UNIVERSITY OF LJUBLJANA
FACULTY OF ECONOMICS

MASTER'S THESIS

AN ANALYSIS OF THE TURKISH ELECTRICITY MARKET

Ljubljana, September 2015 TANJA MIMOVIĆ

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INTRODUCTION

The 20th century saw a rapid increase in population as well as industrialization. This resulted in a huge demand for energy across the world (Baris & Kucukali, 2012, p. 377). Global total net electricity generation reached 17,331 terawatt hours (TWh) in 2005 and is projected to increase to 39,034 TWh in 2040 at a growth rate of 2.2% (2010–2040), as reported in an International Energy Outlook 2013 reference case (U.S. Energy Information Administration, 2013). In the same reference case, global energy consumption (liquids, natural gas, coal, nuclear and other) is projected to grow at a rate of 1.5% in the period 2010–2040.

Data regarding the Turkish electricity market is comparable to the upward global electricity generation trend. Electricity generation in Turkey totalled 162 TWh in 2005 compared with 240 TWh in 2013. This is a 50% increase in the period 2005–2013 (TurkStat, 2014). The country's electricity demand has historically been high, except in 1999 when Turkey suffered a devastating earthquake, and in 1994, 2001, 2008 and 2009, years in which the country faced a severe economic crisis. An increase in electricity demand is expected, from 242,020 gigawatt hours (GWh) in 2010 to 499,490 GWh in 2020, as a consequence of the projected increase in the population and the country's economic growth (Atiyas, Çetin, & Gülen, 2012, p. 15; Baris & Kucukali, 2010, p. 2441).

Electricity plays an important role in every country's economy, since it represents a crucial factor to economic and social development (Toklu, 2013, p. 456). The main features of the electricity market have been economies of scale in generation and the fact that generated electricity must pass through an extensive transmission and distribution network to be delivered to the end-customer (Kopsakangas – Savolainen & Svento, 2012, p. 5). Due to these natural monopolistic characteristics, international electricity sectors were operated by the state as a natural monopoly (also referred to as a state monopoly) during the 20th century, resulting in a situation where a state-owned company dominated the entire electricity supply chain, including generation, transmission and distribution.

It was later determined, however, that introducing competition to potentially competitive segments of the industry might increase its overall efficiency. This meant that network activities such as transmission and distribution (with its natural monopolistic characteristics) should be segregated from generation, wholesale and retail sales activities (which were recognized as potentially competitive activities) (Kopsakangas-Savolainen & Svento, 2012, p. 5).

This led to the start of energy market[1] reform at the international level. "Since each country differed in terms of their geography, availability of domestic resources, energy trade balance, composition of their economy, and socio-political conditions, the restructuring approach differed" from country to country (Atiyas et al., 2012, p. 1). Nevertheless, reform comprises four fundamental elements common to all countries: "privatization of publicly owned electricity assets; the opening of the market to competition; the extension of vertical

[1] In literature, the term energy markets usually refers to gas and electricity markets. In this master's thesis, the term refers to electricity markets.

unbundling of transmission and distribution activities from generation and retail activities; and the introduction of an independent regulator" (Pollitt, 2009, p. 4).

One of the first countries to reform its electricity sector was Chile (1987). Just two years later, England and Wales also initiated a massive privatization and restructuring process (1989). The motivation behind the reform was to make the energy sector cost efficient through the introduction of competition (Sioshansi, 2006, p. 70). Alongside the economic motivation for reform, there were also political incentives such as distaste for strong unions and the urge to attract foreign investment, as well as environment concerns (Woo, Loyd & Tishler, 2003, p. 1104).

With its strategic and political goals, as well as economic concerns, the EU has also been engaged in a debate on the restructuring of energy markets (Baha Karan & Kazdağli, 2011). The main idea was to create an internal electricity market with effective competition that mainly benefits customers (by lowering prices) and companies (by reducing the possibility of the abuse of market power by dominant companies). These benefits were the underlying principle for the liberalization of European energy markets (Böckers, Haucap & Heimeshoff, 2013, p. 7).

As an EU candidate country, Turkey also followed the global trend of energy sector restructuring, with its own triggers for reform. One of the main reasons was the rapid growth in electricity demand and the government's inability to meet that demand. Another significant trigger for reform was foreign influence. Firstly, electricity market reform is one of the preconditions for EU membership. Secondly, international institutions (IMF, World Bank and OECD) that have supported Turkey through its economic crises highlighted the need for energy market reform. Moreover, inefficient state monopolies were problematic in many other developing countries, as well (Erdogdu, 2006, p. 986).

The **purpose** of this thesis is to analyse the Turkish electricity market following the major reform thereof, and to assess its current level of harmonization with EU legislation and practices.

This thesis has five main **objectives**. The first is to review the EU internal electricity market and its regional electricity markets, and to compare the Turkish electricity market with the countries of the South East Europe (SEE) region. The second objective is to identify all triggers and the historical background of Turkish electricity market reform. The third objective is to analyse the Turkish electricity market by separately regulated (transmission and distribution) and competitive (generation, wholesale and retail sales) activities. The fourth objective is to assess the level of competition and to analyse possible entry barriers for new market entrants. The final and most important objective is to assess the level of harmonization of Turkey with EU's rules, legislation and practices, and to identify future challenges for the Turkish electricity market.

This thesis has four main chapters that are further divided into several subchapters. The first chapter describes the EU internal electricity market and its three energy packages. Regional

electricity markets are also presented in order to illustrate the connection between Turkey and the SEE regional market. At the end of the chapter, an overview of the Turkish electricity market is presented, as well a comparison of the market to the electricity markets of SEE countries. The implementation of the three electricity directives in Member States is used as a benchmark for Turkey in order to explain the current status of Turkey and its target model for the future.

In order to understand the current market structure, the second chapter covers the process of electricity market reform in Turkey, beginning with an analysis of the market prior to reform. Triggers and the institutional framework of reform are presented, as well as the privatization process. Generation and distribution assets for privatization are presented, together with an overview of the progress of the privatization process.

The third chapter is the most important, since it analyses the current structure and functioning of the Turkish electricity market. The first subchapter presents an analysis of electricity generation, in terms of the resources used for electricity generation, as well as the ownership of generation assets. The role of government and publicly owned companies is also presented. The next subchapter explains the transmission system and the links between Turkey and neighbouring countries. Further on, electricity trading is presented in the subchapter on the wholesale electricity market, which covers the major market player TETAS, as well as Turkish wholesale market prices and their comparison with other EU regional market prices. The connection between the natural gas and electricity markets is explained throughout the chapter. In the last subchapter, an analysis of distribution and retail activities is presented, together with a graphical presentation of retail prices.

Recent developments on the Turkish electricity market are assessed in chapter four. First, the level of harmonization of Turkey's electricity market with EU legislation and practices is reviewed, followed by a presentation of future challenges for the country. At the end of the thesis, the main findings are summed up in the conclusion.

The main research methods applied are the descriptive method, together with inductive and deductive reasoning, and the comparative method. In addition, extensive literature on the electricity market and the reform thereof was used in order to better understand the topic. For a detailed explanation, the following databases were used: Turkish Statistical Institute (TurkStat), Ministry of Energy and Natural Resources Turkey (MENR), Energy Market Regulatory Authority (EMRA), U.S. Energy Information Administration (EIA), European Network of Transmission System Operators for Electricity (ENTSO-E), International Energy Agency (IEA), EU Commission and Eurostat.

