, the first use of national natural gas was in 1976 for supply means for a cement factory (Atiyas, Cetin, & Gulen, 2012). The actual birth of the Turkish natural gas market is regarded with, the first gas sales and purchase agreement signed between Petroleum Pipeline Corporation (BOTAŞ) and Soyuzgaz of the USSR in 1986, and the construction of the pipeline connecting two countries had begun the same year. The first physical delivery of natural gas to Turkey from the constructed pipeline started in 1987 (Rekabet Kurumu, 2012). In 1980s, natural gas supply service as a residential heating fuel in major cities started; in October 1988 to Ankara, in January December 1992 to Istanbul, in December 1992 to Bursa, in 1996 to Izmit and Eskisehir (Engin & Tuğrul, 2014). In Figure 3.3 main milestones of the industry could be observed.

Until the deliveries to the cities had commenced, natural gas did not play a part in Turkish primary energy consumption. Since then natural gas consumption has risen rapidly; in 2000 it amounted 15 bcm/y and by 2014 tripled to 48.7 bcm/y. In 2014 the natural gas share of primary energy consumption had reached 35 percent of share in the energy mix of Turkey. The natural gas consumption is expected to reach 50.8 bcm/y in 2015, according to demand forecast of EMRA (Energy Community Secretariat, 2015) (Rzayeva, 2014).
3.2.1 Natural Gas Infrastructure

Turkish natural gas transmission grid, managed by the transmission system operator (TSO) BOTAS, has approximately 12’561 km of domestic pipeline, excluding the distribution grid serving within cities to households and industry customers. Turkish natural grid has 4 entry points and 1 exit point connected to international pipelines. The natural gas infrastructure also consists of 2 LNG terminals, one storage facility and 2 production areas all connected to the transmission grid (International Energy Agency, 2013; BOTAS, 2014).
The infrastructure consists of 9 gas compressor stations with a capacity of 250 MW in total and more than 200 pressure reduction and metering stations are operational to sustain the overall pressure in the grid (BOTAS, 2014). By the design of the infrastructure system, Turkish natural gas transmission grid has technical incapability to transfer gas imported from east Anatolian region to northwest Marmara region; to resolve the bottlenecks, currently new compressor stations are planned to be integrated with a capacity of 98 MW. The distribution network has 290 primary exit points nationwide; only 53 exit points are under control of BOTAS, the rest are operated by the private distribution companies (International Energy Agency, 2013).

Table 3.3 Figures of Natural Gas Infrastructure of Turkey in 2014

<table>
<thead>
<tr>
<th>Natural gas production [bcm]</th>
<th>0.537</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total supply [bcm]</td>
<td>45.83</td>
</tr>
<tr>
<td>Consumption in energy sector</td>
<td>21.05</td>
</tr>
<tr>
<td>Available to final consumption of natural gas [bcm]</td>
<td>45.18</td>
</tr>
<tr>
<td>Interconnectors [bcm]</td>
<td>57.65</td>
</tr>
<tr>
<td>Storage capacity [bcm]</td>
<td>4.7</td>
</tr>
<tr>
<td>Length of transmission network [km]</td>
<td>12561</td>
</tr>
<tr>
<td>Length of distribution network [km]</td>
<td>95000</td>
</tr>
<tr>
<td>Natural gas customers</td>
<td>372000</td>
</tr>
<tr>
<td>Eligible customers #</td>
<td></td>
</tr>
<tr>
<td>Households #</td>
<td>9484324</td>
</tr>
<tr>
<td>Internal Market [bcm]</td>
<td></td>
</tr>
<tr>
<td>Gas supplied to active eligible customers</td>
<td>36.4</td>
</tr>
<tr>
<td>Share of total consumption</td>
<td>81 %</td>
</tr>
<tr>
<td>Consumption structure [bcm]</td>
<td></td>
</tr>
<tr>
<td>Energy Transformation</td>
<td>21.05</td>
</tr>
<tr>
<td>Industry and commercial customers</td>
<td>15.33</td>
</tr>
<tr>
<td>Households</td>
<td>9.54</td>
</tr>
</tbody>
</table>

Note: Data from EMRA Report 2012 and 2013, BOTAS annual reports and (Energy Community Secretariat, 2015)

Turkey is constantly enhancing its transmission infrastructure by improving the system to manage bottlenecks. In 2014, in Erzurum Turkey’s ninth high-pressure compression station had become operational. There are ongoing projects to increase the capacity of compressor stations situated in the Eastern region of Turkey, as these stations are inadequate to allow
transportation of gas from Azerbaijan and Iran. Any infrastructural failure of transport is costly due to take-or-pay agreements (Tunçalp, 2015).

3.2.1.1 Interconnections and Transmission Grid

Turkey has an interconnection to 5 international pipelines. Total capacity of the operating pipelines amounts for 57.65 bcm. Among these interconnected pipelines, there are 4 entry points with a total import capacity of 46.6 bcm, which can be interpreted as 127.6 mcm of flow per day and 5.3 mcm per hour. The pipelines are shown in Table 4 below. Turkey has only one international pipeline exit point, which is situated by the Greek border, allowing natural gas exported to Greece with a capacity of 2.4 mcm per day.

![Figure 3.4 Turkish transmission grid (International Energy Agency, 2013)](image)

**Table 3.4** Operative international pipelines for import

<table>
<thead>
<tr>
<th>Pipeline</th>
<th>Via</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia-Turkey West</td>
<td>Kofcaz on Bulgaria border</td>
<td>16 bcm</td>
</tr>
<tr>
<td>Russia Turkey Blue Stream</td>
<td>Samsun on Black Sea</td>
<td>14 bcm</td>
</tr>
<tr>
<td>Iran-Turkey</td>
<td>Dogubeyazit</td>
<td>10 bcm</td>
</tr>
<tr>
<td>Baku-Tbilisi-Erzurum</td>
<td>Ardahan</td>
<td>6.6 bcm</td>
</tr>
</tbody>
</table>
3.2.1.2 Storage Facilities

Turkish natural gas infrastructure consists of two underground storages, approximately having a working gas volume of 3 bcm, with a daily send out capacity of 58.5 mcm which is inadequate to satisfy the gas demand, especially in the Marmara region.

There had been a gas supply shortage in Marmara region where Istanbul is situated in 2012, depleting all gas storage fields. The storage owner in Silivri is Turkish Petroleum Corporation (TPAO), though 2.1 bcm of total capacity is dedicated to BOTAS and 561 mcm is available for the private companies. The Silivri storage facility was expanded to 2.84 bcm by 2014 with a daily withdrawal capacity of 25 mcm. It is planned to increase the capacity to 4.3 bcm with a daily withdrawal capacity of 70 mcm by 2017 (International Energy Agency, 2013; BOTAS, 2014).

There is an ongoing natural gas underground storage facility project in Central Anatolia region, under Tuz Golu (Salt Lake) in order to grant provisional supply security and shave peak demands in the region.

Table 3.5 Storage Facilities (EPDK, 2015)

<table>
<thead>
<tr>
<th>Company</th>
<th>Facility</th>
<th>Location</th>
<th>Storage Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPAO</td>
<td>Underground</td>
<td>Silivri/Istanbul</td>
<td>2.7 bcm</td>
</tr>
<tr>
<td>BOTAŞ</td>
<td>Underground</td>
<td>Sultanhani/Aksaray</td>
<td>1.5 bcm</td>
</tr>
<tr>
<td>BOTAŞ</td>
<td>LNG</td>
<td>Marmara Ereglisi/Tekirdag</td>
<td>156.8 mcm</td>
</tr>
<tr>
<td>EgeGaz</td>
<td>LNG</td>
<td>Aliaga/Izmir</td>
<td>172.2 mcm</td>
</tr>
</tbody>
</table>

3.2.1.3 LNG terminals

Along with underground storage facilities, there are 2 LNG storage facilities, one operated by the incumbent BOTAŞ, Marmara Ereğlisi and the second, privately owned Aliaga terminal of EgeGaz. These LNG storage tanks has a capacity of 255’000 cubic meters of LNG (156.8 mcm natural gas) and 280’000 cubic meters of LNG (172.2 mcm) respectively.

In fact, these LNG storage tanks are part of LNG regasification terminals. These terminals have a maximum capacity of send-out 14 bcm annually. These terminals as mentioned previously are, Marmara Ereğlisi of BOTAS and Aliaga Terminal of Ege Gaz; with a daily send out capacity 22 mcm/day and 16.4 mcm/day respectively (Energy Community
A new LNG regasification project is being evaluated by regulatory authority EMRA, with a send out capacity 18 mcm/day (International Energy Agency, 2013).

### 3.2.2 Natural Gas Figures in Turkey

Turkey suffers from the lack of indigenous gas reserves, as the current domestic reserves are insufficient to meet the demand of the country. Turkey is dependent on imported gas absolutely, which is fundamentally vital for power generation and especially for households during the cold seasons (Rekabet Kurumu, 2012). Stated in the annual report of EMRA, the annual gas consumption amounted as 48.72 bcm including losses (EPDK, 2015).

<table>
<thead>
<tr>
<th>Table 3.6 Natural Gas Figures (in bcm) (EPDK, 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Total Consumption</td>
</tr>
<tr>
<td>Total Production</td>
</tr>
<tr>
<td>Total Exports</td>
</tr>
<tr>
<td>Total Import</td>
</tr>
</tbody>
</table>

Figure 3.5 Yearly total natural gas figures in Turkey (EPDK, 2015)
Turkey’s natural gas reserves are limited; the Oil & Gas Journal (2014) estimates that, as of January 2015, Turkish natural gas reserves are in total 6.8 bcm. Turkey produces scarcely an insignificant amount of natural gas, with the yearly total production amounting to 479 mcm in 2014 (U.S Energy Information Administration, 2015). As seen on Figure 3.5, the production of the national reserves is negligible compared to the total consumption.

In 2014, Turkey imported 49.3 bcm of natural gas, which accounts for 99 percent of total natural gas supply. Through LNG and multiple pipeline connections, Turkey has a reasonably diversified supply mix. However, Russia's Gazprom is by far the largest single supplier, accounting for 54.76 percent of Turkey's total natural gas supply in 2014. Following Russia, second largest supplier is Iran as it is seen in Figure 3.6.

<table>
<thead>
<tr>
<th>Russia</th>
<th>Iran</th>
<th>Azerbaijan</th>
<th>Algeria</th>
<th>Nigeria</th>
<th>Spot LNG</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.975</td>
<td>8.932</td>
<td>6.073</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>41.98</td>
</tr>
<tr>
<td>LNG</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4.179</td>
<td>1.414</td>
<td>1.689</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>49.262</td>
</tr>
</tbody>
</table>

**Table 3.7** Natural gas amounts via Pipeline and LNG in bcm (EPDK, 2015)

![Figure 3.6](image)

**Figure 3.6** Import Shares in 2014 by Country & LNG share in total imports (EPDK, 2015)

Natural gas consumption has been rising increasingly in the last ten years. Natural gas consumption in 2014 reached over 48.7 bcm. Each year, EMRA declares the national natural gas consumption forecast. For the year 2015, the natural gas consumption forecast was projected to be 50.8 bcm (EPDK, 2015).
**Figure 3.7** European region yearly gas consumption (bcm) country ranking in 2014 (CIA Factbook, 2015)

Turkey is ranked among few countries that external dependence is the highest, in which it imports almost three-fourths of its energy in order to meet its demand. When taking into consideration the net import figures of 2014, Turkey is ranked 8th in natural gas import in the world and 3rd in Europe (CIA Factbook, 2015). Turkey has 98 percent dependency on imported pipeline gas; in terms of annual consumption; Turkey is ranked 17th in the world and 4th largest gas market in European region as depicted on Figure 3.7 and Table 3.8 (CIA Factbook, 2015).

Turkey’s main exporter countries are Russia, Iran and Azerbaijan. Turkey also imports LNG chiefly from Algeria, Nigeria and Qatar (Hacisalihoglu, 2008). In Figure 3.8, the share of exported countries is depicted on a yearly basis; in the figure the title “Others” refers to the spot LNG cargoes originated from various producer countries.

**Table 3.8** Natural gas figures in Turkey (CIA Factbook, 2015)

<table>
<thead>
<tr>
<th>Natural gas- production</th>
<th>Volumes</th>
<th>World rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas- consumption</td>
<td>48.7 bcm</td>
<td>17th</td>
</tr>
<tr>
<td>Natural gas -exports</td>
<td>632.6 bcm</td>
<td>40th</td>
</tr>
<tr>
<td>Natural gas- imports</td>
<td>49.3 bcm</td>
<td>8th</td>
</tr>
<tr>
<td>Natural gas-proved reserves</td>
<td>6.83 bcm</td>
<td>85th</td>
</tr>
</tbody>
</table>
Figure 3.8 Share of suppliers in total imports (EPDK, 2015)

After completion of Turkey-Greece Natural Gas Pipeline, in 2007, Turkey started to export some volumes of natural gas to the Greece. The exported volumes through the years, 2007 to 2014, are shown in Figure 3.9. In 2014, BOTAS exported just 633 mcm of natural gas (U.S Energy Information Administration, 2015).

Figure 3.9 Natural gas exports to Greece (mcm) (EPDK, 2015)

Natural gas is very convenient and widely used both in electricity production and in residential heating. Natural gas fired power plants have faster installation and shorter commissioning period compared to the most of other fuelled power plants. Additionally, short start-up time points out natural gas fired power plants as more favourable in fast
developing countries like Turkey that need fast responses to swiftly changing energy demands. Furthermore, natural gas is more environmental friendly with low carbon emission values. These advantages made natural gas widely used in Turkey, especially in the most populated cities. It is also used in industrial heating processes as fuel. Almost half of the natural gas consumption is used for electricity production in power plants (Engin & Tuğrul, 2014). Natural gas consumption in 2014 by various sectors are shown in Table 3.9.

Table 3.9 Natural Gas Consumption, 2014 (in mcm) (EPDK, 2015)

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Consumption</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Electricity generation</td>
<td>23441.97</td>
<td>48.12</td>
</tr>
<tr>
<td>2. Energy Sector</td>
<td>367.41</td>
<td>0.75</td>
</tr>
<tr>
<td>3. Transportation Sector</td>
<td>86.56</td>
<td>0.18</td>
</tr>
<tr>
<td>4. Industry Sector</td>
<td>12375.53</td>
<td>25.40</td>
</tr>
<tr>
<td>5. Service Sector</td>
<td>3018.49</td>
<td>6.20</td>
</tr>
<tr>
<td>6. Other Sectors</td>
<td>9426.09</td>
<td>19.35</td>
</tr>
<tr>
<td>6.1. Residential</td>
<td>9304.42</td>
<td>19.10</td>
</tr>
<tr>
<td>6.2. Agriculture/Forestry</td>
<td>22.80</td>
<td>0.05</td>
</tr>
<tr>
<td>6.3. Farming</td>
<td>37.68</td>
<td>0.08</td>
</tr>
<tr>
<td>6.4. Other</td>
<td>61.19</td>
<td>0.13</td>
</tr>
<tr>
<td>7. Losses</td>
<td>1.13</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>48717.18</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Figure 3.10 Natural Gas Utilization, 2014 (EPDK, 2015)

Natural gas is mainly used in power generation, which accounted for more than 40 percent of consumption in 2014. Most of the remaining consumption is between the household and industry as shown in Figure 3.10. Consumption growth is expected to remain strong as
industrial sector growth and rising electricity consumption continue to spur demand (U.S Energy Information Administration, 2015).

In 2013, Turkey imported liquefied natural gas (LNG) from seven countries; Algeria, Nigeria, Qatar, Norway, Egypt, Netherlands, and France; which accounted for 13 percent of Turkey's total natural gas supply. Cargo vessels arrive at the country's two LNG terminals, Marmara Ereglisi in Tekirdag and the Aliaga terminal in Izmir (U.S Energy Information Administration, 2015). In 2014 the spot cargo LNG imports reached to 1.7 bcm, the major share is accounted for the spot cargo arriving from Qatar by 60 percent (EPDK, 2015).

**Table 3.10** Spot LNG import volumes [mcm] in 2014 by country (EPDK, 2015)

<table>
<thead>
<tr>
<th>Country</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>254.06</td>
</tr>
<tr>
<td>Qatar</td>
<td>1004.65</td>
</tr>
<tr>
<td>Nigeria</td>
<td>74.13</td>
</tr>
<tr>
<td>Norway</td>
<td>270.70</td>
</tr>
<tr>
<td>Trinidad&amp;Tobago</td>
<td>85.17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1688.72</strong></td>
</tr>
</tbody>
</table>

**Figure 3.11** Spot LNG import ratios (EPDK, 2015)

As end of 2014, there are 39 number of licensed companies having the eligibility to import Spot LNG to the domestic natural gas market. Among all licensed importers only 2 companies, BOTAS and Ege Gaz respectively, have executed imports during 2014.
3.3 PESTEL Analysis

Environmental realities and aspects that influence the current energy sector and natural gas industry in Turkey can be analysed with the PESTEL framework. PESTEL analysis is a framework that categorizes the external influences; political, economic, social, technological, environmental and legal respectively. This framework is a useful strategic tool especially to understand the market growth or decline, its potential and direction of operations (Kotler, 1994). PESTEL analysis can then be used to take advantage of opportunities and to make contingency plans for threats when preparing business and strategic plans (Byars, 1991; Nayeem & Shamsher, 2011).

The analysis by use is considered effective for business planning and strategy, marketing, product development and for research reports. Benefits of this analytical framework is realized when a company is having an intention to enter new markets and countries in order to conduct its business. PESTEL provides information to avoid biased assumptions and gives hints of the realities of the future environment for an effective adaptation (Abhishek, 2013).

It is regarded as a very general analysis in the context and it is rather found ambiguous to provide certain guidelines to navigate through changing dynamics of an environment. Nonetheless, as phrased by Abhishek (2013) “The value of the PESTEL is likely to relate directly to the quality of the effort put into it. Time spent thinking about how external change will affect the enterprise and its enterprise is likely to be well spent”.

In this section PESTEL of Turkey is performed and its energy sector is analysed, while using secondary data from recent country and industry reports as well as reputable articles regarding the Turkish energy sector and natural gas sector.
3.3.1 Political

Energy is a fundamental element for the realization of sustainable development and economic growth for countries; subsequently energy demand gains pace gradually as advancements due to industrialization and eventual increase in population. One of the realities of the global economy is interdependency of energy; the countries endowed by rich energy resources have enough reserves to meet increasing demand and every other nation has the aim to access to energy resources without any interruption to sustain economic growth (Fackrell, 2013).

Energy policies shows diversities depending on every respective countries’ dynamics; though in general, countries dependent on imported energy such as Turkey, shape their energy policies by the definition of the energy security. Turkey does not possess rich hydrocarbon reserves in its soil, thus requires to import oil and natural gas (Kaymak, 2014). As a result the fact of being an import dependent country leads Turkey to conduct energy policies; to maintain uninterrupted energy supply, to diversify and introduce an appetite of new energy resources, to reduce energy expenditures and minimize the risks on supply routes, while using the energy efficiently (Kaymak, 2014; Fackrell, 2013).

The political system in Turkey is a parliamentary democracy. The Turkish Constitution structures the Republic of Turkey as a democratic, secular and social state in which the executive, legislative and judicial powers are separated (Cagaptay & Evans, 2013). During the last decade, Turkey has made a major progress in its economic performance. The economic success could be attributed to political developments. Justice and Development Party (AKP), the current governing party, has won four parliamentary elections in a row. Single party government pushed reforms on liberalization and privatization. Efforts were also made to promote liberal trade and investment policies (Cagaptay & Evans, 2013).

Turkey’s contributions to exceptional economic performance and stability is considered as progress regarding EU membership. After Turkey became a candidate for EU membership in 1999, finally in 2005 accession negotiation officially started. Since the accession progress started, the attractiveness of Turkey from the perspective of foreign investors has been enhanced (Koranyi & Sartori, 2013). FDI inflows in the energy sector faced a significant expansion due to EU’s interest in creating energy corridors in which Turkey would be involved (Sanchez, Francés, & De Arce Borda, 2014).
The economic growth and political stability triggered the raise of primary energy consumption (Koranyi & Sartori, 2013). In order to keep up with increasing energy demand Turkey needs to make new agreements on new projects and investments in electricity generation, natural gas and renewable energy. Natural gas will be focal point since it is the key component in Turkey’s energy mix (Winrow G., 2014). Since natural gas accounts almost 50 percent of electricity generation; reforming the natural gas market will enhance the developments in Turkey’s electricity market (The World Bank, 2015).

Natural gas has a vital role in the primary energy mix of Turkey; almost 30 percent of total power generation capacity is dedicated to natural gas as a fuel and it comprises up to 48 percent of nationwide electricity generation in average for the last 10 years. Any issue impacting national gas in terms of supply security and price has a direct influence on the electricity market and the industry. Natural gas consumption of Turkey is forecasted to be doubled by the year 2030, this puts Turkey amongst the fastest growing natural gas markets in the world (The World Bank, 2015; Fackrell, 2013).

3.3.1.1 Turkey’s Energy Policy

Energy market size of Turkey and its supreme geographical position in the Southern and Eastern Mediterranean energy landscape, in literature, often draws attention to the potential leadership of Turkey in the region (Tagliapietra, 2012; Andoura, 2015; Roberts, 2010). Figure 3.12 below illustrates Turkey’s position being in the crossroads of 68 percent of world’s oil reserves and 75 percent of world’s natural gas reserves. Especially, Turkey has direct borders to Iran, the world’s largest natural gas reserves holder by 34 bcm (Tagliapietra & Zachmann, 2015). Tagliapietra (2012) refers such features as opportunities for Turkey in terms of energy transit with these words: “Both the prospects for the European gas demand and for gas production in supplier countries surrounding Turkey allow a bright future to be foreseen for Turkey as the regional natural gas hub.”

A success in these energy policies would strengthen Turkey’s aspirations on becoming a major player in the region. Turkish government’s main objectives in terms of energy policy are threefold; priority objective is, as every country, to avoid being dependent from the outside world, country or organizations by maintaining energy security. Second priority is to satisfy the rising energy demand of a growing economy. Last but not least, Turkish
Officials seek to establish Turkey as an important energy transit state and a significant energy hub (Winrow G. M., 2013; Hacisalihoglu, 2008).

Figure 3.12 Position of Turkey in the heart of hydrocarbon rich regions (Tagliapietra, 2012)

Domestic policies and foreign policy jointly form the energy policy. The Ministry of Foreign Affairs (MFA) and Ministry of Energy and Natural Resources (MENR) are the leading government bodies that determine the energy policies of Turkey. The energy dependency of Turkey makes its energy policy challenging in order to compete with other consumer countries and following a compelling energy-foreign policy. Supply diversification is very important in Turkey’s energy policy. Since the country obtains 75 percent of its energy needs from foreign resources, diversification is necessary to bolster the country’s energy security and mitigate the risk of gas shortages (Hacisalihoglu, 2008; Celikpala, 2013).

During the last two decades, the increase in energy consumption doubled because of positive economic performance. The government’s energy policies to meet this demand is based on four pillars according to Koranyi and Sartori (2013):

- Diversifying the sources and routes of energy
- Increase the production of energy from renewables and nuclear power plants
- Optimizing the energy efficiency
- Contribution to EU’s energy security.
Turkey has been playing pivotal role with its successful energy policies in the region; securing significant volumes of hydrocarbons and attracting major investments for realization of ambitious energy transportation projects (Koranyi & Sartori, 2013). Turkey has the potential to become a regional centre between Asia and Europe, which means Turkey can constructively contribute to world’s energy security and play an important role in the region. Turkey is regarded as at the centre of energy geopolitics both nationally and internationally, quoted as “The core of Turkey’s energy policy is circular and the diameter of this circle is equal to the world’s diameter” by the former minister of MENR, Taner Yildiz (2010).

Geopolitics is referred as “conceptual and terminological tradition in the study of political and strategic relevance geography.” Nowadays energy, in terms of ownership over the resources and influence over the pipelines, is considered as geopolitical instrument. In this context of getting advantage of its geopolitical position, Turkey has been constructing strategies to benefit from neighbouring hydrocarbon rich countries. Turkey’s agenda is to maintain its energy securities as it’s crucial for sustainable development and economic growth (Coşkun & Carlson, 2010).

Energy security can be defined roughly as the uninterrupted availability and reliability of energy resources at a reasonable cost; since Turkey is 98 percent dependent on natural gas imports, energy security plays a critical role in terms of energy security for Turkey (Fackrell, 2013; Coşkun & Carlson, 2010).

After the “gas crisis” of 2006, in which Russia suspended the flow of gas to Ukraine due to energy security issues, eventually European Union officially recognized Turkey as a crucial transit corridor for non-Russian gas supplies to Europe. At the same time, Russia designated Turkey as an important stop along its new gas supply route to Europe by introducing a very ambitious project going by the name of Turkish Stream (Skalamera, 2015). After Germany, in 2014 Turkey is accounted for Russia’s second largest export market for natural gas as demonstrated in Figure 3.13.

Dependence of Russian natural gas has a constraining effect on Turkey’s foreign policy and geopolitical strategy. The recent tensions in Syria between Turkey and Russia raised concerns over the supply security of Turkey, especially remarking the diversification of energy supply sources for the sake of Turkish national security and foreign policy (Tunçalp,
2015). Officially, in 2014, the share of Russian gas in the total natural gas imports of Turkey has been 55% (EPDK, 2015).

<table>
<thead>
<tr>
<th>Country</th>
<th>2014 Exports [bcm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>4.40</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.67</td>
</tr>
<tr>
<td>Finland</td>
<td>2.76</td>
</tr>
<tr>
<td>France</td>
<td>9.70</td>
</tr>
<tr>
<td>Germany</td>
<td>45.31</td>
</tr>
<tr>
<td>Greece</td>
<td>1.98</td>
</tr>
<tr>
<td>Italy</td>
<td>24.42</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2.38</td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.29</td>
</tr>
<tr>
<td><strong>Turkey</strong></td>
<td><strong>27.01</strong></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>11.12</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>3.11</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>4.20</td>
</tr>
<tr>
<td>Hungary</td>
<td>5.87</td>
</tr>
<tr>
<td>Poland</td>
<td>8.91</td>
</tr>
<tr>
<td>Slovakia</td>
<td>3.81</td>
</tr>
</tbody>
</table>

**Figure 3.13** Total exports of Russia's Gazprom in 2014 [bcm]

EU and Turkey engaged in a long-standing process of negotiation over Turkey’s EU membership, facing many obstacles and there is not any prospects of successful conclusion in the near future. At the same time, EU and Turkey have increasingly high energy ambitions, which open the door for potential cooperation in a couple of energy areas. The main areas of such cooperation are the diversification of gas supply and transit through the Southern Corridor, and the convergence of regulatory frameworks and markets (Andoura, 2015).

Turkey plays an indispensable role in the European energy security. Turkey’s energy security policy plays an important role in EU dimension. Accession negotiations depending whether they take positive or negative direction, will affect the success of EU-Turkey cooperation in the field of energy (Koranyi & Sartori, 2013). The Turkish high-level policy makers have announced their enthusiasm and availability to proceed further on making stronger cooperation ties in the field of energy. The opening of the energy chapter in the EU accession negotiations impact positively on the accession negotiations of Turkey to become a member state of EU (Koranyi & Sartori, 2013).
The energy sector is crisis sensitive; Turkey’s hard won reputation on political stability started to shake especially in the eyes of foreign investors after the Gezi Protests that affected Turkey in May/June 2013 where former Prime Minister Recep Tayyip Erdogan and leading government officials were criticized by EU with consent and hostility (Koranyi & Sartori, 2013; Cagaptay & Evans, 2013).

Turkey’s future as an energy transit state is being questioned due to safety concerns. Transmission pipelines connecting Turkey with its oil and gas rich neighbours, Iran and Iraq have been sabotaged several times by rebel groups, on the other hand Kurdistan Workers’ Party (PKK) has also claimed that was responsible for the explosion of Baku–Tbilisi–Ceyhan (BTC) pipeline in Erzincan in 2008 (Winrow G. M., 2013). In addition, the escalating turmoil in Syria is also threatening the ambitions of Turkey’s strategy of growth, expansion and becoming major player in the region and EU (Koranyi & Sartori, 2013).

### 3.3.1.2 Future Projects

Being located at the crossroads between the richest gas regions energy consuming markets, Turkey aims to take advantage of its geographic position (Andoura, 2015). In the recent years Turkey has joined several international pipeline projects. The projects mentioned below would give a great contribution to the realisation Turkish energy polices and aspirations;

- **BTC Pipeline**: Expansion of South Caucasus Pipeline, also known as Baku-Tbilisi-Erzurum, which will run parallel to BTC and will carry Azeri gas through Georgia and Turkey to southeast Europe. The pipeline expansion is expected to start operations in 2019 (Cagaptay & Evans, 2013; EMIS, 2014).

- **TANAP**: Trans Anatolian Pipeline is also under construction. Azerbaijan, Turkey and British Petrol own TANAP. This pipeline carries key strategic importance for Turkey because Turkey’s involvement will enhance countries leverage with both EU and Azerbaijan. This pipeline is expected to start its operations in 2019 (Cagaptay & Evans, 2013; EMIS, 2014).

- **TAP**: Trans-Adriatic pipeline is expected to transport gas from Caspian Sea through Greece, Albania, and the Adriatic Sea to Italy and from Italy to Western Europe. TAP had been a rival to now defunct project Nabucco. This project would carry gas from Azerbaijan via already existing South Caucasus Pipeline but it could carry gas from
Russia or any other source transiting Turkey. TAP is expected to start constructions in 2016 and start its operations in 2020 (Cagaptay & Evans, 2013; EMIS, 2014).

- **Turkish Stream;** is proposed upon cancelation of South Stream, which was to deliver Russian gas to Austrian border via Balkan countries. It is planned to transport 63 bcm through 660 km pipeline under the Black Sea. Turkey will have off take volumes, while it is discussed that it will have TAP connection options for European deliveries via Greece to Italy (Tagliapietra & Zachmann, 2015).

![Map of current and future pipeline projects in the region](image)

Figure 3.14 Current and future pipeline projects in the region (Business Insider UK, 2015)

- **Iraq-Turkey project** that would carry northern Iraq’s gas to Turkey and from Turkey to Southeast Europe. The negotiation between Turkish government, Kurdish regional government and the Iraqi government continues (Cagaptay & Evans, 2013).

- **Interconnector Turkey-Bulgaria;** this pipeline carry Azeri gas to Bulgaria through Turkey and allow Bulgaria to implement its supply contract signed with Azerbaijan in 2013 (Cagaptay & Evans, 2013).
3.3.2 Economical

Mentioning energy policies and energy security, in the previous section it is discussed Turkey and its energy sector from a political perspective. In this section an outlook of Turkish economy is provided as well as remaining facts of energy sector and in particular natural gas industry in Turkey. Cagaptay & Evans (2013) describes the economy of Turkey as follows; "Buoyed by a decade of economic growth, Turkey is more prosperous than ever before".

Turkey’s average GDP growth from 2002-2014 was 4.7 percent. Its current GDP is $ 799.54 billion and the country is ranked 17th among the world’s largest economies (CIA Factbook, 2015; TURKSTAT, 2014). Figures 3.15 and 3.16 illustrate the real GDP growth, from both previous 10 years as well as short forecast of the future compared to other countries.

![Figure 3.15 Average annual real GDP growth in percent, 2002-2013 (The Republic of Turkey Prime Ministry, 2015)](image)

After the financial crisis in 2001, Turkey adopted financial and fiscal reforms which led to bolster up the economic fundamentals as well as ushered in an era of strong growth, averaging more than 6 percent annually until 2008. GDP rebounded strongly to around 9 percent in 2010-2011 after global economic conditions and tighter fiscal policy caused GDP to contract in 2009. Main factor was the well-regulated financial markets and the banking system (CIA Factbook, 2015). However recent geopolitical developments, election-related uncertainties and corruption crises has changed the trend of growth, the growth moderated to 4.2 percent in 2013 and fell to 2.9 percent in 2014 (TURKSTAT, 2014). The private sector during the past 10 years has also been quite dynamic with a remarkable increase of 250

Turkey’s economy is driven by its service and industry sectors. Privatizations have reduced state involvement; and as a result of this now Turkey is a largely free-market economy. Although its traditional agriculture sector still accounts about 25 percent of employment, other sectors and industries has started to increase their share of contribution to the economy. Turkey also is expanding its production beyond traditional textiles and clothing sectors; the automotive construction and electronic industries are rising in importance and have surpassed textiles within Turkey’s export mix (CIA Factbook, 2015).