1 EUROPEAN UNION ELECTRICITY MARKET

The European Union (EU) electricity market is part of the EU's wider energy policy. Historically, the founding Member States highlighted the need for a common approach to energy with the Coal and Steel Treaty in 1952 and the Euratom Treaty in 1957. Energy markets have changed significantly since then, and the need for an efficient common energy policy has grown with the EU's increasing energy challenges such as climate change,

increasing dependence on imports and higher energy prices (Commission of the European Communities, 2007). The EU is committed to addressing these challenges, primarily through the establishment of a real Internal Energy Market (IEM), i.e. the creation of an internal electricity market and an internal gas market.

European energy policy is currently focused on achieving **sustainability** (to reduce EU and global greenhouse emissions), the **security of supply** (investments in additional generation and the establishment of an effective internal electricity and gas market) and **competitiveness** (stimulation of fair and competitive prices) (Commission of the European Communities, 2007; European Parliament, 2014).

1.1 Establishment of a European Union internal electricity market

Historically, the main features of the electricity industry have been economies of scale in generation and the fact that generated electricity must pass through an extensive transmission and distribution network to be delivered to the end-customer (Kopsakangas-Savolainen & Svento, 2012, p. 5). Due to these natural monopolistic characteristics, international electricity markets were operated by the state as a natural monopoly (also referred to as a *state monopoly*) or by a large monopolistic company during the 20th century, resulting in a situation where only one (state-owned) company dominated the entire electricity supply chain.

In practice, this meant that the state regulated the electricity sector by setting prices and defining technical frameworks. The state was usually the regulator, as well as the owner and manager of electricity companies. Typical examples are the French company EDF, Great Britain's CEGB (Central Electricity Generating Board), ENEL in Italy and Verbund in Austria (Hrovatin & Zorić, 2011, p. 3).

Nevertheless, there was a growing ideological and political disaffection with these vertically integrated monopolies. Moreover, successful liberalization processes were carried out in other network industries, and thus led to initiatives to liberalize the electricity industry worldwide (Meeus, Purchala & Belmans, 2005, p. 25). The EU was no exception. With its strategic and political goals, as well as economic concerns, it has been actively engaged in a debate on the restructuring of energy markets (Karan & Kazdağli, 2011, p. 12).

The EU's main idea was to create an internal electricity market with effective competition that mainly benefits customers (by lowering prices) and companies (by reducing the possibility of the abuse of market power by dominant companies). These benefits were the underlying principles for the liberalization of European energy markets (Böckers et al., 2013, p. 7). In terms of introducing competition to the electricity market, the generation, trade (wholesale) and supply of electricity were seen as potential competitive activities, while network activities (transmission and distribution) were regarded as activities that require regulatory control (due to their natural monopolistic characteristics), as shown in Figure 1.

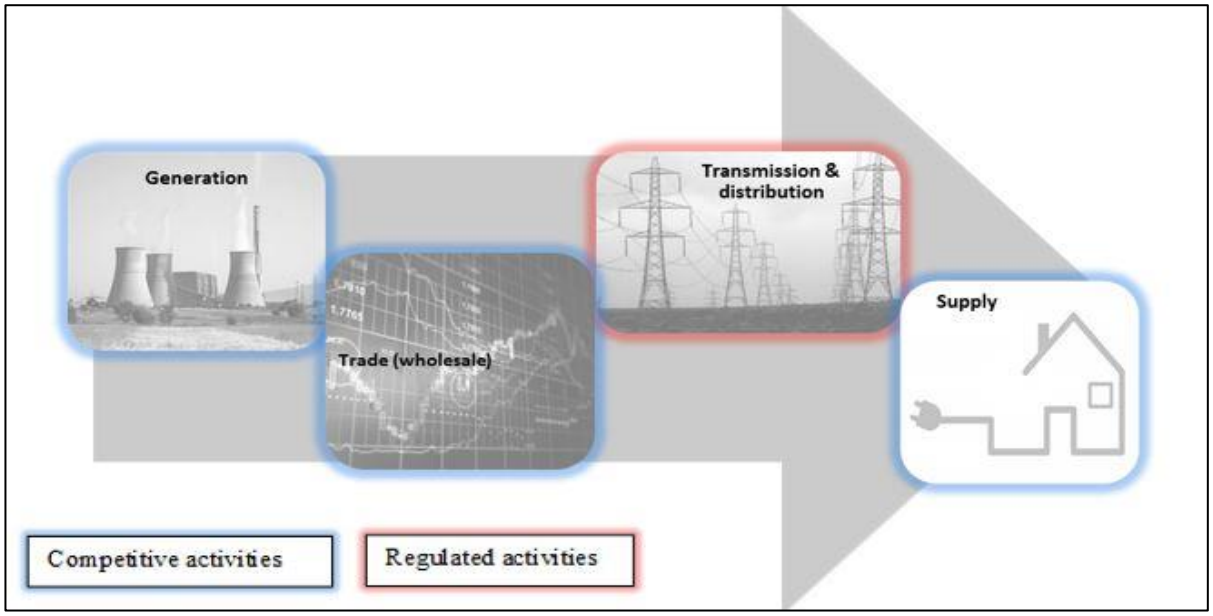


Figure 1. Electricity supply chain – competitive and regulated activities

Source: N. Hrovatin & J. Zorić, Reforme elektrogospodarstva v EU in Sloveniji, 2011, p. 4.

In the process of reforming a vertically integrated electricity industry into a competitive industry, there are some general features that can be observed among countries. As explained by Jamasb & Pollitt (2005, p. 13), four main steps usually occur:

a. Restructuring: Vertical unbundling of generation, transmission, distribution and retail sales activities.
b. Competition and markets: Creation of a wholesale market as well as retail competition. Allowing new entrants into generation and retail supply.
c. Regulation: Establishment of an independent regulator. Provision of third-party network access. Incentive regulation of transmission and distribution networks.
d. Ownership: Allowing in new private actors, by privatizing existing publicly owned businesses.

The above noted steps were promoted among EU Member States in the scope of European reform, which was carried out at two parallel levels. First, were the EU electricity market directives issued by the European Parliament and Council, which brought the liberalization of national electricity markets. These were significant contributions to the creation of an internal electricity market. Second, the European Commission encouraged the expansion of cross-border transmission links, as well as the improvement of cross-border trading rules with the aim of promoting efforts to improve interfaces between national markets (Karan & Kazdagli, 2011, p. 13; Jamasb & Pollitt, 2005, p. 17).

The EU's electricity directives were part of the so-called energy packages introduced in 1996, 2003 and 2009, which included a set of regulations and directives in the area of EU energy policy, all with the aim of creating an IEM.

- **First Electricity Directive – 1996**

The legal framework that provided the initiative for the creation of the EU internal electricity market was ***Directive 96/92/EC*** *of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market in electricity.* The main objective of the aforementioned directive was the introduction of competition on the electricity market. It represented a set of common rules for all Member States in the areas of generation, transmission, distribution and supply of electricity.

According to Directive 96/92/EC (OJ L 027), Member States were required to designate transmission and distribution system operators (TSOs and DSOs) who are responsible for operating, maintaining and developing transmission and distribution systems.

In terms of restructuring (vertical unbundling), the first directive focused on unbundling and the transparency of accounts. This was the first step toward the gradual unbundling of generation, transmission and distribution activities. The first directive instructed Member States to ensure that their integrated electricity companies keep separate accounts for their generation, transmission, distribution and supply activities within their internal accounting records. The aim of such unbundling was to avoid discrimination, cross-subsidization and the distortion of competition (Directive 96/92/EC, OJ L 027).

Moreover, Directive 96/92/EC facilitated competition in generation in such way that Member States are able to choose between a tendering or authorization procedure for the construction of new generating capacities (Directive 96/92/EC, OJ L 027). An authorization procedure allows anyone to build a power plant, under the condition that they comply with certain criteria such as safety of installation, environmental protection and the use of public land. A tendering procedure allows Member States to maintain centralized planning of the power system, while allowing them to tender out the construction of new capacities (Pellini, 2014, p. 12).

In order to enter the market and to sell and deliver electricity, new suppliers and producers needed access to the grid. Consequently, Directive 96/92/EC presented three third-party access models (Directive 96/92/EC, OJ L 027):

a) Negotiated third-party access (nTPA): Eligible customers and suppliers negotiate a transmission fee (access to the system). Where eligible customers are connected to the distribution system, access is the subject of negotiations with the relevant network operator. To ensure transparency, indicative prices for the use of the network must be published by the network operator.
b) Regulated third-party access (rTPA): Access rights may be granted on the basis of pre-determined published tariffs.
c) Single-buyer model: Creation of a mandatory power pool for producers, with one entity acting as a single buyer in the pool (e.g. a system operator may be a single buyer).

The concept of ‘‘eligible customer” was introduced for the first time with Directive 96/92/EC. An eligible customer is defined as a customer who has the legal capacity to contract volumes of electricity from any supplier. The aim of the directive was the slow, gradual and partial opening of Member States’ electricity markets in such way that customers and producers would be able to negotiate the purchase and sale of electricity freely. The first phase opens the market for end-customers who consume more than 40 GWh per year. After three years, the degree of market opening increases with a consumption threshold of 20 GWh, followed by 9 GWh after six years (Directive 96/92/EC, OJ L 02).

Although the first directive initiated changes to the electricity markets of Member States, it also featured some serious shortcomings. In terms of market concentration, monopolies and oligopolies were still present. Since the form of unbundling required by the directive was weak, vertically integrated companies still presented a barrier to competition. Overall, there was a lack of transparency and technical barriers to accessing the grid. Moreover, trading was not fully established in all countries and balancing markets were not fully developed, while some markets were too small or isolated. In order to ensure competitive prices and a real internal electricity market and to increase the standards of service for customers, the Second Electricity Directive replaced Directive 96/92/EC (Kovács, 2011).

- **Second Electricity Directive – 2003**

Directive 2003/54/EC *concerning common rules for the internal market in electricity and repealing Directive 96/92/EC* enforced the unbundling of TSOs as well as the unbundling of DSOs, in terms of the legal separation of activities. The separation of the ownership of assets of the transmission/distribution system operator from the vertically integrated company was not mandatory. The criterion only referred to the legal status and functional activities of TSOs and the management of DSOs (Directive 2003/54/EC, OJ L 176).

Directive 2003/54/EC (OJ L 176) also enforced the adoption of an authorization procedure for all Member States for generation, as the only option. The procedure and related criteria required publishing, while the results were to be objective and non-discriminatory.

Moreover, retail markets were opened as the result of Directive 2003/54/EC, since all non-household customers were considered eligible from 1 July 2004, while all customers were deemed eligible from 1 July 2007 (Meeus et al., 2005, p. 27).

In addition, Directive 2003/54/EC (OJ L 176) instructed Member States to designate a regulatory authority to be responsible for “ensuring non-discrimination, effective competition, efficient functioning of the market and monitoring of the market”. The aforementioned authority is wholly independent from the interests of the electricity industry.

Since the Second Electricity Directive was not specific in terms of how to ease the monopolistic situation on the market and how to introduce wholesale electricity markets, several shortcomings remained to be resolved. Although almost all Member States ensured competition in generation via a transparent authorization procedure, some issues remained unresolved and the generated electricity was not entirely sold on the market. Access to the grid was no longer a problem. On the other hand, there was no incentive to enter the market

due to the lack of competitive and liquid wholesale markets. In addition, TSOs and DSOs were required to legally separate the functioning of their network from generation and/or retail activities. In practice, TSOs or DSOs were still owned by a company involved in generation or retail activities, which represented a barrier to competition. Moreover, one of the most serious and unresolved problems was the presence of dominant companies, and the unclear measures set out in the aforementioned directive regarding how and to what extent the problem can be resolved. In general, it seemed that there was a lack of will among Member States and on behalf of the Commission to reduce the market power of dominant companies (Thomas, 2006; Jakovac, 2012, p. 321).

With the Third Energy Package, Directive 2009/72/EC came into force and updated the previous two electricity directives with the goal of accelerating the process of creating an EU internal electricity market.

- **Third Electricity Directive – 2009**

According to ***Directive 2009/72/EC***, Member States have the possibility to choose among three alternative models of unbundling. The first model is *ownership unbundling*, meaning that supply and production companies cannot hold a majority stake in a TSO, nor exercise voting rights or appoint board members. On the other hand, supply and production companies are allowed to choose to whom and at what price they sell their networks. The second model allows supply and production companies to own the physical network. In such cases, however, they are obliged to delegate any operation, maintenance and investment decision to an independent company, i.e. an *independent system operator*. The third model, which employs an *independent transmission system operator*, allows supply and production companies to own the network, under the condition that it is operated by a subsidiary of the parent company that makes decisions independently of the latter (Pellini, 2014, pp. 15-16).

The Third Directive also imposes a high standard of public service obligations on Member States, while a high level of customer protection is promoted (DG Energy – European Commission, 2011). Member States are also obliged to define the concept of vulnerable customers. Therefore, the categories of consumer that will qualify as a vulnerable customer must be specified. For example, elderly consumers with extremely low income may be considered as vulnerable in special circumstances, such as a severe winter (when they use electricity to heat their home). A prohibition of disconnection may apply for such customer, in the form of licence condition or obligation (European Commission, 2010, p. 6).

Within the framework of the Third Energy Package, *Regulation 713/2009/EC* established the **Agency for the Cooperation of Energy Regulators** (ACER). ACER plays an important role in the process of completing the IEM. It mainly complements and coordinates the work of national energy regulators at the EU level. ACER was also allocated additional tasks concerning wholesale energy market integrity and transparency (REMIT), as well as guidelines for the trans-European energy infrastructure. It plays a central role in the creation of the IEM and the enhancement of competition. Its main tasks are the coordination of

regional and cross-regional initiatives that favour market integration, and monitoring the IEM in general, as well as wholesale energy trading activities (ACER, 2014).

Moreover, *Regulation 714/2009/EC* established the **European Network of Transmission System Operators** (ENTSO): ENTSO-E for electricity and ENTSO-G for gas. ENTSO-E's mission is to offer security through the coordinated, reliable and secure operation of the interconnected electricity transmission network. Its objectives are to provide a platform for the market and to promote sustainability by facilitating the secure integration of new generation sources. In line with its mission, it also promotes the requisite development of the interconnected European grid (Entsoe, 2014). The work of ENTSO-E and its network development plans are monitored by ACER.

In addition to the work of ACER and ENTSO-E, many other EU agencies and institutions play an important role in the creation of the EU's IEM. The first are the *Directorate-Generals (DGs) of the European Commission,* which formulate and implement European policies. The specific DGs for energy are DG Energy and Transport (DG TREN), DG Competition and DG Environment. The second is the *Electricity Regulatory Forum (Florence Forum),* a forum where parties meet twice a year to discuss the creation of the IEM. Participants include regulatory authorities, representatives of the governments of Member States, the European Commission, TSOs, electricity traders, customers, network users and power exchanges. The *Council of European Energy Regulators (CEER)* also contributes to the facilitation of a single, competitive and sustainable EU IEM. CEER is a non-profit organization established in 2000 to promote cooperation between independent energy regulators in Europe (Meeus et al., 2005, p. 27; CEER, 2014; European Commission – Energy, 2014).

Each year, ACER and CEER draft a Market Monitoring Report that assesses developments on the electricity and gas markets, as well as progress in the implementation of the Third Energy Package. There is still room for improvement in terms of the completion of the IEM.