![Figure 3.16 Annual Average Real GDP growth (percent) forecast in OECD Countries - 2014-2016](The Republic of Turkey Prime Ministry, 2015)

Turkey is a member of G-20 and a founding member of Organization for Economic Co-operation and Development (OECD) (The World Bank, 2015). The objective of the government on turning countries geographic location into an advantage in the Eurasian natural gas game, comes along with its ambition to give Turkey a greater role within its region (Cagaptay & Evans, 2013).
The domestic political uncertainties and turmoil within Turkey’s neighboring countries, as well as Turkey’s relatively high current account deficit, are important economic weaknesses causing possible destabilizing shifts in investor’s confidence (CIA Factbook, 2015).

Over the last decade, Turkey has made tremendous changes in its energy markets with aim to establish a more competitive market. These changes include liberalization, opening up to private sector participation and restructuring the energy markets (EPDK, 2012).

Having discussed the economic growth trends, burst of production and welfare gains, it is important to mention that these changes have also boosted dramatically the primary energy consumption in the country. Rapid population growth is another factor that determines the increase of energy consumption. Natural gas consumption raised from 15 bcm in 2000 to over 48 bcm in 2014 (Tagliapietra, 2014). Figure 3.17 indicates the correlation between GDP and natural gas consumption during last two decades (Cagaptay & Evans, 2013; Tagliapietra, 2014; Erdogdu, 2014).

![Figure 3.17 Correlation of GDP growth and natural gas consumption (Rzayeva, 2014)](image)

Natural gas, has a cardinal role in generation of power and other conventional use fields in Turkish energy supply mix; due to Turkey’s strategic position in the region and proximity to the world’s richest natural gas reserves, it is a crucial commodity and has the utmost importance for the Turkey’s energy security (Tagliapietra, 2014). Figure 3.18 indicates the growth in energy consumption from 1980 until 2012 categorized according to type of fuel.
Having the vision of being ranked amongst the top 10 economies by 2023, Turkey is to embark a path of economic transformation in consequent years; as soaring economic growth comes with considerably increasing energy consumption, the energy demand of Turkey will presumably increase as well (Fackrell, 2013).

### 3.3.3 Social

Turkey’s population consists of 77.7 million citizens, with a median age of 30.7 (TURKSTAT, 2014). This makes Turkey the largest youth population compared with EU countries (EUROSTAT, 2014). The average population growth for the next eight years is expected to be 9.7 percent; according to this estimations Turkey will become the largest population in Europe in the following years (TURKSTAT, 2014).

Booming economy and population growth over the last two decades came along with rapid urbanization. Since natural gas is a necessary good for households in Turkey, it also caused a rapid increase in gasification of households. Respectively, sensitivity of gas demand for household to prices remains low. Low elasticity is an indicator that natural gas consumption does not decrease even in a scenario where Turkish economy would decline (Erdogdu, 2010). Thus, one could argue that natural gas for household has become a necessity that will not change in short-term to medium run.
The availability of skilled labour increases the overall attractiveness of the Turkish energy sector (Deloitte, 2013). Turkey has a labor force of over 28.1 million and is ranked as 4th largest labor force in relation to EU countries (The Republic of Turkey Prime Ministry, 2015). Main challenges of Turkey during the last decade were the unemployment level and the lack of proper education system; but with the recent reforms on education system, this situation will be improved and the gap on disharmony between academic and industrial needs will be adjusted.

Turkey initiated programs for fiscal sustainability; reforms on healthcare and pension system are among the goals of current government. Medical insurance, unemployment insurance, work-related injuries insurance and maternity insurance are some of the important social welfare systems that government has been providing. The social welfare system is financed by payroll cuts and the contributions of employers (Datamonitor, 2008).

In energy sector, there have been also social principals also known as state policies regarding changing the consumption patterns, these patterns include:

- Minimizing losses in production, transmission and consumption of any type of energy source as well as preventing the extravagance in consumption. Shortly an “Energy saving program” for energy efficiency.
- While fulfilling the energy needs, protecting the environment and public health and controlling emissions energy production and consumption welded.
- Increasing the utilization rate of the existing power plants with rehabilitation studies and in order to have low cost reliable electricity, improving the current distribution network.
- Developing Research and Development (R&D) studies in the energy field (United Nations, 2002).

Initiatives and investments of the government on constructing nuclear plant as alternative energy affected the society. These initiatives also cause concerns and polarization. Protest were held in the areas where nuclear plants are going to be built. According to a survey that aimed to understand citizen’s preferences regarding renewable energy and nuclear energy in Turkey, it was noted that there was a high level of nuclear opposition in Turkey and, on the other hand, almost two third of the surveyors endorsed the investment in renewable energy sources (Ertor-Akyazi, Adaman, Ozkaynak, & Zenginobuz, 2012).
3.3.4 Technological

Over the past decade, Turkey has been slower in technological developments in comparison to EU and OECD countries. Political measures have been taken to expedite the progress, and therefore gradual increase on expenditures in research and development are on track. The total expenditure on R&D as a percentage of GDP raised from 0.51 in 2004 up to 0.94 in 2014 (OECD, 2015). Despite the increase in comparison to EU and OECD countries, Turkey still remains below the average. To foster a culture of innovation and change the current R&D climate for further development in the technological landscape, the government has been taking several initiatives by encouraging foreign entities, prominent universities and research organizations (Datamonitor, 2008).

Turkey has signed agreements with the EU ensuring an increase in R&D expenditure (Deloitte, 2014). Turkish government is increasing its initiatives for energy efficiency and new energy technologies (European Commission, 2015). The energy R&D is the responsibility of several ministries and their affiliated institutions as seen in Figure 3.19.

![Figure 3.19 Ministries responsible for Energy R&D (European Commission, 2015)](image)

Turkish Science and Technology Research Institute estimates an expenditure of the EUR 42.5 million of the government in energy sector R&D over the next 10 years. The present annual budget for energy R&D is about EUR 7.8 million (European Commission, 2015). The Table 3.11 below shows the main energy research programs in Turkey.
### Table 3.11 Main energy research programs in Turkey (European Commission, 2015)

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Budget</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and Development Projects support Program (ENAR)</td>
<td>MENR</td>
<td>EUR 21 Million*</td>
<td>2010-2014</td>
</tr>
<tr>
<td>TTGV* R&amp;D Projects Support Program Technology Development Project Support</td>
<td>TTGV</td>
<td>Up to EUR 771 000</td>
<td>Ongoing</td>
</tr>
<tr>
<td>TTGV Environmental Projects Support Program- Environmental Technologies Support</td>
<td>TTGV</td>
<td>Up to EUR 771 000</td>
<td>Ongoing</td>
</tr>
<tr>
<td>TTGV Environmental Projects Support Program- Energy Efficiency Support</td>
<td>TTGV</td>
<td>EUR 77 000 - 771 000</td>
<td>Ongoing</td>
</tr>
<tr>
<td>TTGV R&amp;D Projects Support Program- Advanced Technology Projects</td>
<td>TTGV</td>
<td>771 000 - 2.31 Million</td>
<td>2010 onwards</td>
</tr>
</tbody>
</table>

*TTGV: Technology Development Foundation of Turkey.  
**ENAR Supports a maximum of 80 percent of the project budget.  
***TTGV supports maximum 50 percent of the project.

Technologies in the field of renewables, such as waste processing and greenhouse gas reduction, are also among Turkey’s energy strategies. This new type power generation is as critical and important as all the renewable energy sources. A number of measures and regulations that are in effect, or will be soon included; such as lowering carbon emissions, increasing generation/transmission efficiency and the promotion of the waste management technologies usage (The Republic of Turkey Prime Ministry, 2015).

The Ministry of Energy and Natural Resources (MENR), in its strategic plan for 2015-2019 refers to the establishment of infrastructure for production, import transmission, storage and distribution, the management of the and the management of the demand, as key components to the energy security. In order to avoid bottlenecks the necessary infrastructure including an extensive system of pipeline, refineries, receiving terminals and storage units must be present. Currently Turkey lacks adequate gas storage capacity and gas pipeline network (Winrow G., 2014; T.C Enerji ve Tabii Kaynaklar Bakanligi, 2015).

MENR states that Turkey has an important potential on energy production and heat generation from solar, wind, hydroelectric, geothermal, biomass, wave and stream energy sources as renewable energy. Though actually, this potential is not being realized completely as there is a necessity for improvement in financing, amendments to regulations and legislations, reinforcement to the transmission infrastructure and an increase in the awareness of the investors (T.C Enerji ve Tabii Kaynaklar Bakanligi, 2015).
3.3.4.1 Turkey’s Strategic Energy Plan for 2023

The government plans to launch a number of large-scale investment projects in the energy sector, including construction of nuclear plants. The current government, among other economic targets, aims the realisation of such energy plans by the centennial anniversary of foundation of the Turkish Republic in 2023. The ambitious vision for 2023 has the following targets set by the Turkish Prime Ministry (2015):

- Increasing the installed power generation capacity to 120 GW
- Establishing an energy stock exchange
- Addition of 5 bcm underground natural gas storage
- Generating 30 percent of energy from renewables
- Increasing the share of renewables to 30 percent
- Maximizing the use of hydropower resources
- Increasing the installed capacity based on wind power to 20,000 MW
- Installing power plants that will provide 600 MW geothermal and 5000 MW solar energy
- Extending the length of electricity transmission lines to 60,717 km
- Reaching a power distribution unit capacity of 158,460 MVA
- Extending the use of smart grids
- Commissioning of nuclear power plants
- Increasing the coal-fired installed capacity from the current level of 14.5 GW to 30 GW

The main driver of the demand increase is expected to be power generation sector, which depends highly on imported natural gas. As the demand for electricity is yearly expected to grow approximately 6 percent until 2023, Turkey is planning to increase the installed capacity to 100 GW (World Nuclear Association, 2015; Santos, 2015). According to International Energy Agency (IEA) estimations, total final and the total primary energy demand will double the current figures and shall reach to 170.3 and 222.4 Mtoe respectively by 2020. It is also estimated that electricity, natural gas and oil demand will reach 398 to 434 billion kWh, 59 bcm and 59 million tons respectively (Ministry of Foreign Affairs of Republic of Turkey, 2015; Santos, 2015). The share of natural gas in electricity generation is planned to drop from 44 percent to 38 percent, and coal share to increase from 40 to 60 TWh by 2019.
Table 3.12 Strategic Plan at installed capacity by energy sources in Turkey, 2014-2030
(Bloomberg New Energy Finance, 2014)

<table>
<thead>
<tr>
<th>Technology</th>
<th>2014 MW</th>
<th>2023 MW</th>
<th>2030 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Coal</td>
<td>5005</td>
<td>8,755</td>
<td>12,257</td>
</tr>
<tr>
<td>Lignite</td>
<td>9288</td>
<td>16,245</td>
<td>22,743</td>
</tr>
<tr>
<td>Oil</td>
<td>737</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Natural gas</td>
<td>24,672</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Nuclear</td>
<td>0</td>
<td>9,600</td>
<td>12,000</td>
</tr>
<tr>
<td>Hydro</td>
<td>23,660</td>
<td>36,000</td>
<td>36,000</td>
</tr>
<tr>
<td>Geothermal</td>
<td>340</td>
<td>600</td>
<td>1,000</td>
</tr>
<tr>
<td>Wind</td>
<td>4,484</td>
<td>20,000</td>
<td>38,000</td>
</tr>
<tr>
<td>Solar</td>
<td>318</td>
<td>3,000</td>
<td>16,000</td>
</tr>
<tr>
<td>Biomass</td>
<td>153</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Total</td>
<td>68,658</td>
<td>121,200</td>
<td>165,000</td>
</tr>
</tbody>
</table>

The country’s “National Renewable Energy Action Plan” set out by the MENR aims to boost the share of renewables in the energy mix to 30 percent by 2023, adding 61 GW to enable secure energy supply and reduce carbon emissions. The European Bank will assist the plan for Reconstruction and Development (EBRD) (World Nuclear Association, 2015).

Figure 3.20 Projected energy capacity [GW] by source in Turkey, 2014-2030 (Bloomberg New Energy Finance, 2014)

Plans for nuclear power are a key aspect of the Turkey's aim for economic growth, and it aims to reduce its vulnerable dependency on Russian and Iranian gas for electricity generation. As can be seen from Figure 3.20 below, nuclear power is planned to take some share of the natural gas (World Nuclear Association, 2015). Although Turkey does not currently generate any electricity from nuclear power, the government has been advocating...
The rapid growth in energy consumption has caused a range of environmental issues at local, regional and global levels. Also in Turkey, along with energy consumption, carbon dioxide emission have grown (Yuksel & Arman, 2014). Greenhouse gas (GHG) levels in the atmosphere leads to warmer temperatures, and the increase of carbon dioxide levels (CO2) is among other the causes of global warming. Polluting capacity of fossil fuels increases

Table 3.13 Planned and proposed nuclear power reactors (World Nuclear Association, 2015)

<table>
<thead>
<tr>
<th>Plant</th>
<th>Gross MW</th>
<th>Start of construction</th>
<th>Start of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akkuyu 1</td>
<td>1200</td>
<td>late 2016</td>
<td>2023</td>
</tr>
<tr>
<td>Akkuyu 2</td>
<td>1200</td>
<td>2017</td>
<td>2023</td>
</tr>
<tr>
<td>Akkuyu 3</td>
<td>1200</td>
<td>2018</td>
<td>2024</td>
</tr>
<tr>
<td>Akkuyu 4</td>
<td>1200</td>
<td>2019</td>
<td>2025</td>
</tr>
<tr>
<td>Sinop 1</td>
<td>1150</td>
<td>2017</td>
<td>2023</td>
</tr>
<tr>
<td>Sinop 2</td>
<td>1150</td>
<td>2018</td>
<td>2024</td>
</tr>
<tr>
<td>Sinop 3-4</td>
<td>2300</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Igneada</td>
<td>5300</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The third plant, Iğneada, is projected to build after 2023. The bidder for the project have not been chosen yet, however, in October 2015, interim Energy and Natural Resources Minister Ali Rıza Alaboyun stated that Chinese firms and U.S.-based Westinghouse are the potential bidders for the project, while Japanese firms also show interest in the third nuclear plant (U.S Energy Information Administration, 2015; World Nuclear Association, 2015).
with the increasing carbon content. Among others, natural gas is the least responsible fossil fuel for CO2 emissions (Hacisalihoglu, 2008).

Turkey is one of the leaders regarding environmental legislations. It is ranked as ninth among European countries with respect to biodiversity (Datamonitor, 2008). The environmental objectives and policies that focus on environmental issues such as air pollution, biodiversity, chemical substances, environmental health and climate change are among important initiatives in order to lower carbon emissions, increasing generation/transmission, efficiency and promoting the use of waste management technologies (The Republic of Turkey Prime Ministry, 2015).

Despite the initiatives of the government, the environmental pollution is still high. The reasons of the environmental pollution are the rising air pollution, especially in urban areas such as Istanbul and Ankara due to the increasing number of cars, but chiefly the increase in dumped chemicals and detergents (Datamonitor, 2008). Energy generation activities have direct impact on environmental issues. Among the energy mix, renewable energy is the most effective. Turkey has been using very limited portion of its solar, wind and geothermal energy potential (Ustun, 2012). Though, natural gas remains one of lower-carbon hydrogenated fuel (Hacisalihoglu, 2008). Thus, Turkey’s initiative to reduce the pollution remains valid. Reducing the amount of energy is required for an optimum level economic development, supply security and environmental sustainability; in addition, energy efficiency also reduces countries dependency on foreign energy supplies. Thus, energy efficiency plays an important role in Turkish energy policies (Ozturk I., 2014).