With regard to retail electricity markets,[2] the latest Market Monitoring Report (ACER/CEER, 2014) exposed the heterogeneity of national energy policies. This is reflected in electricity prices that are influenced by taxation and network charges, which in most cases represent more than one half of the bill. There are major differences across the EU concerning this issue. Moreover, on the largest EU markets (Denmark, Finland, Germany, Italy etc.), retail markets are moderately concentrated, and thus perform relatively well (the main performance indicators used were choice of suppliers and offers, entry-exit activity etc.). The Market Monitoring Report reveals that customers do not participate actively in terms of supplier switching, and consequently do not choose among different products offered on the market. Worthy of note with regard to market players is the need to ensure transparent and reliable online price comparison tools, as well as transparent energy invoices. This is also one of the key barriers to entering retail markets, as perceived by suppliers. Additional barriers to enter the market are a lack of harmonization of regulatory frameworks among Member States, the

[2] Progress on the wholesale electricity markets is described in Subchapter 1.2 (Section 1.2.1 Electricity Regional Initiative).

regulation of retail prices[3] and the low liquidity of wholesale markets (particularly on less developed markets) (ACER, 2014).

1.2 Regional electricity markets in the European Union

Regionally, countries share a similar economic and political environment. It is thus normal that common rules and methods are first created and applied within a region, followed later by pan-European integration.

In this respect, regional electricity markets (REMs) are considered a natural step in the evolution of national electricity markets towards a fully integrated internal electricity market. Through REMs, barriers to trade can be removed and practical solutions can be found to increase competition within regions (Mercados, 2010, p. 20).

1.2.1 Electricity Regional Initiative

In 2006, National Regulatory Authorities (NRAs) set up the Electricity Regional Initiative (ERI) with the support of the European Commission. The project was intended to speed up the integration of national energy markets in Europe, and is perceived as an interim step to complete the IEM. Initially, Regional Initiatives were launched by European Regulators' Group for Electricity and Gas (ERGEG), following the "bottom-up" approach. The project brought together NRAs, the European Commission, transmission system operators (TSOs) and other relevant stakeholders in seven electricity and three gas regions (Table 1). Regional Initiative brought good results such as the implementation of network codes, and the exchange of information and best practices. Nevertheless, after implementation of the Third Energy Package (2009) and with the creation of ACER, a new approach was introduced. ACER took over the Regional Initiatives project, and now employs a new "top-down" regulatory approach (ACER, 2013, p. 16).

Table 1. Electricity Regional Initiative (ERI)

Region	Countries
Baltic Region	Estonia, Latvia, Lithuania
Central-East (CEE)	Austria, Czech Republic, Germany, Hungary, Poland, Slovakia, Slovenia
Central-South (CSE)	Austria, France, Germany, Greece, Italy, Slovenia
Central-West (CWE)	Belgium, France, Germany, Luxembourg, Netherlands
Northern (NE-NWE)	Denmark, Finland, Germany, Norway, Poland, Sweden
South-West (SWE)	France, Portugal, Spain (Spain and Portugal are also called MIBEL region)
France-UK-Ireland	France, Ireland, United Kingdom

Source: CEER, 2014.

[3] "As of 31 December 2013, household end-user price regulation existed in 15 countries (out of 29)", as follows: Croatia, Bulgaria, Spain, France, Hungary, Latvia, Lithuania, Poland, Slovakia, Romania, Denmark, Cyprus, Estonia, Malta, Belgium (ACER, 2014).

ACER's project promotes cooperation and the early implementation of rules at the regional and cross-regional level. This new approach accelerates the completion of the IEM, which was planned by the end of 2014. It started in 2010, and the goal is for electricity markets across Europe to share a set of common features that are linked by the efficient management of interconnection capacities (ACER, 2014).

To that end, four Target Models have been defined for electricity market integration. All Member States are expected to implement the below described Target Models in order to achieve improved market integration between themselves, and to facilitate cross-border trading in all timeframes (ACER/CEER, 2014).

- First Target Model: market coupling (for the day-ahead and intraday timeframe)

Using the market coupling method, energy and capacity are allocated together, while energy prices reflect both congestion costs and energy costs. According to this method, energy flow is always from a low price region to a high price region (Deloitte Consulting, 2013, p. 26). Market coupling will be used instead of the method of separate capacity allocation via explicit auctions and energy purchases/sales via an energy exchange.

The target model for the day-ahead timeframe is the European Price Coupling (EPC) model that simultaneously determines volumes and prices for all price zones in Europe (ACER Coordination Group for Electricity Regional Initiatives, 2015, p. 5). The markets of Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Great Britain, Latvia, Lithuania, Luxemburg, the Netherlands, Norway, Poland and Sweden have been coupled since February 2014. Spain and Portugal have also been using the same market coupling platform since 2014, while the aforementioned markets have been coupled since 2010. This means that market coupling has been implemented between the NWE, MIBEL and CSE regions (ACER, 2014a). There are ongoing discussions between Croatian, Hungarian and Slovenian counterparties regarding the decision on which border the coupling will be implemented first. The Croatian Power Exchange (CROPEX) was established prior to discussions. Coupling has been in place on the Italian-Slovenian border for a few years already. Bulgaria-Romania market coupling is in its initial phase and is expected to go live after 2015 (ACER Coordination Group for Electricity Regional Initiatives, 2015, pp. 5-6). The exception is the Greek market, whose wholesale market requires restructuring in the future in order to achieve harmonization with the rest of the region.

- Second Target Model: cross-border intraday

The goal is to implement an Intraday Target Model on all borders in Europe. Implementation is based on two phases: (i) implicit continuous intraday trading and (ii) intraday capacity recalculation, capacity pricing and the trading of sophisticated products (ACER, 2014). The second phase actually represents the evolution of implicit continuous intraday trading. Implementation of the Second Target Model is first planned in the NWE region. This pilot project is run by Ofgem (UK). Later, the model will also be implemented in other regions.

Currently, there are major delays with the NWE pilot project, since it was planned to go live in 2014. Certain operational and legal challenges are causing the delay (ACER Coordination Group for Electricity Regional Initiatives, 2014, p. 7).

- Third Target Model: long-term (LT) transmission rights

The objective of this project is to offer participants an opportunity to hedge against congestion costs and day-ahead congestion pricing. In order to achieve this objective, allocation rules, the allocation platform and nomination procedures must be harmonized. There exists a possibility that a shift will be made to Financial Transmission Rights (FTRs) (ACER Coordination Group for Electricity Regional Initiatives, 2014, p. 9).

Regarding the harmonization of allocation rules, ENTSO-E has prepared a set of harmonized auction rules (EU HAR) that will be applicable from 2016. To date, the first version has been published and is available for public consultation. With regard to the allocation platform, the merger of the Capacity Allocation Office (CAO) and Capacity Allocation Service Company (CASC) is planned. CASC and CAO are two major regional allocation platforms and, once merged, will function under a new entity called the Joint Allocation Office (JAO). It is expected that JAO will be organising the 2016 auctions.

- Fourth Target Model: capacity calculation

The final objective is to implement a fully coordinated capacity calculation methodology, in the form of an Available Transmission Capacity (ATC) or a Flow-Based (FB) method. The second is preferable for short-term capacity calculation (ACER, 2014).