During 80’s and 90’s, Turkey initiated the substitution of highly polluting domestic coal with cleaner natural gas. The construction of pipeline in 1986 that carried Soviet natural gas through Bulgaria to the Turkish capital Ankara was mainly to reduce the pollution caused by coal consumption. Other big cities such as Istanbul and Bursa started using natural gas in 1992, Eskisehir and Izmit in 1996 and today natural gas is being used all over Turkey for both residential and industrial purposes (Ozturk, Yuksel, & Ozek, 2011). The greenhouse emission has declined significantly since the introduction of natural gas; however, air pollution in metropolitan areas remains high in comparison to OECD metropolitan areas (Hacisalihoglu, 2008).
Currently in Turkey, 109 mt of CO2e equivalents on life cycle basis is emitted from fossil fuels; however the majority of this emission is due to lignite and hard coal fuelled power generation, despite the fact that natural gas plants generate almost three time more electricity than lignite and five times more in comparison to hard coal power generation (Atilgan & Azapagic, 2015). These results indicate that a reduction of lignite and hard coal fuels from Turkey’s energy mix would result in a significant reduction on environmental impacts caused by the energy sector, including GHG emissions (Atilgan & Azapagic, 2015).

Energy efficiency being among the goals of the Turkish energy policies. The government enacts laws that set principles for energy saving, both at individual and corporate level (The Republic of Turkey Prime Ministry, 2015).

**Table 3.14** Energy efficiency of Turkey in years (Energy Community Secretariat, 2015)

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total primary energy supply (TPES)</td>
<td>105.272</td>
<td>112.212</td>
<td>116.897</td>
<td>116.9</td>
</tr>
<tr>
<td>Total final energy consumption (TFEC)</td>
<td>77.75</td>
<td>81.666</td>
<td>87.326</td>
<td>86.02</td>
</tr>
<tr>
<td>Share (TFES/TPEI)</td>
<td>74%</td>
<td>73%</td>
<td>75%</td>
<td>74%</td>
</tr>
</tbody>
</table>

The measures included for the future energy efficiency in the agenda of the government can be listed as follows; reducing energy losses and decreasing the energy intensity in the energy industry, increasing energy sustainability, reducing the overall energy consumption and decreasing the carbon emissions (Energy Community Secretariat, 2015).

### 3.3.6 Legal

Turkey has an independent judicial system for the maintenance of law and order; the constitutional court is the highest constitutional body regarding legislation in Turkey (Datamonitor, 2008). In recent periods, Turkish judicial system has changed considerably along with the harmonization process of Turkey with the European Union (Aksel, 2013). In order to adapt Turkish constitutional law with EU directives and regulations, in line with the framework of the liberalization of the Turkish energy markets, amendments have been issued in the Turkish energy market legislation (Herdem Attorneys at Law, 2014). Turkish government has been trying to attract investors by encouraging more infrastructure investments that contribute significantly to the country’s economic growth through diffusion of technology, positive externalities and capital inflows. In addition, the government has reduced the basic rate of corporation tax (Datamonitor, 2008).
Particular laws in each field of Turkish energy mix set general principles in Turkish energy market. These laws enlisted chronologically by authors (EMIS, 2014; Sanchez, Francés, & De Arce Borda, 2014) include:

- Electricity Market Law No.4628 (2001)
- The Natural Gas Law No. 4646 (2001)
- The Liquefied Petroleum gases law No.5307 (2005)
- Electricity Market Law (2013)

In 2001 with Electricity Market TEAS, the state owned utility entity of electricity was unbundled into three new companies separating transmission, generation and commercial activities. Same year, the Natural Gas Market Law (the “Law No. 4646”), was introduced right after the Electricity Market Law, which was issued with the decisive purpose of liberalizing the sector (Hacisalihoglu, 2008).

Turkey also introduced three concession models for energy plants as part of restructuring process of the energy sector. These models include; Build Operate and Transfer (BOT), Build and Operate, and Transfer of Operating Rights (EMIS, 2014). The privatization of energy generation assets, coupled with a strategy to clear the way for more private investments, has resulted in an increased share of private entities in the electricity generation sector, from 32 percent in 2002 to 75 percent in 2015. Another step of the government, in order to have a more competitive energy sector, is establishment of energy stock market, which will strengthen the liberalization of the market and help to maintain a balance between supply and demand (The Republic of Turkey Prime Ministry, 2015).

According to Electricity Market Law that was adopted in 2013, EPIAŞ, the energy markets operating company will operate to handle trade in the power market; eventually EPIAS is planned to manage the spot trading in natural gas market as well. In natural gas sector, issues that needs further improvements are: regulatory measures, the unbundling of BOTAŞ and the setting of cost-based pricing mechanism. These improvements would come along with revisions to the Natural Gas Market Law that was adopted in 2001 (Winrow G., 2014).
4. Liberalisation of the Turkish Natural Gas Market

The first legal regulation of the Turkish natural gas market was started by provisional decree Law No. 350, enacted in 1988. By this legal framework, state-owned BOTAŞ was empowered as a monopoly to import natural gas in Turkey. By decree Law No.397, after 1990, BOTAS was totally entitled to manage the natural gas imports along with pricing of the natural gas in the domestic market and the transmission of natural gas in Turkey (Rekabet Kurumu, 2012).

Main bodies in charge of the natural gas activities, secondary legislation, policymaking and monitoring can be listed as;

**TPAO** - Turkish Petroleum Corporation, exploration production and storage, also licensed to sell produced gas from natural reserves to wholesalers and end consumers by permission of EMRA via pipelines or compressed form (CNG). TPAO was founded in 1954 as a state-owned company with the aim of hydrocarbon exploration and production in Turkey (Engin & Tugrul, 2014).

**MENR** – Ministry of Energy and Natural Resources, responsible for legislation and introduction of governmental energy policies and strategies. In alignment with prime minister, the high planning council of MENR outlines the state policy in the energy sector and governmental authority responsible for the energy market in Turkey (EMIS, 2014).

**GDPA** - General Directorate of Petroleum Affairs, which has the duty to set the national policy for petroleum products, grants oil and gas exploration licenses within Turkish soil, and promotes the involvement of national and international companies for the utilisation and exploration of the domestic petroleum and natural gas reserves.

**BOTAŞ** - In 1974, for managing the Iraqi crude oil transportation via pipelines between Kirkuk and Yumurtalik, state-owned BOTAŞ (Petroleum Pipeline Corporation) was established as a subsidiary of TPAO (Engin & Tugrul, 2014). The main incumbent in the Turkish natural gas market is BOTAS.

Since its foundation 40 years ago, the main aim of BOTAS is sustaining supply security of natural gas to Turkey by handling import, export, transmission, exploration, production, storage, wholesale and retail activities. In addition, while expanding the domestic use of
natural gas within Turkish borders, BOTAS has the motives to form an energy bridge between Asian natural gas reserves and European consumption area, in the framework of completion of transit natural gas pipeline projects passing through Turkish soil (BOTAŞ, 2014).

In 1987, there was an expansion of the duties and responsibilities of BOTAŞ. By this new role, BOTAŞ was enabled to import natural gas, handle distribution activities and natural gas sales, and determine the price of natural gas; essentially BOTAS was granted monopoly rights as a state-owned company by this restructuring process.

In Figure 4.1, it is depicted concisely the tasks of BOTAS before the Law No. 4646, natural gas was directly imported solely by BOTAS, responsible for all the value-chain of the industry (BOTAŞ, 2014). From transmission of the natural gas via pipelines to distribution of gas to final consumers, such value-chain creates a substantial burden to BOTAS to be efficient in terms of operational service (Çetin, 2014).

The independence from TPAO was gained after 8 years of initial restructuring of BOTAS, in 1995, in purpose of managing increased amount of natural gas operations cumulated during the years. The activities of BOTAS were extended to:

- Transmission of natural gas via pipelines,
- Construction and maintenance of natural gas pipelines,
- Import and export of natural gas,
- Trading of natural gas transported via pipelines,
- Distribution to final consumers,
- Storage of the natural gas
- Exploration, drilling and production of natural gas

Currently, Gazprom export LLC from Russian Federation, Azerbaijan Gas Supply Company (SOCAR), Nigeria LNG limited, National Iranian Gas Company (NIGC), Enterprise National Sonatrach from Algeria, Qatar and Greece DESFA (Hellenic Gas Transmission Operator) are the trade partners of BOTAS for import and export activities (BOTAŞ, 2014).

**EMRA (EPDK)** – Energy Market Regulatory Authority - EMRA was created in 2001 as a part of reforms of the government with purpose of achieving the transition to competition in energy markets (Sanchez, Francés, & De Arce Borda, 2014). EMRA is the main independent regulatory authority responsible of monitoring the legislation of the legal framework Law No. 4646 and safeguarding the development of a financially sound, transparent, competitive energy market. The tariff approvals and operational licenses are supervised and regulated by EMRA (EMIS, 2014). Even though, EMRA is the independent authority over the Turkish energy sector and it has a financial autonomy, it is associated to the Ministry of Energy and Natural Resource administratively (Çetin & Oguz, 2007).

The regulatory responsibilities of EMRA related to the Turkish Natural Gas market can briefly shortlisted as follows;

- Establishment of a competitive market
- Licensing of new entrants into market
- Regulation of the third party access
- Approval of tariff structures
- Preparation of secondary legislation
- Settling disputes among entities
- To determine eligible consumers
- To perform tendering process (Çetin & Oguz, 2007).

Primarily, in purpose of establishment of a competitive gas market open to new entrants, EMRA ensures the execution and approval of all regulations in the Turkish gas market in accordance to Law No. 4646; in addition it determines and publishes any policies, secondary legislation and new applications related to gas market activities (EMRA, 2012). Thereof, it
is the duty of EMRA to safeguard the execution of rights of the international agreements linked to Turkish Natural Gas market and ensure that obligations are met.

Along with the aforementioned activates EMRA is the main authority to approve the investment plans of third parties prepared for the national gas system. This responsibility extends to assure certain safety and tariff regulations of the future planned facilities. EMRA oversees the price reflected on the consumers calculated by companies future cost projections of the planned investment. These duties are actually is implementation of the Law No. 4646, regulated by EMRA, in order to form a liberalized market open the third parties access. This purpose gives permission to EMRA to organize tenders for the privatization of the natural gas distribution in the cities by licensing third party players (EMRA, 2012).

EMRA is in full charge of regulation, determination and approval of tariffs and price structures in transmission, distribution and storage facilities, as regulated in the Law No. 4646, until there is a sufficient competitive structure exist in the gas market. EMRA is also eligible to decide on tariff revision for the activities indicated in the Law No. 4646. The tariffs required to be approved are: transmission, wholesale, interconnection, distribution, storage and retail sales (Law Business Research, 2015).

Any company to be active in the market for transmission, import, export, wholesale, distribution or storage activities is required to obtain a licence from EMRA; these licenses are granted from 10 years to 30 years. Licensing is another primary duty of EMRA, which consists of; evaluation of a new entrants application depending of the type of license requested provided in Law No. 4646, issuing the license allowing the new entrant to be active in the market, and overseeing of the implementation of such licenses, and termination if need be. These licenses can be regarding to construction, ownership, operation or transportation of natural gas in pipelines or in storage facilities determined by the regulatory framework (EMRA, 2012).

For the licenses EMRA has an incentive based rate of return formulation used for licences, which is set to be adjusted according to inflation rates. The regulatory framework, Law No. 4646 stipulates a fair rate of return for the companies (Çetin & Oguz, 2007). Subsequently, this duty extends to determine eligible customers/consumers of gas, and settling disputes among legal entities and consumers arising from the facilitation of transmission and distribution system. It’s under EMRA’s administrative authority to supervise and investigate
requests, and eventually decides on enforcement of any penalty or sanction (Atiyas & Dutz, 2005). Another notable duty of EMRA is currently regulation and control of activities of BOTAS, until its market share in imports decrease to 20 percent as stated on Law No. 4646.

Activities of the companies on the natural gas market requires to obtain a licence from EMRA. For each type of activity there is a particular license allowing the companies to operate within the limits of the license, the general provisions subjected to the licenses are regulated under the regulatory framework Law No. 4646. Type of licences can be obtained by EMRA are;

- Import (LNG) licence,
- Wholesale (LNG) license,
- Distribution licenses
- Transmission license,
- Storage licence
- Export license
4.1 Regulatory Reform in the Turkish Natural Gas Sector

In 2\textsuperscript{nd} of May 2001, by enactment of the Law No. 4646, the regulatory framework of Turkish natural gas market was restructured in compliance with the EU integration process of Turkey in the context of liberalization of the Turkish energy market (BOTAŞ, 2014). Turkish Authority of Competition (2012), considers the new framework as a reformer law and a milestone of liberalization process of the Turkish natural gas industry. Energy Community Secretariat (2015) recognizes the beginning of the liberalisation of the Turkish natural gas market with the adoption of Law No. 4646 in 2001.

The new regulatory framework, the Law No. 4646, was commissioned with the objective of establishing a competitive and transparent natural gas market by reducing the dominant role of state owned companies in the natural gas sector. The reformer law is in line with accession process of Turkey into EU; developing a liberalized natural gas market in Turkey is an essential step forward for the potential gas market harmonization between EU gas markets and Turkey (BOTAŞ, 2014).

The domestic rules and regulations included in the Law No. 4646 are already approved by IEA, which are in compliance with the EU directives in purpose of forming a harmonized European gas market (EMRA, 2012). According to the official investor’s guide prepared by EMRA (2012), the liberalization progress has been slow in terms of achieving a totally liberalized and competitive market mainly due to BOTAS’s on-going dominant market share and presence in the natural gas sector in Turkey. In order to reinforce the reform, the Energy Market Regulatory Authority (EMRA) was entitled to supervise and stipulate the law while monitoring the market independently (Rekabet Kurumu, 2012).

On the report of PricewaterhouseCoopers (PwC) on liberalisation process in Turkey, it is stated as; “The widespread effects of the natural gas market on the energy markets and the overall economy make liberalization a vital (and political) issue.” (PWC, 2014). Thus, this process should be better investigated in terms of motivation of the liberalisation, the reasons driving the process and the objectives. In Table 4.1, milestones of the liberalization of the Natural Gas Market in Turkey are listed.
Table 4.1 Liberalization timeline in the Turkish natural gas market (PWC, 2014)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MILESTONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>Natural Gas Market Law is adopted.</td>
</tr>
<tr>
<td>2003</td>
<td>EPDK puts first inner-city distribution company on tender</td>
</tr>
<tr>
<td>2004</td>
<td>“The Principles for BOTAS Transmission Network Operation Regulations” go into effect and TPA to the national grid</td>
</tr>
<tr>
<td>2007</td>
<td>The first importer and wholesaler of gas, Shell Enerji starts operation</td>
</tr>
<tr>
<td>2008</td>
<td>Spot LNG imports are liberalized with an amendment to the Natural Gas Market Law</td>
</tr>
<tr>
<td>2009</td>
<td>First Spot LNG import and 3rd party access to LNG terminals</td>
</tr>
<tr>
<td>2011</td>
<td>BOTAS’s 6-bcm import agreement with Gazprom expired</td>
</tr>
<tr>
<td>2012</td>
<td>Four private suppliers receive import licenses from the EPDK after signing supply contracts with Gazprom</td>
</tr>
<tr>
<td>2014</td>
<td>Amendments to Law No. 4646 as Draft Law in commission at the parliament</td>
</tr>
</tbody>
</table>

**4.1.1 Motivation**

The leading motivation of the liberalization of the Turkish natural gas sector according to Safak Herdem, a lawyer in Turkish energy sector are enlisted as:

- Establishment of a transparent and financially stable natural gas market that will operate in a competitive environment
- Ensuring of natural gas supply to consumers in terms stability, quality, competitive prices and sufficient quantities while respecting the environment (Law Business Research, 2015).

**4.1.2 Causes**

The rapid growth of the natural gas demand following the economic growth of Turkey in years, resulted in an exponential increase in energy consumption that left BOTAS alone under massive responsibilities (Çetin, 2014). Introduction of Law No. 4646 in 2001 was an essential reform mainly driven by the following reasons pointed out by Çetin (2014) on his investigation on the regulatory reform in Turkey:
The dominant monopoly presence of BOTAS in the Turkish market was not allowing any third party activities, therefore till the Law No. 4646 the market boundaries was confined by BOTAS in terms of competition (Çetin, 2014). According to Çetin (2014) the main driver that urged a market reform was fundamentally the lack of competition in the market. Predominantly influenced by EU’s energy charter and Turkey’s accession negotiations to EU, the Law No. 4646 was expected to lower the domestic natural gas prices by promoting competition in the Turkish gas market (Law Business Research, 2015).