The progress made by wholesale electricity markets is assessed in the Market Monitoring Report (ACER/CEER, 2014). The Four Target Models are therefore included as a main component of the final IEM. As stated in the aforementioned report, one of the indicators of market integration is the convergence of wholesale electricity prices. For example, when market coupling was extended from the Czech Republic and Slovakia to Hungary in 2012, electricity prices on these three markets converged significantly. Although an increase in price convergence was expected across all EU regions, this was not the case in 2013. The CWE region experienced a significant decrease, of 32% compared to 2012. The underlying reason was German prices (mostly driven by renewables and coal-fired plants), which were lower than elsewhere in the region due to cheap coal on international markets and the penetration of renewables. Nevertheless, the recent NWE price coupling initiative "is expected to improve price convergence across all the regions in the coming years" (ACER/CEER, 2014, p. 14).

Another positive effect of market coupling is the efficient use of interconnectors, which recorded an efficiency rate of 77% in 2013 in the day-ahead timeframe. Nevertheless, the full implementation of the four electricity Target Models remains a priority. The report also highlights the need for efficient and well-integrated gas markets in order to achieve flexibility on electricity markets. In addition, it is reported that demand-side participation can also contribute to the flexibility of electricity markets (ACER/CEER, 2014, p. 16).

1.2.2 South East Europe

The so-called 8th region or South East Europe (SEE) region covers the Energy Community contracting parties (Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Kosovo, Moldova, Montenegro, Serbia and Ukraine) as well as the seven neighbouring EU Member States (Bulgaria, Croatia, Greece, Italy, Hungary, Romania and Slovenia) (Energy Community, 2014). Georgia is an Energy Community candidate country, while Turkey, Armenia and Norway have been granted the status of observer.

Historically, the countries of the SEE region have shared the same energy problems such as small energy markets, energy intensive economies and regional energy prices below economic levels, inappropriate pricing/tariffs and poor infrastructure, as well as energy policies that differ significantly from the EU's policy. These common challenges triggered the need for regional energy cooperation (Karova, 2011, p. 81).

The creation of a regional SEE energy market was proposed in 2002 with the so-called Athens Process that included a plan to integrate the SEE market with the EU's IEM. Following several memorandums of understanding, the Energy Community Treaty was finally signed in 2005, and entered into force in 2006 with ratification by all signatories (Karova, 2011, p. 81). This was the first ever multilateral treaty signed between the EU and South East Europe (EU candidate and potential candidate countries), with the goal of boosting energy integration. In addition, the Energy Community Treaty will extend the EU's IEM to the Balkan Peninsula as a whole. Consequently, the relevant *acquis communautaire*[4] on energy, the environment and competition is also planned to be implemented in this area (European Commission, 2005).

In terms of the creation of the SEE regional market and its subsequent integration with the EU's IEM, a special document has been developed in line with the elements of the European Electricity Target Model, called the *Regional Action Plan for Wholesale Market Opening in South East Europe* (SEE RAP). Since implementation of the EU's IEM was planned for 2014, the target for the SEE region is 2015. Prior to the RAP, the Third Energy Package was incorporated into the Energy Community back in 2011, with a transposition deadline of January 2015 (ACER Coordination Group for Electricity Regional Initiatives, 2014, pp. 19-20). In its reports, ACER also provides details about the progress of the SEE region. The 2014 status is presented in Table 2.

[4] *Acquis communautaire* is a term that refers to EU laws, and includes all treaties, regulations and directives passed by European institutions, as well as the judgements handed down by the European Court of Justice. This term is most often used in preparations by EU candidate countries, since they must adopt and implement the entire *acquis* to be able to join the EU (Eurofound, 2014).

Table 2. 2014 SEE region status (integration with the EU's IEM)

RAP element	Project - Progress and issues
Harmonization of allocation and nomination rules for long-term (LT) and medium-term transmission rights.	There is a lack of regional coordinated capacity allocation mechanisms, as well as insufficient transmission interconnection capacity with neighbouring systems. Nevertheless, an important step was the establishment of a coordinated auction office, the SEE CAO, which conducts centralized and multilaterally coordinated auctions for the largest parts of the region.
Day-ahead (DA) capacity allocation (market coupling)	The aim is to achieve single Price Coupling (PC), which simultaneously determines volumes and prices in all relevant zones (marginal pricing principle). The first step is to establish power exchanges. Announcement of a power exchange in Serbia by EMS and EPEX spot. Greece, Italy, Slovenia, Romania, Croatia and Hungary have established trading hubs.
Continuous mechanisms for implicit cross-border intraday trading	A specific cross-border continuous intraday trading system at all borders of the 8th region has not begun to function yet, although it was required under the EU's Second Energy Package.
Capacity calculation	No concrete milestones for the implementation of the flow-based allocation have been defined to date, and no concrete steps have been taken.

Source: ACER Coordination Group for Electricity Regional Initiatives, ERI Progress Report, April 2014 – September 2014, 2014.

As presented in Table 2, progress in the regional implementation of common practices and rules is slow. The main characteristic of the SEE region is significant heterogeneity in its market and regulatory framework. There are some major obstacles to creating an efficient regional market. The SEE region's legal basis lacks harmonization and requires implementation. Consequently, a number of legislative provisions in some countries (related to public supply, single-buyer models, regulated energy prices, and monopolistic positions in electricity generation and supply) are preventing the effective opening of the market. Moreover, additional commitment is needed from major regional players in order to achieve further improvements (ACER Coordination Group for Electricity Regional Initiatives, 2014). There is also a need for the development of harmonized cross-border balancing and overall transparency.

As mentioned in Table 2, an important step forward was the establishment of the SEE CAO in 2014. The office conducted its first yearly auctions for 2015 for the Bosnia-Montenegro and Bosnia-Croatia borders, offering 200 MW and 400 MW of available capacities (in both directions) respectively. The SEE CAO targets the harmonization of allocation and nomination rules for long- and short-term transmission rights in the SEE region. Coordinated NTC-based capacity allocation is initially planned, with a subsequent switch to flow-based capacity auctioning. The office is located in Montenegro, and the shareholders of the SEE CAO are TSOs of Greece (IPTO), Montenegro (CGES), Croatia (HOPS), Kosovo (KOSTT),

Bosnia and Herzegovina (NOS-BIH), Albania (OST) and Turkey (TEIAS). It was pointed out in the recent Athens Forum that the TSOs of Bulgaria, Macedonia and Serbia should participate, and were required to draw up concrete plans for their integration (SEE CAO, 2014; ACER Coordination Group for Electricity Regional Initiatives, p. 27).

1.3 Turkish electricity market overview and its interconnection with the SEE region

Turkey is the 16th largest economy in the world, with its GDP reaching $820 billion in 2013, and would have ranked as the 6th largest economy in the EU in 2013 had it been a member. Its population is about 76.7 million, with an annual growth rate of 1.12%. Half of the population is under the age of 30. Projections indicate that Turkey's population will reach 84 million by 2023 (Invest in Turkey, 2014; TurkStat, 2014).

As shown in the graphs below (Figure 2), Turkey is a growing economy, since its GDP has grown at an exceptional rate relative to other OECD[5] countries over the last decade. The decline in GDP in 2008 and 2009 was a result of the international financial crisis, from which Turkey recovered in 2010 (IEA, 2009, p. 2).