In addition, it is worth mentioning the fact that, even after the complete market liberalization, dependence on natural gas will remain as the most crucial issue for the Turkish natural gas market. The reformer Law No. 4646 was enacted in order to encourage private companies to import gas independently to aid the natural gas market to meet the ever increasing demand by diversification of supplies, while taking advantage of Turkey’s geographically strategic location between energy rich countries, and its proximity to energy reserves encircling the country (Rekabet Kurumu, 2012).

4.1.3 Objectives

Even though the main objective of the Law No. 4646 is to initiate the liberalisation process to achieve a competitive gas market in Turkey, the underlying aim is to prepare Turkish natural gas market activities for an evolution through modernisation and liberalisation, and set the principles and procedures for potential engaging legal entities in the prospective liberal market (Tennant & Law, 2015). In the literature, since the introduction of the Law No. 4646 and secondary legislation added to the legal framework during the course of
liberalisation, it is stated there are several targets for the future of the Turkish natural gas market (PWC, 2014; Atiyas, Cetin, & Gulen, 2012).

The Law No. 4646 was considered a reform as it is the main primary step that initiated the liberalization process of Turkish natural gas market (Atiyas, Cetin, & Gulen, 2012). According to Atiyas et. al. (2012, p. 69) and PwC (2014) the main objectives of the reform are;

- End the monopoly of BOTAS in the market and reduce the market share of BOTAS
- Unbundling of BOTAS into 3 separate entities for transmission, trading and storage activities
- Allowance of third-party access to the transmission grid
- Set-up legal ground for privatization
- Privatisation of public owned distribution assets
- Setting up competition in the market
- Maintain energy supply security by reducing dependence on Russian gas imports
- Increasing the import competition, encourage private importers to bring in natural gas supplies to aid the increasing domestic natural gas demand
- Transition to cost based pricing
- Establishment of a spot market
- Gas prices to be set in market, by market conditions
- Cap of eligible consumers

By this reformist law, the role and the intervention level of the government were changed, and private sector players were permitted to enter to the market. In other words, as mentioned in Chapter 2, Section “Stages of Development”, by the role of state, the Turkish natural gas market’s transition from birth to growth stage was embarked in 2001.
4.2 Industry after the Reform

As mentioned previously, prior to the enactment of the Law No. 4646, Turkish natural gas market was under total control of state owned, vertically integrated BOTAS. By enactment of statutory and regulatory Law No. 4646, BOTAS’s monopoly privileges in imports, transmission, distribution, storage and wholesales of natural gas in Turkish market was terminated (Rekabet Kurumu, 2012; BOTAS, 2014).

4.2.1 Unbundling

Until Law No. 4646 had entered into force, through the years, BOTAS had operated the natural gas imports, wholesales and transmission activities of the value chain as a legal monopoly, with a vertically integrated structure (Rekabet Kurumu, 2012; Energy Community Secretariat, 2015).

According to the Law No. 4646, BOTAS is set to go under account separation for transmission and commercial activities; and eventually opening the market to competition. Respectively there shall be 3 separate entities for import activities, storage and transmission (Energy Community Secretariat, 2015). The Figure 4.2 demonstrates an outline of the new market structure after the unbundling of the BOTAS in terms of de jure and de facto state of market in order to depict the differences.

The law required BOTAS to reduce gradually its market share in contracts to private parties each year by 10%. The Law No. 4646 stipulates that there shall be a transition period of release of BOTAS contracts in the value chain of natural gas industry, until the market share of BOTAS is decreased to 20% (Çetin & Oguz, 2007). According to Cetin & Oguz (2007) the nature of BOTAS is making the transition difficult as BOTAS has no incentive to follow the legal procedure and is under political influence.
4.2.2 Third Party Access & Network Code

In accordance with the law, BOTAS firstly established a department for the transmission system; subsequently, through this department and in correspondence to Network Code, BOTAS has granted third party access to the transmission system (Rekabet Kurumu, 2012). Following the enactment of the reformer Law No. 4646, for the operational basis of the gas system network, rules and procedures for the transmission system are first published on 10.26.2002 in the official gazette of the state (Rekabet Kurumu, 2012).

Third party access to the market was officially granted in 2nd of November 2002; it took 18 months of transition period after the enactment of Law No. 4646. After this milestone, natural gas sector was opened to competition officially; only after then private companies were allowed to operate in the market; once obtained the licenses required for each natural gas activity (BOTAŞ, 2014).
Though the official framework of the Turkish natural gas transmission network, the Network Code (Network Operation Procedure) has entered into force on 01.09.2004. Under stipulation of BOTAS, the Network Code is compulsory to set the standards of the gas transportation procedures, dispatching and transmission tariffs, and to assess and record the certain rights and obligations of the parties for facilitating the transmission system (Rekabet Kurumu, 2012). On July 2007 AKSA Enerji was named as the first shipper by transporting the gas originated from TPAO Akçakoca Production facilities via national transmission grid (Rekabet Kurumu, 2012).

The steps already taken is considered promising regarding the current transparency of market entry conditions for the third party access, along with non-discriminatory allowance of private players to gas transmission infrastructure and responsibilities of EMRA to extended by secondary legislation in favour of a more liberalized and competitive gas market (EMRA, 2012).

4.2.3 Distribution

Before the enactment of the Law No. 4646, the in-city municipal gas distribution activities were handled by BOTAS in the whole country apart from the 3 main cities of Turkey: Istanbul, Ankara and Izmir. Municipality owned companies and managed the distributions in the main cities: EGO in Ankara, IGDAS in Istanbul and IZGAS in Izmir (Rekabet Kurumu, 2012; Energy Community Secretariat, 2015).

Figure 4.3 Gas distributed regions in Turkey (Deloitte, 2013)
During the period in which the law came into effect, natural gas distribution in the cities in service of natural gas was operated by BOTAS, by the Law No. 4646 the assets and operations were stipulated to be privatized, and for the prospective distribution regions were operated by private companies where EMRA is designated to call for tenders and issue licenses (Rekabet Kurumu, 2012).

In Figure 4.3, the regions indicated in grey and pink are all privatized; in the brown regions the privatisation tenders are concluded. Only the region in red, demonstrating Istanbul, is yet to be privatized and currently under control by state owned IGDAS. By the law, eligible consumers can buy gas from distribution and wholesale companies, while non-eligible consumers are obliged to buy gas only from distribution companies (Deloitte, 2013)

### 4.2.4 Gas Release Programme

Law No. 4646 was adopted to commercially create a liberal market environment, where all relevant players have equal opportunities; state owned BOTAS was mandated to release contracts and transfer the import rights to private companies through tenders. BOTAS is obliged to provide transportation service by the national pipelines, based on tariff models, to any party requesting to benefit from the transmission system (Rekabet Kurumu, 2012). As investigated in Chapter 2, contract release is an obligatory step to be taken, for the establishment of a competitive market environment in natural gas industry. In Figure 4.4 can be seen the lifespan of the current long-term contracts of BOTAS and on Table 4.2 characteristics of the contracts already signed by BOTAS are specified.

| Table 4.2 Long-term contracts of BOTAS, *volumes by private importers |
|------------------|----------------|-------|-------|-------|----------------------|
|                  | Volume [bcm]  | Signed | Start | State  | Termination          |
| Algeria (LNG)    | 4.4           | 1988   | 1994  | Active | October 2024         |
| Nigeria (LNG)    | 1.3           | 1995   | 1999  | Active | October 2021         |
| Iran             | 9.6           | 1996   | 2001  | Active | July 2026            |
| Russia - Westernline | 6         | 1986   | 2011  | Active | 2021*                |
| Russia–Blue Stream | 16       | 1997   | 2003  | Active | December 2025        |
| Russia - Westernline | 4+4*     | 1998   | 1998  | Active | December 2021        |
| Turkmenistan     | 15.6*         | 1999   | -     | -      | -                    |
| Azerbaijan (Phase-I) | 6.6        | 2001   | 2007  | Active | April 2021           |
| Azerbaijan (Phase-II) | 6          | 2011   | -     | 2017/2018 | 2032/2033 |
| Azerbaijan (BIL) | 0.15          | 2011   | -     | Active | 2046                 |
Decreed by the Law No. 4646, by gradual contract release program, the dominant market share of BOTAŞ shall be reduced to 20 percent of the annual domestic natural gas consumption of Turkey; the law removes the entry barriers and allows third party companies to import natural gas in Turkey (Energy Community Secretariat, 2015). Consequently, in 30th November 2005 by a tender for the contract release of BOTAŞ, 4 private companies were granted import licences for a total of 4 bcm by EMRA (EMRA, 2012).

The release program was handled by two methods: release of contract and release of volume. The contract release refers to the transfer of all rights and obligations decreed by the long-term contracts previously undersigned by BOTAS. On the other hand, the volume release means the sale of natural gas imported by BOTAS to the wholesalers at the Turkish natural gas entry points, located by the international borders. On volume release, BOTAS continues to hold the obligations arising from the contracts; whereas on contract release the companies are responsible for all the terms and conditions (Atiyas, Cetin, & Gulen, 2012).
In truth, actual intention of BOTAS was to release of gas purchase contracts from all the suppliers in the time being; including Russia, Algeria, Nigeria and Iran. Unfortunately, none of the producers agreed to sell directly to private companies, as the contractual purchase price would had been lower than the prices settled on the contracts already signed with BOTAS. Eventually, only Gazprom of Russia came to in to terms with an agreement. In line with Gazprom, BOTAS followed the method of contract release for the companies, which are demonstrated in Table 4.3 (Rzayeva, 2014).

**Table 4.3** First contract release in 2007 & volumes transferred (EMRA, 2012)

<table>
<thead>
<tr>
<th>Company</th>
<th>Volume mcm/year</th>
<th>First Flow</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell Energy</td>
<td>250</td>
<td>2007 - April</td>
<td>2021</td>
</tr>
<tr>
<td>Bosphorus Gaz Corp.</td>
<td>750</td>
<td>2009 - January</td>
<td>2021</td>
</tr>
<tr>
<td>Enerco Energy</td>
<td>2500</td>
<td>2009 - April</td>
<td>2021</td>
</tr>
<tr>
<td>Avrasya Gas</td>
<td>500</td>
<td>2009 - April</td>
<td>2021</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4000 (4 bcm)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After 2 years from the first transfer of long-term contractual rights of gas imports of BOTAS to private companies, on December 2007, Shell Energy delivered the first quantities from the WesternLine and was entitled as the first private company to import gas in Turkey (EMRA, 2012). Considering the first third party access to national transmission grid from AKSA Enerji and the first flow of private imported gas into the domestic market by Shell, Turkish Authority of Competition (Rekabet Kurumu, 2012) refers 2007 as a milestone in the Turkish gas sector, and a fundamental step in compliance with the EU integration process as well.

On 2009 January the 3rd, the first imported gas flow of Shell Energy was followed by Bosphorus Gaz Corp. along with Enerco Enerji Sanayi ve Ticaret and Avrasya Gaz, where they exercised the first flow on 1 April 2009. Aforementioned private companies were to be the first to facilitate the gas system to import and to supply end consumers with imported gas in Turkish gas market after many years of BOTAS monopoly (Rekabet Kurumu, 2012).

In 2011, upon the termination of the first natural gas supply agreement of 6 bcm, signed in 1986 with Russia, instead of contract renewal with Russian Gazprom, it’s been decided to release the contract to private companies. By the end of December 2011, a total volume of 6 bcm was contracted to the companies, as demonstrated in Table 4.4. Even though the contract release was organized for the gas imports from the Western Line entry point, the
first intention was to tender 6 bcm of the total capacity of the Blue Stream pipeline, connected to Turkey from the Black Sea shores. However, Gazprom refused the bids of the private companies and the tender was cancelled. The negotiations were brought back to agenda, following the termination of the first contract between Gazprom Export LLC and BOTAS signed back in 14 February 1986, the old contract was renewed granting import volumes to private companies as stipulated in the framework of Law No. 4646, in accordance with the old terms of the prior contract with Gazprom (Rzayeva, 2014).

It should be noted that, the total sum of release contracts concluded so far adds up to 10 bcm of yearly imports. Also, another fact is all volumes can be transported only from the Malkoclar Entry point of the Western Line pipeline and contracts are binding all private companies to import solely from Russia’s Gazprom.

**Table 4.4** Second contract release in 2011 & volumes transferred (EMRA, 2012)

<table>
<thead>
<tr>
<th>Company</th>
<th>Volume mcm/year</th>
<th>First Flow</th>
<th>End of Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akfel Gaz</td>
<td>2250</td>
<td>2012</td>
<td>2043</td>
</tr>
<tr>
<td>Bosphorus Gaz Corp.</td>
<td>1750</td>
<td>2012</td>
<td>2043</td>
</tr>
<tr>
<td>West Line</td>
<td>1000</td>
<td>2012</td>
<td>2036</td>
</tr>
<tr>
<td>Kibar Enerji</td>
<td>1000</td>
<td>2012</td>
<td>2043</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6000 (6 bcm)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The last tender ever held by BOTAS was in May 2011, for the contract release on the Blue Stream pipeline. Even though EMRA prequalified six companies, the tender was cancelled as the applications were not corresponding to the tender criteria (Energy Community Secretariat, 2015).

**4.2.5 Monopoly of BOTAS**

The dominant presence of BOTAS in the Turkish natural gas sector is hampering the competition in the market; even EMRA warned BOTAS to impose penalties in case BOTAS would not reduce its market share by 10 percent every year as decreed by Law No. 4646 (Çetin, 2014). Though according to Rzayeva (2014) this initiative didn’t have any substantial effect on implementation of the transfer of the contractual rights to other companies. Moreover, even though as stipulated by Law No. 4646, BOTAS was not allowed to ink a new contract for gas imports, in 2008 AKP government has changed the law just to allow BOTAS to sign a new contract with Egypt (Çetin, 2014).
The dominant position of BOTAS in the market is not only due to internal policy but influenced by external forces to a certain extent as well creating entry barriers in the market (Atiyas, Cetin, & Gulen, 2012, p. 74). As stated previously, BOTAS was not able to release its contractual rights to private companies because of the confidential terms of the long-term contracts signed between BOTAS and supplier countries, which were not allowed to be examined by the private companies. During the contract release programmes, there was reluctance of the suppliers to renegotiate the contracts and agree with the contract release to private companies. The already signed contracts includes security clauses guaranteed by Turkish Treasury of the state, thus supplier countries did not give consent to private companies (Atiyas, Cetin, & Gulen, 2012, p. 74).

Decreed by Law No. 4646, the total volume of imported natural gas by a company into Turkey annually cannot exceed 20% of the total national gas consumption in a year, such consumption quantity is to be designated by EMRA. However, as seen in Figure 4.5 the total share of imports in 2014, BOTAS holds 80% of market share.
4.2.6 Gas Prices in the Market

In the Turkish natural gas market, as stipulated by Law No. 4646, EMRA is authorized and responsible to regulate and monitor the prices; however, in fact, the tariffs for transmission and wholesale prices are solely set by BOTAS, leaving EMRA no discretionary power and independence over the prices (Çetin & Oguz, 2007; TEPAV, 2009). The statement of Çetin & Oguz (2007) has not altered through the years; still in the market, the wholesale price that is determined by BOTAŞ does not represent the actual cost of the natural gas; which, in truth, is against the regulatory framework requiring to adopt a cost-based pricing mechanism in the market (Çetin, 2014; TEPAV, 2009).

The imported gas prices in the long-term contracts are indexed to oil prices and can be very sensitive due to volatility of the exchange rates between Turkish lira and USD (Çetin, 2014). It was expected of BOTAS to take into account the change of variables in contracts each month or and refresh prices every 3 months depending on the market conditions and taking the average of previous 6 months of oil prices (TEPAV, 2009). Even though EMRA, by the regulation of the legal framework Law No. 4646, obligates to use cost-based pricing for the final gas prices, the government is reluctant to reflect any alteration in the oil prices and exchange rates on the final gas prices (Çetin, 2014).