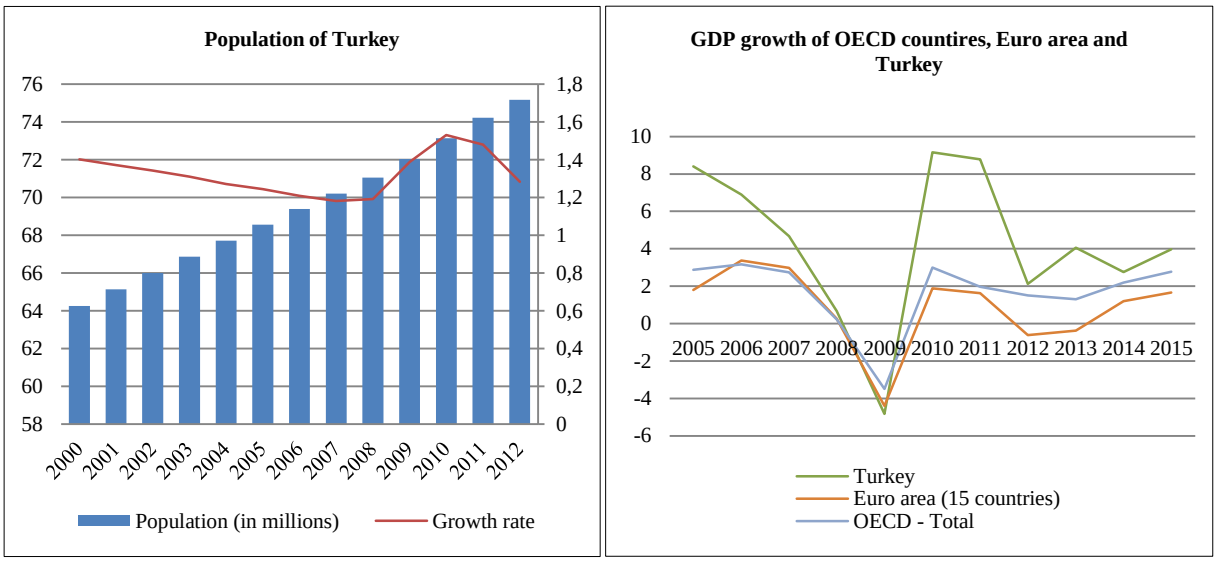


Figure 2. Population of Turkey and GDP growth rates for Turkey, the Euro Area and OECD countries

Source: OECD.Stat Extracts, 2014.

The country's energy demand is driven by increasing GDP and population. Its main energy policy concern is thus ensuring a sufficient energy supply. In the coming years, Turkey's energy consumption is expected to double due to its economic growth. In 2011, its energy production was 32.06 Mtoe, while its energy consumption was 112.46 Mtoe. The difference

[5] Organization for Economic Cooperation and Development. OECD Members: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States (OECD, 2014).

of 80.16 Mtoe was imported (IEA, 2009, p. 1; IEA, 2013, p. 56). The data reveal that Turkey is dependent on imported energy, since it is limited in terms of primary energy resources. Nevertheless, it enjoys a position as a natural bridge between the demand-rich west and supply-rich east. Turkey's importance on the world energy markets is growing in line with its growth as an energy consumer (Deloitte, 2013, p. 9; IEA, 2014).

With its growing electricity demand driven by industrialization and urbanization, the Turkish electricity market is one of the fastest growing in the world. As can be seen from Figure 3, its electricity demand doubled over more than decade, from 128 TWh in 2000 to 246 TWh in 2013 (Deloitte, 2014, p. 5; Electricity generation & transmission statistics of Turkey for 2013, 2014). The majority of the electricity produced is distributed for industrial use (around 47%), while the remainder goes to households (around 20%), for commercial consumption, government consumption, illumination and other consumption needs such as the agriculture and fishery sector (TurkStat, 2014).

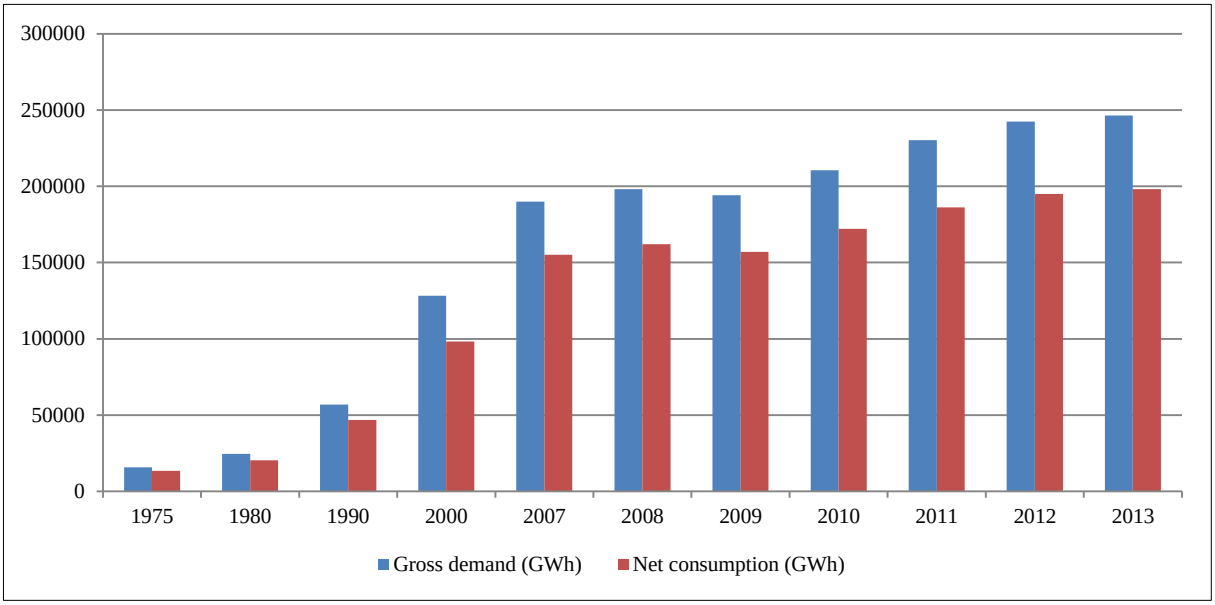


Figure 3. Turkish electricity demand 1975-2013

Note: Gross demand = gross generation + import - export; net consumption = supply - network loss

Source: TurkStat, 2014.

On average, 45% of electricity is produced from natural gas, while 25% is produced from coal. Around 20% to 25% is produced from hydro and the remaining 5% is produced from renewable sources. Turkey does not have any nuclear energy (Electricity generation & transmission statistics of Turkey for year 2013, 2014).

- **Turkey and the SEE region**

As mentioned in the previous subchapter, Turkey has the status of Energy Community observer, and has also formally expressed its interest in full membership. As an observer, it has the right to be represented at institutional meetings and to receive any information distributed at those meetings. Once the Energy Community Treaty is signed, Turkey agrees to

adapt EU energy standards and practices, which is also in line with its status as EU candidate country and the related requirements (Energy Community, 2014).

Turkey is also a shareholder in the SEE CAO, and is interconnected with the SEE region via Bulgaria and Greece. Interconnection and trading among those countries is described in Chapter 3.2. The ENTSO-E connection[6] offers Turkey new trading opportunities, while it is widely discussed that Turkey increases the liquidity of the SEE region, since the Turkish market is large (see Appendix C) and ENTSO-E interconnection capacities are to be 1,200 MW in the future.

Compared with the other markets of Energy Community contracting parties, Turkey's generation is by far the largest. In 2013, Turkey generated 240,154 GWh of electricity, while Albania, Bosnia and Herzegovina, Macedonia, Moldova, Montenegro and Serbia produced 5,956 GWh, 16,303 GWh, 5,676 GWh, 748 GWh, 3,809 GWh, and 27,537 GWh respectively. Markets also differ in terms of the number of end-customers. For example, Turkey has approximately 66,505,050 end-customers, while Serbia has 3,580,579 end-customers. Since liquidity is a key component of the wholesale electricity market, Turkey is a positive influence for the SEE region is this respect (Appendix C).

As cross-border trading activities among Greece, Bulgaria and Turkey develop, the Turkish electricity market will also become a role model or a benchmark for Georgia. In this way, the Georgian electricity market can develop rapidly and its hydro potential can fully be utilized (Deloitte Consulting, 2013. p. 23). Georgian traders will be able to access the European electricity market and vice versa.

2 ELECTRICITY MARKET REFORM IN TURKEY

2.1 Turkish electricity market prior to reform

Prior to reform efforts, a vertically integrated company dominated the entire Turkish electricity industry, as was the case in many other countries worldwide. The company was called the Turkish Electricity Authority (Türkiye Elektrik Kurumu – TEK). TEK was founded in 1970 with the main goal of unifying electricity generation, transmission, distribution and trade under one integrated system of a state-owned enterprise (TEIAS, 2014). Subsequently in 1993, TEK was separated into two companies: the Turkish Electricity Generation Company (TEAS) and the Turkish Electricity Distribution Company (TEDAS).

As Atiyas et al. (2012, pp. 20-21) explain, there were attempts to attract private capital to the electricity industry in the 1980s and 1990s. In the post-World War II era, Turkey had a policy regime that was characterized by a high level of involvement by the state in economic activities such as the ownership of enterprises in key industries, one of them being the energy industry. In addition, the state also played an important role in the allocation of financial resources via state-owned banks. This regime collapsed as a result of a major balance of payments crisis in the 1970s. The 1980s brought the liberalization of domestic markets,

[6] ENTSO-E connection is the term used to refer to the Continental Europe Synchronous Area, which is an area of interconnected markets (a TSO must be a member of ENTSO-E) that are in compliance with common technical standards and the management of operational issues (Entsoe, 2014).

international trade and finance, as well as privatization being seen as a "substitute" to the inefficient public sector. Moreover, Turkey had high public deficit in the 1990s. The Turkish government thus wanted to attract private capital to the electricity industry to cover the high costs of investments needed to build new electricity capacities. These new capacities were needed due to forecasts of high growth in electricity demand.

The privatization of TEK was envisaged through different development plans over the years, with an important attempt to privatize TEK in 1994 through the sale of ownership rights. The privatization was blocked by the Constitutional Court due to its concerns regarding foreign ownership in a strategic industry, and possible monopolization and cartelization. Private-sector presence in Turkey's electricity industry was legally enabled for the first time in 1984 under Law No. 3096. The aforementioned law introduced two types of contracts, BOT (build-operate- transfer) contracts for new generation facilities and TOR (transfer of operating rights) contracts for existing generation and distribution facilities. An autoproducer system was also formed for companies to produce their own electricity. Subsequently, under Law No. 4283, a third type of contract was introduced, the BOO (build-operate-own) model (Atiyas et al., 2012, p. 21; Cetin & Oguz, 2007, p. 1763).

BOT, TOR and BOO contracts were signed between a private company and state-owned TEAS or TEDAS. They all included an exclusive "take or pay" obligation with fixed quantities and prices (or price formulas) for a period of 15 to 30 years (Atiyas & Dutz, 2005, p. 8).

The specifics of each contracts are as follows (Cetin & Oguz, 2007, p. 1763):

- **BOT (build-operate-transfer)**

Under such a contract, concession is granted to a private company, whereby the company may build and operate a power plant for up to 99 years (later reduced to 49 years). After this period, it is transferred to the state at no cost. In 1994, these contracts also included treasury guarantees and tax exemptions, making them more interesting.

- **TOR (transfer of operating rights)**

This type of contract enables a private company to operate an already existing government-owned facility via a lease-type agreement.

- **BOO (built-operate-own)**

This type of contract entails the construction and operation of new thermal power plants, introduces a licensing system rather than concession, and also provides treasury guarantees. At the end of the contract period, the investor retains ownership of the facility.

There were several serious shortcomings related to these contracts, as some of contracts were awarded on the basis of bids from preselected companies. There were irregularities in both the design and implementation of the contracts. Overall, they did not contribute to the development of competitive electricity markets, since producers did not need to compete on the market due to the "take or pay" clause. This structural problem and dissatisfaction with the BOT, TOR, BOO model led to the search for more competitive electricity supply models

(Atiyas et al., 2012, p. 23). In 2001, a more fundamental approach for introducing competition to the market was adopted under the Electricity Market Law (EML) No. 4628. The EML was accompanied by the Strategy Paper of 2004 (Bagdadioglu & Odzakmaz, 2009, p. 145). Both documents will be explained in more detail in the following chapter of this thesis.

In addition, foreign influence also played an important role in the introduction of competition to the market and the implementation of structural changes. Various international institutions such as the International Monetary Fund (IMF), World Bank and OECD, which supported Turkey during its economic crises, highlighted the need for energy market reform. Moreover, reform is a precondition for Turkey's longer-term objective of EU membership (Erdogdu, 2006, p. 986). Consequently, the EML was also drafted in line with the EU Energy Acquis.

2.2 Institutional framework

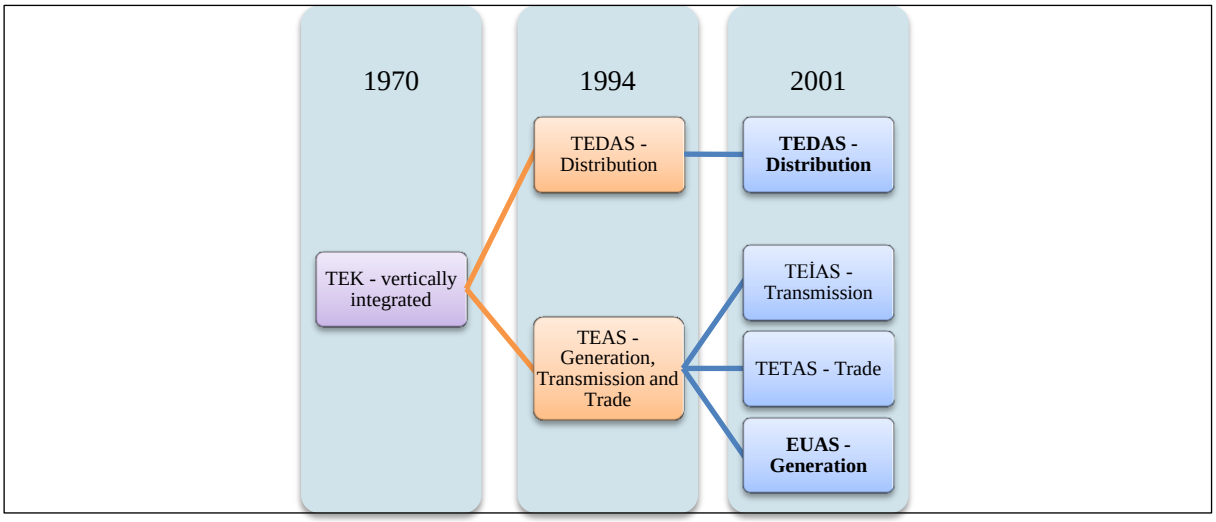
2.2.1 Electricity Market Law No. 4628

The regulatory framework that introduced competition to the Turkish electricity market is Electricity Market Law (EML) No. 4628, published in 2001. It set out a new framework for the organization of the Turkish electricity market, and was the first law to bring concrete reform to the market. It was in line with the 1996 EU Electricity Directive. The main principles and objectives of the EML are described below.

- Unbundling of public assets

Through reform measures, public assets were unbundled into separate public companies. TEAS was separated into three companies: Electricity Generation Company (EUAS) for electricity generation, Turkish Electricity Trading and Contracting Company (TETAS) for wholesale trade activities and Turkish Electricity Transmission Company (TEIAS) for transmission activities (Figure 4). The assets of EUAS and TEDAS were earmarked for privatization (Bahce & Taymaz, 2007, p. 1604; Atiyas et al., 2012, p. 24). All unbundled companies remained publicly owned at that time.