Until 2008, BOTAS was applying cost-based pricing system, which was requiring BOTAS to update the gas prices monthly with respect to import prices, TRY/USD parity and other variables. Though, afterwards BOTAS started to determine subsidized wholesale prices for distribution companies, eligible consumers and gas fired power plants (PWC, 2014). In Table 4.5, the monthly balancing prices gathered from daily Heren European Gas Markets reports can be seen; such prices are taken as the only reference in the market against the wholesale tariffs of BOTAŞ which are published monthly as well (ICIS, 2016).

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>63.25</td>
<td>63.25</td>
<td>63.25</td>
<td>65.70</td>
<td>65.70</td>
<td>65.70</td>
<td>68.80</td>
<td>73.12</td>
</tr>
<tr>
<td>2014</td>
<td>73.12</td>
<td>75.32</td>
<td>75.32</td>
<td>66.11</td>
<td>67.39</td>
<td>73.12</td>
<td>67.39</td>
<td>73.12</td>
<td>67.48</td>
<td>74.53</td>
<td>79.74</td>
<td>79.74</td>
</tr>
<tr>
<td>2015</td>
<td>76.64</td>
<td>76.64</td>
<td>73.53</td>
<td>68.77</td>
<td>72.93</td>
<td>71.79</td>
<td>63.21</td>
<td>66.41</td>
<td>69.23</td>
<td>61.29</td>
<td>58.43</td>
<td>62.56</td>
</tr>
<tr>
<td>2016</td>
<td>73.53</td>
<td>73.53</td>
<td>65.20</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

From the Table 4.5, it is seen that during second and third quarter of 2013, the monthly balancing price was set indifferent for 3 months period. Following years, the monthly
balancing price started to exhibit volatility. In order to comprehend this fluctuation it should be examined the Brent oil prices and USD/TRY parity, as the import gas contracts include an oil-indexed formula in USD denomination. These dynamics is expected to have a fundamental effect on the domestic gas prices for wholesale tariffs set by BOTAŞ. In Figure 4.6, it is demonstrated the daily Brent oil, and USD/TRY parity starting from May 2013. Such date is chosen, as it is the oldest data could be found for BOTAS monthly balancing prices in Heren ICIS reports for comparison. Since mid-2014 Brent oil has devaluated almost 60 percent till 2016, and Turkish lira showed a similar depreciation against USD around 60 percent.

![Figure 4.6 Daily Brent oil prices and USD/TRY parity](image)

In order to have a better demonstration of the market dynamics, not only the daily Brent oil prices should be taken into consideration but also the actual parameters affecting the imported gas prices should be determined. Even though the details of import contracts are publicly disclosed, from the sources it is known that gas import contracts use a formula to assess the gas price for 3 months period. The formula takes 6-month average of variables of oil prices one month prior to start of 3-month delivery as the main parameter, and the prices are published every first of January, April, July and October (CIHAN, 2016).
In order to acquire a similar pattern of the formula, the daily Brent oil prices taken from Bloomberg were compiled into monthly averages, and an average price has been calculated for previous six consecutive months for the following gas delivery period of 3 months, which will be referred as Brent 613. Consequently, Brent 613 price was calculated, which is a reference price for oil indexed imported gas prices in the Turkish gas market.

In Figure 4.7, the trend of Brent 613 and monthly balancing price of BOTAS against the wholesale tariffs converted in accordingly to monthly average USD exchange are presented. It should be kept in mind that BOTAS applies a fixed wholesale tariff for the sales of natural gas to eligible consumers and distribution companies in the domestic market. In table 4.6, the prices published by BOTAS is demonstrated.

**Table 4.6** BOTAS wholesale tariffs for eligible consumers and distribution companies

<table>
<thead>
<tr>
<th>Consumption &lt;300'000 Scm</th>
<th>Consumption &gt;300'000 Scm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TL/kwh</td>
</tr>
<tr>
<td>Till sep.14</td>
<td>0.07316</td>
</tr>
<tr>
<td>Since oct.14</td>
<td>0.07974</td>
</tr>
</tbody>
</table>

**Figure 4.7** Brent oil 6 months average for delivery period and BOTAS prices in the market
From the Figure 4.7, it can be concluded that the decreasing trend of Brent is more aggressive than the depreciation of lira against USD that is affecting the lira denominated monthly prices in the domestic market. It is also seen that the monthly balancing price in USD is generally higher than the wholesale tariffs of BOTAS in USD until the end of 2014, which means that private companies had to balance their positions for a higher price than their selling price. It is important to mention the fact that by the distribution companies and eligible consumers are obliged to buy the gas from the cheapest source in the market; thus, private wholesale companies for their own pricing take the wholesale tariff of BOTAS as a benchmark (PWC, 2014). After 2015, it can be noted that the monthly balancing price of BOTAS remained lower than the wholesale tariffs, naturally following the depreciation of Turkish lira against USD.

The reason for subsidizations, according to Çetin (2014) natural gas in Turkey is treated as a political good by the government. Since BOTAS charges the end consumers with subsidized pricing, according to ex-minister of MENR Yildiz, Turkey has lower prices than most of the EU states (PWC, 2014). Winrow (2014) describes the situation as follows; “Through a complicated arrangement in which different prices are charged by BOTAS to various customers, the state-owned entity pays a high price for imported gas which is sold at subsidized prices to households with the government then forced to reimburse BOTAS.” The dominant presence of BOTAS as a monopoly on the market, allows subsidisation of the prices that can be only sustained over its legal body (Çetin, 2014).

Subsidized gas prices by the government is fundamentally against the objective of the Turkish natural gas market reform. Eventually, due to the discrepancies between the oil-indexed prices of the long-term contracts and the manipulated price by the government, BOTAS ends every year substantial duty losses on its balance sheet, generating a huge deficit in the national economy (Atiyas, Cetin, & Gulen, 2012). In 2013, BOTAS was accounted for 2 billion USD of loss, and rising energy costs and depreciation of lira widened the gap to 7 billion USD in 2014, as announced by the Ex-minister of MENR (Winrow G., 2014).

On the market, there is no transparency of the actual reflection of the contractual gas prices on the final consumer price determined by BOTAS (Atiyas, Cetin, & Gulen, 2012). The position of BOTAS in the market is absolutely halting the market reform and conflicting with the regulatory authority EMRA’s responsibility of determination of market prices.
(Çetin & Oguz, 2007). Consequently, according to Winrow (2014) the market is distorted further; private companies are purchasing gas from Russia at a cheaper price in USD, and they are obliged to sell this gas in the domestic market at regulated prices in TL. The tariffs are set by BOTAS; and subsidized prices according to tariffs of BOTAS for distribution companies and eligible consumers are taken as benchmark by the private wholesale companies for pricing (PWC, 2014). As a result, by depreciation of lira against USD, private importer companies suffered to sell gas purchased in USD at a capped lira denominated wholesale price on the domestic market (Winrow G., 2014).

Every individual import contract has been concluded with a different pricing structure, though BOTAS has never revealed the pricing structure. Even though the import contracts for natural gas, are not publicly disclosed by BOTAS because of the confidentiality clauses, according to unofficial sources there are speculative prices could be considered valid for the real price paid for the imported gas by BOTAS. Among all other supplier countries Iranian gas is known as the most expensive gas purchased by BOTAS, and several times Turkey has applied to International Court of Arbitration for the unjust pricing of the Iranian gas, where Turkey was awarded a compensation (Rzayeva, 2014). In Table 4.7, non-official prices of the imported gas gathered from newspapers and other sources are demonstrated.

| Table 4.7 Imported gas price USD/ 1000scm (Rzayeva, 2014) |
|-----------------|--------|--------|--------|
| Country         | 2012   | 2013   | 2014   |
| Iran            | 530    | 507    | 487    |
| Azerbaijan      | 354    | 349    | 340    |
| Russia          | 445–446| 428–429| 418    |


The connection between BOTAS tariffs, the impacts of decreasing global oil prices and the depreciation of lira against USD could be evaluated more comprehensively, only when the imported gas prices are examined as well. The data provided in the Table 4.7 has been taken as a reference, and a yearly average price is calculated by the weighted average of the import volumes from the respective countries. As a result, a yearly average of 421 USD/1000scm for 2013 and 434 USD/1000scm for 2014 has been estimated. For the estimation of the monthly imported gas prices, a simple oil-indexed formula is used, linked to the monthly Brent 613 prices in USD; and then the formula was calibrated according to the estimated yearly import prices compiled from the data of Table 4.7 to match the average of monthly...
assessments. Finally, the prices were converted into Turkish lira in order to compare with the official BOTAS monthly balancing prices and wholesale tariffs. The resulting data has been sketched into Figure 4.8; all data used and calculated values can be found in Annex.

![Figure 4.8 Estimated contractual gas prices against domestic market prices in TL/MWh](chart.png)

Even though it is a very raw estimation, Figure 4.7 present a monthly view of the market in terms of prices. It gives an image of the market to comprehend the prices and subsidies argued in this section. It can be argued that, until the end of 2014 BOTAS was making loss as the monthly prices in the domestic market are way lower than the estimated import price. After 2015 due to the decrease in oil prices, it can be concluded that oil indexed prices favoured a drastic decrease in the imported gas costs. Since these prices in Figure 4.7 are in TL, it can be said that, even if the wholesale price is in TL and the purchase price is in USD, the devaluation of the Turkish lira did not have much of a negative impact in the market. As BOTAS continues to apply the same tariffs for wholesales of gas, it is claimed by sources in the sector that BOTAS is compensating the losses of prior years by not reflecting any price changes in the industry (CIHAN, 2016).

As final words, the absent transparency of the real prices in the market is a vast obstacle for the private importers as their contractual price for the imported gas remains higher than the offered prices of BOTAS in the market, impeding the competition (Çetin, 2014).
4.2.7 LNG

In search for diversifying the supply security and increasing flexibility the procurement of gas, in 1994, Marmara Ereğli LNG terminal was commissioned as a property of BOTAS; and the first LNG supply vessels started to embark from Algeria. In 1999, a long-term LNG agreement was signed for Nigerian originated gas. The second LNG terminal, Aliaga LNG terminal, was constructed by the Aegean Sea coast, near the 3rd largest city of Turkey Izmir in 2006; it is privately owned by company EgeGaz (Rekabet Kurumu, 2012).

Until the secondary legislation dated in 26 July 2008, LNG activities was solely managed by BOTAS and there was no clauses specifying or regulating the LNG activities in the regulatory framework. Law No. 4646 was amended to grant permission to private companies to import LNG on contract and spot LNG cargoes without any limit. In which EgeGaz is currently the only player due to the non-competitive pricing of disclosed prices of BOTAS in the domestic market, which is not favouring a good price for the companies to sell the imported LNG (BOTAŞ, 2014).

**Figure 4.9** LNG import shares of EGE GAZ and BOTAŞ (EPDK, 2015)
4.3 Future Outlook of the Turkish Natural Gas Market

4.3.1 Liberalized Market Structure and the Draft Law

The Law No. 4646 is statuary and regulatory framework envisioned a liberalized natural gas value chain, comprised of exploration, production, transmission, distribution, storage, import, wholesale and retail activities open to third party access (Deloitte, 2013). Currently, the aim has been accomplished to a certain extent; since Turkey’s natural gas demand is sustained by import due to the limited domestic reserves and scarce production, import companies will play a tremendous role in the physical process of the natural gas once dominant role of BOTAŞ on imports is reduced (Energy Community Secretariat, 2015).

In order to meet the changing needs of the natural gas market on the process of the liberalization, the draft law that offers complete adjustments to the Law No. 4646 was commissioned to the Parliament on 4 August 2014 (Voyvoda & Basgul, 2014). The Draft Law introduces significant amendments to meet the changing needs of the natural gas market and achieve the target of market liberalization.

By the future market structure seen in Figure 4.10, natural gas suppliers are the international producers exporting gas via pipelines or LNG, the role of supplier is then undertaken once the imported gas is transported domestically by private importer companies and wholesalers.

![Figure 4.10 Market value chain of Turkey after unbundling (Deloitte, 2013)](image-url)
The law enables import companies to sell natural gas to wholesale companies, end consumers and distributors, once provided 10% of natural gas imported annually by the company into the storage facilities for security measures. All the regulation and issue of licenses and tariffs and agreements are to be contracted and supervised by EMRA between the companies and the storage company (Tennant & Law, 2015).

4.3.2 Main Amendments included in the Draft Law

The main amendments can be enlisted in brief titles as follows:

- **Unbundling of BOTAŞ**
  
  The Law No. 4646 stipulates the activities to be legally unbundled into three different business segments; wholesale and trade activities, transmission activities, storage activities. Requiring an autonomous Transmission system Operator (TSO) to manage the national transmission network infrastructure and operate in the system separately. On the last amendment draft, of the Law No. 4646, deadline for unbundling of BOTAŞ is set to 01.01.2015 (PWC, 2014). Though it is not yet been realized (Energy Community Secretariat, 2015).

  The Draft Law prohibits BOTAŞ from the following;

  i. Entering into new natural gas purchase agreements (excluding LNG) until its import share falls to 20 percent of the national consumption, as required in the Law No. 4646.

  ii. Entering into new gas sales agreements other than contracts with gas distribution companies or for those executed to meet its last resort supply obligations (Voyvoda & Basgul, 2014).


- **Increase in import competition**

  One of the most important aim of the Law No. 4646 is to decrease gas imports of BOTAŞ to 20 percent of total consumption by transferring contracts and volumes to private companies. Additionally, one of the provision in the Law No. 4646 was forbidding the private investors importing pipeline gas from countries that already have a supply agreement with BOTAŞ. In the draft amendments this provision has been eliminated (Voyvoda & Basgul, 2014).
Furthermore, another matter is the necessity to receive specific import licences for each import contract and separate export licenses in case the company is re-exporting some of its supplies. According to report of PWC (2014), companies should be allowed to engage with one licence for both import and export without any limitation on source and route of the supplies.

➢ Introduction of New Market Activities: LNG
In 2010, the terms and conditions for access to BOTAS and EgeGaz LNG import terminals were published; however at the moment the operation of LNG terminals are defined within the scope of storage activities. For potential private investments more effective third-party access regime is needed in transmission, storage and LNG terminals to progress. LNG imports are allowed to BOTAS and to private market actors. As the regulation stipulates, once a LNG import licence acquired from a supplier country, the importing entity was permitted to import from various other countries as well (Energy Community Secretariat, 2015; Rekabet Kurumu, 2012).

Under the Draft Law, operation of LNG terminals is regulated as a distinct market activity under a separate license. The Draft Law provisions necessitate all storage capacity to be made available to third parties on an impartial and equal basis. Tariffs of LNG terminals will be determined independently by the EMRA according to its terms and conditions.

➢ New Tariff Categories
The draft law proposes (i) LNG terminal operation tariff; (ii) system usage tariff; and (iii) ultimate source supply tariffs (Voyvoda & Basgul, 2014).

➢ Establishment of a Natural Gas Spot Market
Energy Markets Operation Company, EPİAŞ, will be established to run intraday and day-ahead power market as stated in the new Electricity Market Law. Power generation companies are influenced by the developments in the natural gas market therefore they demand a spot natural gas market to be established under EPİAŞ. This would provide not only power generation companies but also the potential investors with the reliable price signals and financial products needed for feasibility studies and risk management (PWC, 2014).

Under the draft law, BOTAS is appointed as the national transmission system operator (TSO) responsible for managing imbalances in the system. On the other hand, from market
operations and financial agreements among the market participants, EPIAŞ (Energy Markets Operation Joint Stock Company) and/or Borsa Istanbul (the Istanbul Stock Exchange) will be responsible for the commercial activities. Moreover, in Borsa Istanbul natural gas contracts and derivatives shall be traded (Voyvoda & Basgul, 2014).

➢ **Competition Between Wholesale Suppliers**
One of the provision in the Law No. 4646 prohibits distribution companies to buy more than 50 percent of their natural gas needs from a single supplier. Due to the dominance of the BOTAŞ in the market, this provision was not implemented (PWC, 2014).

➢ **Eligible Consumer Limit**
Current law allows only the eligible consumers to pick their own suppliers once met the 100 tcm/year threshold. The new draft amends the law and abolishes the limit for eligible consumers except for household consumers (PWC, 2014).

The draft law adds categories to the status of eligible consumer under the Law No. 4646; free zones and organized industrial zones user, CNG and LNG users respectively (Voyvoda & Basgul, 2014).

➢ **Amendments Concerning License Applications**
The Draft Law introduces several amendments for the procedures of license applications. The applicants for wholesale licenses will no longer need to certify technical details such as origin of supply and transportation of the natural gas and the storage arrangements (Voyvoda & Basgul, 2014).

➢ **Storage Requirements**
The draft law removes the storage responsibilities of the wholesale companies. Requirements of the wholesale companies will be such:

- Taking the balancing measures that are determined by the Energy Market Regulatory Authority (“EMRA”);
- Providing a security supply during their sale contracts with distribution companies.

In the draft law, the import license holders’ responsibility to hold a security storage of 10 percent of their annual import for 5 years period is unchanged (Voyvoda & Basgul, 2014).
Use of State Lands
The Draft Law grants the actors in the natural gas market beneficial interests, rental rights or utilization permit in relation to their activities on the lands that are owned by or at the disposal of the State or the Treasury by the approval of EMRA (Voyvoda & Basgul, 2014).

Amendments Proposed for Distribution Activities
The Draft Law introduces substantial novelties regarding distribution activities as well. Voyvoda & Basgul (2014) list such novelties as follows:

- Distribution licence holders are required approval of the EMRA in order to sell their distribution networks to another company.
- The restriction that requires the distribution companies to hold only one license in two cities within the country is abolished. The draft law proposes that one licence can be hold for more than one distribution region and the existing distribution regions can be divided into different licenced regions.
- Distribution companies shall decompose their accounts for their distribution and retail sale activities.
- Under the draft law, the tendered distribution licence will be obtained by the participant with the highest bid, however the Law No. 4646 is awarded the most appropriate bid during the tender process for privatization of distribution networks.
- In case, where EMRA confirms that a distribution company is in material breach of its regulatory necessities or the company is incapable to pay its debts, EMRA is authorized to assign new members to executive board of the company. Also collects the monetary amounts corresponding to the default of the company; if it found insufficient, from the dividend of shareholders and, if this is not also sufficient, from the assets of the shareholders, take any other measures that protect consumers and continuity of the services (Voyvoda & Basgul, 2014).
- Privatization of IGDAŞ, The draft law considers that in case of the privatization of IGDAS (Istanbul Gas Distribution Company), the Privatization Administration will be responsible.
5. Critical Evaluation & Discussions

5.1 SWOT Analysis

The dynamics of the Turkish natural gas market define its own distinctive characteristics compared to other natural gas markets; thus, such dynamics should be examined in order to evaluate the attractiveness of the market and the potential competition. In this section, the internal strength and weaknesses of the Turkish natural gas industry are demonstrated together with the possible opportunities or threats that might affect the industry by external factors. In order to have a short yet effective view of the impacts of internal and external forces on the natural gas sector in Turkey, the SWOT analysis is applied. The main reason behind using this simple yet efficient tool is due to the fact that researchers often use SWOT while analysing a sector, to simplify the factors that determine the dynamics of the sector.

SWOT (strength, weaknesses, opportunities and threats) analysis is widely proposed by many in academia as an analytical tool to assert and categorize factors concerning a business both internally and externally (Pickton & Wright, 1998). The theoretical analysis was developed by Harvard Professor Andrews (1971); in order to plot a corporate strategy, he created the SWOT matrix to analyse strength, weakness, opportunities and threats. As he formed the framework, he distinguished two major dimensions named as internal factors and external environment (Andrews, 1971). Pickton and Wright (1998) describe SWOT analysis as follows; “the collection and portrayal of information about internal and external factors which have, or may have an impact on business.”

The essence of this framework is formulating a strategy, while evaluating the attractiveness of an industry and the level of competition within. According to Porter (1985), SWOT is an analysis of a business or a business proposition from the point of the view of the owner or the industry itself. Since strategic planning is not a precise science, SWOT is considered as a pragmatic method to identify and describe the internal and external factors (Porter M., 1985).
SWOT analysis gives a critical view of an industry (Pickton & Wright, 1998). Thus analysing the internal and external factors, arising from facts and dynamics, that shape the natural gas industry in Turkey, and evaluating its liberalisation process and competitive attractiveness could be better realized with this tool.

On the afore-covered chapters, the general overview of the natural gas industry in Turkey and its liberalisation process was investigated; all titles included hints that depict an overall idea of the industry structure and some topics were provided in details, supported with facts and data. All previously gathered information deemed necessary was sorted, then it was attempted to enlist the factors in such an order that fits the framework of the SWOT matrix as seen in Table 5.1.

As a guideline, and to originate additional factors, SWOT analysis performed in the reports of the respectable and reliable authorities in the industry such as BOTAS (2014), TOBB - the Union of Chambers and Commodity Exchanges in Turkey- (2014), IENE -Institute of Energy- (2014) and academic works (Bilgehan & Tugrul, 2014) were partially used as well to enhance the developed SWOT analysis.

Considering the facts, regarding, Turkey’s geopolitical position and its energy policy, natural gas usage in the country, the legal aspects of the industry and its liberalisation process, and the aspects of natural gas supply security for Turkey are all portrayed by the matrix framework of SWOT analysis. As demonstrated in Table 5.1, under the factors strengths, weaknesses, opportunities and threats, the SWOT analysis performed for this thesis work, brings forward the factors to be taken into consideration, while analysing the natural gas market industry of Turkey and its liberalisation process. Then the analysis is further explained and discussed for the points deemed important.

As mentioned more elaborately in Political section of PESTEL analysis from Chapter 3, it could be deduced that the most prominent strength of Turkish natural gas industry is by far its significant geographical position. Turkey’s boundaries extend between continents as a natural bridge; laying on the crossroads of Europe and energy reserve rich countries of Caspian basin and Middle-east, Turkey’s location gives it a geostrategic and crucial position for the transportation of energy commodities, especially natural gas. Europe is seeking for more energy sources to sustain its ever-growing demand and energy producer countries are looking for new routes to deliver the supplies.
Table 5.1 SWOT Analysis of Turkish natural gas industry

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESS</th>
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<tbody>
<tr>
<td>- Latest consumption and growth rate makes Turkey 4th biggest market in European region;</td>
<td>- Supply security, due to scarce reserves and low level of domestic production, high dependency on imported gas, in particular 55% dependency on Russian gas.</td>
</tr>
<tr>
<td>- Supply diversity; Turkey has multiple entry points, 5 pipeline interconnections (1 exit) and 2 LNG terminals</td>
<td>- Market monopoly of BOTAŞ is still existent; remains as the dominant player of the market with 80% share</td>
</tr>
<tr>
<td>- Multiple supplies potential from a wide range of sources</td>
<td>- Government subsidies and pricing policy of BOTAŞ creates an uneven competition in the market.</td>
</tr>
<tr>
<td>- Situated between gas reserves in Middle East and Caspian basin, and consumer countries of the EU as a natural geographical bridge</td>
<td>- Unbundling of BOTAŞ with Law No. 4646 still not realized.</td>
</tr>
<tr>
<td>- Turkey’s positive performance in economy with future prospects and increasing natural gas demand</td>
<td>- Regulatory barriers for import and export of natural gas</td>
</tr>
<tr>
<td>- The base structure of regulatory framework is aligned with the regulatory regime of EU directives</td>
<td>- Lack of flexibility and inadequacy of transmission infrastructure and supply links to meet the peak demands.</td>
</tr>
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<td>- Natural gas is the dominant energy source to generate power in Turkish energy mix</td>
<td>- Insufficient underground storage capacity and limited send-out capacity of the LNG terminals</td>
</tr>
<tr>
<td>- TANAP pipeline under construction, and other ongoing-future projects to enhance the pipeline grid and flexibility</td>
<td>- Non-existence of day ahead and intraday market legislation.</td>
</tr>
<tr>
<td>- Salt Lake underground storage will reinforce the infrastructure to meet the peak demands</td>
<td>- Non-established reference prices that would indicate natural gas markets and lack of liquidity.</td>
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<td>- Balancing platform is being developed for system balancing</td>
<td>- Turkey’s inability to integrate with international natural gas markets.</td>
</tr>
<tr>
<td>- Spot market will be established under EPİAŞ and İstanbul stock exchange</td>
<td>- Regulatory framework not yet implemented completely</td>
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<table>
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<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
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<tr>
<td>- Upcoming further market opening to private investors as BOTAŞ market share reduces to 20%, and eventual upsurge of competition</td>
<td>- As a result of high dependency on imported natural gas, lack of supply security</td>
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<tr>
<td>- Turkey’s effort to maintain the economic and political stability and its role in the region, and continue developments in the direction of liberalization.</td>
<td>- Turkey losing its geopolitical importance due to discoveries in Mediterranean basin and other regions</td>
</tr>
<tr>
<td>- Turkey’s geographical location as a natural bridge for transportation of natural gas, it is a favorable destination for hosting new pipeline projects, such as Turkish Stream</td>
<td>- Proposal of new pipeline routes circumventing Turkey</td>
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<tr>
<td>- EU countries looking for alternative routes to increase the diversity of sources.</td>
<td>- Inability to meet the rising demand of domestic consumption</td>
</tr>
<tr>
<td>- Turkey being determined on taking place in EU</td>
<td>- Possible increase in investment costs due to the global macroeconomic developments</td>
</tr>
<tr>
<td>- The growth on energy demand therefore growth on natural gas demand due to Turkey’s economic growth.</td>
<td>- Possibility of diminishing demand of EU for natural gas</td>
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<tr>
<td>- Increasing tendency of domestic natural gas usage</td>
<td>- Inability of natural gas competing with new energy sources for domestic power generation in Turkey</td>
</tr>
<tr>
<td>- Current investments of additional storage facilities</td>
<td>- Nonfulfillment of liberalization process and unbundling of BOTAŞ to create a competitive market.</td>
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<tr>
<td>- The government incentives on investment projects.</td>
<td>- Political disputes and regional crisis between importer/exporter countries laying on the transit route of Turkey</td>
</tr>
<tr>
<td>- Potential renewal of long-term gas contracts and new deals allowing of re-exportation of the imported gas</td>
<td>- Possible national or international economic crisis; any economic instability might cause fluctuations in exchange rate and interest rates.</td>
</tr>
<tr>
<td>- Turkey’s possibility to get fairly advantageous prices, in comparison to other European markets, from purchasing contracts of the natural gas produced in eastern Mediterranean and Middle-east.</td>
<td>- Possible increase in oil-indexed natural gas prices in domestic market</td>
</tr>
<tr>
<td>- Realization of long-term contract between Turkmenistan and Turkey, and exploiting the proximity to Iran holding the largest gas reserves in the world.</td>
<td>- Obligations arising from international environmental agreements</td>
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<tr>
<td>- Establishment of a liquid exchange market and spot trading of natural gas as a commodity</td>
<td>- Natural disasters or any seasonal and geographical conditions might cause delays on pipeline constructions.</td>
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<td></td>
<td>- Terrorist attracts on national or international petroleum and natural gas pipelines</td>
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Evidently, once the transit of natural gas is considered between natural gas producing countries of the East and energy consumer Europe, the geographical position of Turkey brings into discussion its geopolitical advantage, and as well as Turkey’s role as a significant consumer. As mentioned in the political analysis section, Turkey is in very close proximity to majority of world’s natural gas reserves; and in particular, it should be noted that Turkey is even neighbouring the world’s largest natural gas reserves holder Iran.

In Chapter 3, it has been covered the fact that Turkey is already hosting several international pipeline connections from Russia via land and undersea pipelines, also from Azerbaijan via Georgia, and directly from Iran. Its geographical location is suitable for LNG transport as well, it has a long coastline in Mediterranean basin and the Black sea. Already having 2 LNG regasification terminals, Turkey has long-term LNG supply contracts with Algeria and Nigeria, and frequently accommodates spot LNG cargoes.

All aforementioned facts put Turkey’s geopolitical strategic upper hand into spotlight; as with long-term contracts, natural gas exporter countries could use Turkey’s existing pipeline infrastructure to deliver gas in short distances, with direct interconnections to energy demanding countries, meanwhile meeting the domestic demand of Turkey as well. Also currently, active long-term gas supply agreements with gas exporter countries offer variety of supply sources by pipeline gas and LNG as well. Considering the current pipeline interconnections and existing long-term contracts, Turkey is an attractive destination international pipeline projects, which requires reliability and security for a sustainable gas transit by long-term contracts.

From the geopolitical point of view, Turkey is located in a region where the political dynamics are ever changing, and balances are constantly shifting between countries. Opportunities could easily arise for Turkish natural gas industry, as Turkey takes advantage of its geographical position to gain more importance in the region, which could influence new natural gas supply agreements with favourable terms. In this regards, a remarkable pipeline project TANAP has already commissioned to transport gas from Azerbaijan to Europe while delivering significant volumes of natural gas to Turkey. TANAP is designed to deliver natural gas to EU countries with TAP connection option, which is another international pipeline project, planned to reach Italian shores through Greece and Albania. Additionally, another ambitious project, Turkish Stream, is under discussion; which is to
deliver Russian gas under Black Sea, with interconnection options to EU countries from Turkish borders. Such pipeline projects with international connections, is Turkey’s opportunity to become a regional natural gas hub.

Possible discoveries in Mediterranean basin by Egypt, Israel and Cyprus could make possible new opportunities, only if Turkey uses its geopolitical influence and proposes to host prospective pipeline projects to deliver gas to EU. In addition, there could be new projects to construct pipelines form the reserves of Northern Iraq. Such projects could be further beneficial for Turkey’s domestic market if off-take terms could be included. The energy policy of Turkey is in favour with new energy supply agreements that can meet the demand for the sake of national supply security and for the purpose of boosting the competition in the market.

Turkey already has an integrated gas infrastructure that delivers gas to all its regions, though its technical capacity and reverse flow options are limited. Improvement in the national gas grid, adding more interconnection points with new gas supply contracts and constructing new LNG terminals, while increasing the regasification and storage capacity of existing terminals, are necessary steps to be taken, and would be in Turkey’s advantage. Such future investments in infrastructure, will point out Turkey in the first place for the choice of a host country for prospective international pipeline projects in the region. Once completed, ongoing projects of Salt Lake underground storage and enhancements in the transmission grid is going to provide flexibility in the natural gas infrastructure as well.

As investigated in Chapter 4, “Gas Release Programme” section, long-term gas import agreements of BOTAS are mostly ending by 2021; renewing the contracts with better terms, such as permission to re-export the imported gas, which is prohibited by current long-term contracts, would be an opportunity for Turkey to make a strategic move for the establishment of a regional hub. It will be advantageous for Turkey’s energy security in terms of warranting natural gas supply for the domestic demand and for the upsurge of the competitive trading in the natural gas sector as well. Since the projected future demand technically cannot be met by only renewal of current contracts, as seen on Figure 4.4 in Chapter 4, opportunities might arise for private companies once encouraged and incentivized the new import contracts with new pipeline projects by the government in sake of market opening and competitiveness.
Turkey has a gradual GDP increase year by year, which is in positive correlation with natural gas consumption as discussed in Chapter 3, in economic analysis. Turkey has a vision of being amongst the top 10 economies by 2023, while setting a new energy policy adding nuclear power to the energy mix. By the official figures from TEIAS as mentioned in Chapter 3, “Energy Outlook” section, natural gas fired plants have 38% share of the total installed capacity among all power plants in Turkey; while total share of natural gas in electricity generation is accounted for 48 percent by the official figures of 2014. Even though the possible decrease of natural gas share in the future energy mix could be recognised as a threat, it is evident that natural gas will always remain as a fundamental source in the Turkish energy mix.

In 2001, Turkey had set forth the liberalisation process by adopting the reformer regulatory Law No. 4646; the principles of the law were in line with EU directives and international harmonization of national gas markets. Still under commission in the parliament, there are new amendments to the Law No. 4646, to enforce the unbundling of BOTAS and reduce its market share to 20 percent. As mentioned extensively in Chapter 4, by the enactment of the law it had been aimed the unbundling of BOTAS and termination of its monopoly in the Turkish natural gas industry.

Since the beginning of the liberalization process, there had been several long-term contract release from BOTAS to private companies, however such releases didn’t change any terms and conditions of the previous contracts and didn’t impact the quantities imported contractually in total. By the official figures of 2014, BOTAS still holds 80 percent of the market share in import and wholesales overall.

Subsequently, by the complete adoption of Law No. 4646, the decline of the BOTAS’s market share is expected while leaving more space for private companies; the law enforces BOTAS to reduce its market share to 20 percent and regulatory framework prohibits BOTAS to renew its expired long-term contracts. In terms of opportunities for private companies, it’s highly probable that more contract transfer would take place for private companies to import natural gas. BOTAS’s future gas release program grants potential for the domestic market, it could be envisaged the increase in numbers of private companies in participation, will certainly generate more competition in natural gas trading. So far, the level of implementation of the law is not satisfactory; though the ultimate aim of the law is the establishment of a competitive market, without any entry barriers to private investors.
Opportunities in LNG activities is another discussion point; once the long-term LNG contracts of BOTAS are abolished with Nigeria and Algeria and with further allowances, private companies will have more chance to import LNG cargos independently. Currently, apart from BOTAS, only EGEbaz is able to import LNG cargos, as it owns and operates the Aliaga LNG terminal facilities privately.

Once, more private companies are introduced as importers to the domestic market, and as the eligible consumers are obliged to buy the gas from the cheapest source possible, the competition for favourable pricing would increase, along with the demand for cheaper gas. Such conditions, in fact, would create new opportunities for private companies, and these are essential steps for the transition into a competitive market in basis. It’s worth mentioning that the amendments stipulates the foundation of a spot market under EPIAS connected to Istanbul stock exchange. Once totally implemented the reformer regulatory Law No. 4646, Turkish natural gas market will experience a soaring competition that most possibly benefit the industry and the players within.

The vital weakness of the Turkish natural gas industry is its high dependency on imported natural gas. Almost half of its electricity is generated from natural gas fired power plants, and in addition it has a notable consumption of natural gas by households and industry itself. Natural gas is the preferred fuel for residential use as it is considered relatively cleaner and more environment friendly than other fossil fuels. The natural gas consumption is growing rapidly and Turkey lacks indigenous natural gas reserves, making it 99 percent dependent on imported gas.

Threat of natural gas curtailment resulting in a short to long-term supply shortage is hanging over the Turkish natural gas industry like the sword of Damocles. Even though Turkey has a wide range of supply choices for natural gas, the heavy dependency on imported natural is a threat to the industry in terms of energy supply security. State owned companies of Russia, Azerbaijan, Iran, Algeria and Nigeria supply natural gas demand of the Turkish market. Over the course of 2014, Russia’s Gazprom supplied 55 percent of Turkish natural gas consumption, 18 percent was from Iran’s state-owned company NIGC, and 12 percent arrived from Azeri state owned company SOCAR. In terms of supply security, it should be emphasized that the supplier companies are all state-owned; since natural gas is considered as a political tool as well, such countries may use natural gas as a political leverage and
could possibly threaten Turkey with flow curtailments in times of conflict between the respective countries. Supply shortage in industry, could have negative fallouts not only nation-wise but for the players in the market also.

Risk of political disputes or any regional crisis must be accounted as a threat that could affect the transmission of the natural gas flow, since Turkey is situated in a fragile environment in terms of political stability. Any problem between the supplier countries and importer countries besides Turkey, or any issue e.g. terrorist attacks, natural disasters or conflicts between regional players impacting the production of the supplier countries could lead to an interruption of the transmission flow of the natural gas. As a matter of fact, such scenarios could be catastrophic for Turkey on a major scale since the natural gas industry depends heavily on imported natural gas.

The threat of curtailments brings forth the grand share of imports by Russia’s Gazprom into discussion. By the figures of 2014, following Germany’s lead, Turkey is the second largest consumer of Gazprom’s natural gas imports in Europe with around 27 bcm of intake; which is almost 20 percent of the total exports of Gazprom to EU markets in 2014. Turkey is Russia’s second largest market for natural gas, however the dependency on Russian gas is both a weakness and a threat, as supply shortages and gas flow curtailment risks can have major catastrophic impacts on the natural gas industry and Turkey itself. The imported Russian gas is essentially distributed in highly populated and industrial Marmara region, where the majority of large-scale industry facilities and Turkey’s largest city Istanbul is situated.

In the light of above mentioned facts and also taking into consideration the bounding obligations of take-or-pay clauses included in the long-term contracts, switching from suppliers is quite unfeasible in case of natural gas industry of Turkey. Dominance of Russia’s Gazprom on imports cannot change due to the current design of the existing infrastructure. Westernline pipeline entering via Bulgaria, is delivering gas only to Marmara region and Istanbul. Seeking more LNG cargoes is not a solution as the send out capacity of LNG regasification terminal of Marmara Ereglisi can barely meet the daily demand of the Marmara region itself only. Subsequently, since Gazprom itself is the monopolistic national exporter of Russian natural gas, such aspects leaves Gazprom as the sole provider of natural gas of Turkey’s most populated region Marmara. New pipeline projects are not a quick fix; pipeline construction is not only costly but also requires a long period and a testing phase.
before the commissioning of the uninterrupted gas flow. To be considered as an important threat, in case the imported volumes could not meet the increasing demand in the future by new projects, inevitably the industry will be left with supply shortages.

Supply security can be warranted, especially for the winter period when the domestic demand peaks, by adequate underground natural gas storage facilities. Government offers incentives on investment projects in energy sector. Since the current storage facilities are insufficient, and it’s crucial for the market players to meet the demand of the customers during the supply shortages and peak demand seasons, investments in storage facilities by private companies could be a viable opportunity.

As an important economic weakness, the cost of imported gas is a hefty burden encumbering the Turkish economy; which, in fact, has a substantial impact on Turkey’s already high current account deficit. The long-term contracts of natural gas are oil indexed and USD denominated while, in the domestic market the gas is sold in liras. Since the Turkish lira-USD parity is fragile and due to the fluctuation of oil prices, the cost of natural gas is volatile in the domestic market. The actual contractual price of the imported gas by BOTAS is not disclosed officially to the public.

One of the most important weakness and threat to total liberalisation of the Turkish natural gas industry is the subsidized gas prices offered by BOTAS in domestic market by governmental aid. In essence, such intervention in the market is the reason creating a huge account deficit in Turkey. In brief, the intervention of the government by subsidizing the gas prices set by monopoly BOTAS in the domestic market is a threat for the establishment of a competitive market.

As another considerable threat that must be evaluated is the depreciation of Turkish lira against USD and increase in global oil prices which are linked to the contractual cost of imported natural gas. Further upsurge prices in the market could have negative consequences for the private companies trying to operate in the market. It is also possible that the threat of a national economic crisis resulting in economic instability could have an impact on the gas prices as well. Consequently, unfavourable gas prices in the domestic market convict private importers to make inevitable losses, as the competition is hampered by subsidized prices of BOTAS in the domestic market. As the prices are subsidized in the domestic market by the hand of the government, private companies are forced to compete with BOTAS with same
conditions. As long as the unbundling of BOTAS is not concluded and the steps of liberalisation process continue to be unfulfilled, creation of a competitive market that will favour all the market participants cannot be realized.

On the other hand, opportunities would arise once the liberalisation process continues; in fact, the reformer Law No. 4646 aims to introduce the policy of cost based pricing, to lower the domestic natural gas prices, while promoting competition in the Turkish gas market. Turkey has the effort to maintain the economic and political stability and its role in the region. Once the natural gas price is set in the market and the competition is established, the private players and gas consumers in the market could certainly demand lower prices from the suppliers. By the future market opening, a liberal market environment could attract private companies to invest more in the industry, and take major roles in the industry’s value-chain.

Turkey is determined on taking place in EU, and it is in Turkey’s agenda to establish a competitive liberal gas market in harmony with EU gas markets. Turkey desires to be a regional hub, also plans to be a host country for potential transit pipeline projects delivering gas to EU; however there could be new reserve discoveries and it is certainly possible that the demand of EU countries might diminish and EU could find new supply routes. In such circumstances, any project bypassing Turkey, just like cancelled “South Stream”, is a threat not only for Turkey’s own energy security policies but also for Turkey’s geopolitical importance and significance in the region. Subsequently, in such scenario, Turkey’s aspirations to become a regional hub possibly might not be realized.

Nevertheless, as demonstrated on the Table 5.1 the strengths and opportunities make Turkish natural gas market as an interesting attraction point for investors in the region. There are many opportunities to take as the liberalisation process is still yet to be over. The factors of weakness can be solved and overcome by new agreements and infrastructure upgrades. There are risks both technically and contractually; the most of the external threats are there to remain, as the market demand will continue rising and the current long-term supply contracts will remain valid for years to follow. However, Turkey has significant advantages and could possibly become a regional hub.
5.2 Further Discussions

On Chapter 2, section “Stages of development” of this thesis work, a model developed by respective authorities, representing the evolution of natural gas markets by specific characteristics during certain stages, has been included as a part of literature survey. The Table 2.2, showed these generalized characteristics under four main stages; birth, growth, adolescence, maturity respectively. In order to analyse and discuss the level of competition and the state of liberalisation of Turkish natural gas industry such model is used as a reference.

On early stages of development, the natural gas demand of the market is sustained by long-term gas import contracts; on a mature market, gas can be traded on spot basis depending on the daily demand. In case of Turkey, the long-term contracts are still active and, currently, contract renewals or terminations are not in debate. Even though demand for the natural gas market is constantly growing, it is not as aggressive as on the beginning of 2000s.

Infrastructure is becoming more flexible with the investments for upgrades and modifications to the pipeline grid and storage facilities; though, it is not yet adequate to meet the peak demands and manage reverse flows. There are ongoing projects for new underground storage facilities and international pipelines, while new projects are being proposed. Natural gas is distributed to almost the whole regions of the country and privatization for distribution had taken place.

Due to the terms of the long-term contracts, the natural gas price is indexed to oil; it is not yet switched to cost-based pricing nor is the price not determined independently in the market. Even though third party access is granted to the pipeline grid, the level of competition is not adequate for a mature market. There are many private players in the market but the total share of the private companies is only 20%. Transparency of information flow in the market is not apparent yet. These are all common characteristics of a natural gas market on a growth stage.

In terms of wholesales market and trading, the industry is still in transition stage from birth to growth as the natural gas trading in the market is limited. The current value-chain of Turkish natural gas industry is just allowing a churn rate of 1 to 3; the imported gas by BOTAS or private importers is directly delivered to end consumers or via distributors.
Trading occurs only when wholesale companies purchase gas from importer companies in order to sell to distributors or end consumers. Short-term trading on a daily basis is not present yet as the current system balancing and infrastructure of the market is not supporting daily trading activities of companies. The progress to establish a natural gas trading platform by EPİAŞ under Istanbul stock exchange is currently ongoing.

By this thesis work, it had been attempted to shed light on the dynamics governing the prices of contractual imported gas, and also the prices of the natural gas traded in the domestic market. As mentioned in the “Gas Prices in the Market” section, the terms of the long-term contracts defining the conditions of the imported gas, are not publicly disclosed by the main incumbent BOTAS. In the sector it is known that BOTAS applies subsidized prices by government in the domestic wholesale market; even though it is not published legitimately, it’s been informed that the contracts concluded contain oil-indexed pricing formulas which is common with long-term contract and the imported gas price is USD denominated by respectable authorities. In addition, sources in the sector and press publishes average purchase price paid for imported gas by BOTAS. The only price published publicly by BOTAS is the wholesale tariff for eligible consumers and distribution companies for the domestic market, which is fixed in Turkish lira. The second set of data analysed in this thesis work, is the monthly balancing price published by BOTAS which is made available only to market players and it’s taken as a reference for monthly prices.

Since the global oil prices are in a decreasing trend and TL is depreciating against the USD year by year, the consequences in the domestic market has been investigated. Despite the fact that USD is appreciating against TL, due to the effect of low oil prices, it’s been portrayed that the gas prices are in decline in the domestic market. Though, since the actual import prices are not published, for the sake of satisfactory argument, a rough estimation for monthly BOTAS import prices has been conveyed. A simple oil index formula is developed to estimate the import prices and it is compared to the monthly balancing price and regulated tariffs. It’s been demonstrated that the domestic market prices applied by BOTAS had been lower than the estimated purchase price till end of 2014. Since the fixed tariffs are not updated, and the oil prices decreased tremendously by 2015, it’s been shown by Figures 4.7 and 4.8, that the BOTAS’s import prices are formulated lower than applied tariffs. Such findings are in line with the sources claiming that BOTAS has government aids and latest low oil prices are exploited to compensate the losses made in previous years.
6. Conclusion

The main purpose of this thesis is shedding light on the dynamics of the Turkish natural gas industry, and investigating its liberalisation process while providing useful facts and practical information, regarding Turkey and its energy sector from general a perspective.

Firstly, a literature survey is performed for investigating the general structure of natural gas markets and the liberalisation process, starting from the initial reforms to the foundation of liberal markets. It’s been also investigated the categorization of certain characteristics that are observed during the evolution of a liberalized market, from the initial birth to maturity. Subsequently, such study provided a guideline to examine the right aspects of the liberalisation in the Turkish natural gas industry.

Thereafter, the energy outlook of Turkey in terms of its energy mix by different energy sources for power generation has been presented; it has been attempted to lay emphasis on the indispensable role of natural gas in electricity production. Then the Turkish natural gas industry itself has been analysed by technical specifications of its infrastructure, while providing the latest official information reported; regarding total imports, consumption rates, and usage fields. Afterwards, PESTEL analysis has been implemented for getting a macro perspective on Turkey itself and its energy sector in general. The analysis has been provided with facts and data regarding Turkey’s energy policy, socio-economic conditions, and its energy strategies, and with many other beneficial information deemed necessary to better comprehend the certain aspects in Turkey and the natural gas industry as well.

Particular attention was given to the liberalisation process of Turkish natural gas market. The enactment of the reformer Law No. 4646 in 2001 and the new market structure stipulated by the law has been examined. The current adoption state of the law, the competition level, and market opening during the course of liberalisation process has been evaluated. The gas release programme, present monopoly of BOTAS, and gas price dynamics has been conveyed to demonstrate the deficiencies of the liberalisation process in the industry. Subsequently, the amendments still under discussion in the parliament were provided to point out the future direction of the industry and the liberalisation process.
Finally, SWOT analysis has been performed for the critical evaluation of the natural gas industry of Turkey. The internal strengths and weaknesses has been expressed as factors, along with potential opportunities and threats might have positive results and negative consequences in the sector. It’s been evaluated the Turkish natural gas market’s current stage of development and the market prices of BOTAS as further discussions.

Some concluding remarks about the liberalisation process and the future of the industry; laying the legal foundations of Turkish gas market, reformer Law No. 4646 was a prominent step for the liberalisation of the market and market opening. The aim had been restructuring the market establishment an international natural gas market in Turkey as gas trading hub by allowing private companies to be involved in the market activities. Even though considerable steps are taken in the liberalisation process, BOTAS still preserves a monopoly on the national natural gas transmission network while being the main authority over the natural gas value chain and pricing of the natural gas in the domestic market.

As final verdicts, it could be said that, once realized the complete adoption of the Law No. 4646 and liberalization of market, by reduction of the market share of BOTAS after its eventual unbundling, more contractual rights of import agreements will be transferred to private companies. Eventually, natural gas imported by private companies will be the gateway to many business opportunities and further development of the Turkish natural gas industry. Nevertheless, the regulatory framework is already aligned to EU directives and future amendments are under discussion in the parliament; which will allow compatibility to international connections and harmonization with other natural gas market.

In conclusion, by this thesis work it is been shown that Turkish natural gas industry is still in the growth stage. The liberalisation process initiated by enactment of Law No. 4646, which envisages the competition in the market is yet to be complete. Albeit the fact that the liberalisation is still not actualized entirely, and there is a monopoly, the market will offer opportunities for private companies in the future. It can be concluded that Turkish natural gas industry possess a potential, and could become a regional hub.
Bibliography


PWC. (2014). Liberalizing natural gas in Turkey. PWC.


TURKSTAT. (2014). Ankara: TURKSTAT.


Winrow, G. M. (2013). The southern gas corridor and Turkey's role as an energy trasit state and energy hub. *Insight Turkey*, 145-163.


### Annex

**BOTAŞ Monthly Balancing**

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