Figure 4: Unbundling of public assets



Source: EMRA, Electricity Market Report 2010, n.d., p. 3.

- Establishment of an independent regulator

The Electricity Market Regulatory Authority (EMRA) was established under the EML as an "independent, administratively and financially autonomous public institution" as described by the aforementioned law itself. It has its own board comprising nine members and a president, all appointed by the Council of Ministers for a period of six years. EMRA was also given the authority over the natural gas and oil market, and was thus renamed the Energy Market Regulatory Authority (Atiyas et al., 2012, p. 23). Its main objectives are to ensure the development of financially sound and transparent energy markets, to promote a competitive environment and to deliver environmentally friendly, low-cost energy to customers. In order to pursue its objectives and to ensure that market participants comply with the relevant rules and regulations, EMRA supervises and imposes penalties if necessary. It also assures non-discriminatory third-party access to grids and other monopolistic infrastructures (EMRA, n.d., p. 11).

EMRA also drafts secondary legislation and is responsible for the implementation of a new transmission and distribution code. Another of its tasks is to determine the threshold level for eligible customers over time and the protection of customers' rights (Erdogdu, 2006, p. 987).

- New wholesale market model

The market model presented under the EML comprises two elements, one being a *market for bilateral contracts* and the other being a *balancing mechanism*, established in order to ensure balancing between the demand side and supply side. This new model became operational in 2006, while no spot market was mentioned in the law (Atiyas et al., 2012, p. 24).

In 2004, an "Electricity Sector Reform and Strategy Paper" was released by the Turkish government, outlining the major steps to be taken (at that time) in order to achieve liberalization of the sector. The Strategy Paper states that the balancing and settlement mechanism is in line with the objective of creating a spot market and includes price signals to attract new investments. In addition, the balancing and settlement regime offers the possibility of buying and selling the non-contracted generation (Republic of Turkey – High planning Council, 2004, p. 5). In practice, the system functioning under this model was not transparent, since no crucial information was published (e.g. maintenance of generation units, volume of concluded transactions etc.). There was no spot market at that time, but only a platform that enabled balancing between the demand side and supply side.

- Licensing framework for market participants

Any legal entity wanting to engage in any electricity market activity is obliged to obtain a *license*. Licenses are issued for a minimum period of 10 years and a maximum period of 49 years. There are five types of licenses (Electricity Market Law No. 4628, Official Gazette, No. 24335):

a. Generation license: Each facility must obtain a generation license, except for autoproducer groups and those entities that generate electricity only to meet their own needs and do not operate in parallel with the transmission and distribution system. Generation companies are also allowed to enter into an affiliate relationship[7] with distribution companies, *without exercising control over them.*

b. Transmission license: The license obtained by TEIAS in order to perform its transmission-related activities. It is also pointed out that TEIAS can not engage in any other activities on the market.

c. Distribution license: The license obtained by any legal entity that wishes to engage in distribution activities in a specific region.

d. Retail sales license: The license obtained by legal entities in order to sell electricity and offer retail sales services to the market. In addition, the import of electricity below the transmission level is permitted, taking into account technical issues. Retail sales are allowed in any region, while distribution companies that hold a retail license may only sell electricity and capacities to an eligible customer in another distribution company's region if their retail license includes such a provision.

e. Autoproducer and Autoproducer Group License: The license obtained by an autoproducer that generates electricity for its own needs.

- Eligible customer concept

The EML also initiated the *liberalization of the demand side.* The concept of an eligible customer was defined, while the board of EMRA determines the threshold level each year. Customers who consume more than 9 GWh a year were designated as eligible customers free to choose their suppliers (Atiyas & Dutz, 2004, p. 10). The threshold level was later decreased gradually. The current status of market openness is explained in Chapter 3.4.

Although the EML brought changes to the market, amendments to the aforementioned law were necessary in order to achieve a higher level of competition on the market. In **2008, the EML was amended by Law No. 5784.** Under the amended EML, the development of competition is stipulated in several provisions, including a provision requiring accounting separation for operators who hold more than one license (operators must keep different accounts for different activities or plants). Another important provision is that the total market share of a generating company and its affiliates cannot exceed 20% of total installed market capacity. Moreover, holders of a distribution or transmission license are required to provide non-discriminatory system access and the use of system rights to all natural persons and legal entities (Atiyas et al., 2012, p. 25).

[7] An affiliate relationship is a situation where one company owns less than a majority of another company's shares. It can also be a type of relationship where at least two companies are subsidiaries of a larger company. In Turkey, for example, a generation company could have owned a part of a distribution company (Investopedia dictionary - Affiliate, 2015).

With regard to the amended EML, the Energy Community Secretariat reported full compliance with EU Directive 2003/54/EC in November 2008, except for cross-border trading (EBRD, n.d., p. 165).

2.2.2. New Electricity Market Law No. 6446

In 2013, a new law regulating the Turkish electricity market was enacted: Electricity Market Law No. 6446 (new EML). It repealed and replaced all provisions of the previous EML. The primary objective of the new EML is the establishment of a financially robust, stable, competitive and transparent electricity market, with an independent regulatory and auditing mechanism. The new EML is also expected to create an environment that will attract investments in the electricity generation sector. Another important aim is to increase private-sector presence in the electricity sector (Karaduman & Avcisert, 2013). The main new features in the sector are explained below.

- New licensing framework

The new EML focuses more on types of electricity market activities rather than types of licences. Article 4 of the new EML lists generation, transmission, distribution, wholesale, retail sales, market operation, export and import as activities that require a license. In contrast to the previous EML, it does not mention retail sales services and trade activities, and introduces *market operation* as a new type of activity (Erdem & Erdem, 2013).

There is a new, *preliminary license for generation* required for any legal entity that plans to commence generation activities. The aforementioned license applies to the performance of electricity generation activities. The preliminary license is issued for a specific term, not to exceed 24 months. During this period, a legal entity must obtain the necessary permits, approvals and licenses, and acquire ownership of or usufruct rights relating to the land where the facility is to be constructed or located (Erdem, 2013).

A *supply license* is an additional amendment to the types of licences. It combines wholesale and retail sales activities under one license type. Holders of this license have no regional restrictions in regards to eligible customers (Çakmak Avukatlık Bürosu, 2013, p. 1).

In summary, there are several types of licenses under the new EML: preliminary license, generation license, supplier license, distribution license, transmission license, market operation license, OIZ[8] preliminary license, OIZ generation license and OIZ distribution license. Currently, all market players are operating under the new license system.

- Electricity market operation activities

[8] OIZ – "Organized industrial zone legal entities established in accordance with Organized Industrial Zones Law No. 4562 may engage in distribution and/or generation activities in approved areas to meet the needs of its participants, without the obligation of incorporation according to the Turkish Commercial Code No. 6762, provided that they obtain a license from EMRA. OIZ legal entities are deemed eligible customers regardless of their consumption quantities. Customers exceeding the eligibility threshold have the right to choose their suppliers, provided that they pay a distribution fee to the OIZ." EMRA (2012).

Activities relating to the organization of the wholesale market and the financial settlement of wholesale market activities are planned to be performed by the newly established Energy Markets Operation Joint Stock Company (Enerji Piyasaları İşletme Anonim Şirketi, EPIAS), instead of TEIAS (Ergun Benan & Burcu Tuzcu, 2014).

- Competition

The new EML also aims to create a competitive environment and to prevent monopolistic situations on the market. In this regard, three important provisions are included in the aforementioned law and affect all license holding companies. One is that generation companies "may not hold a total installed capacity of more than 20% of the previous year's calculated total installed capacity in Turkey". Another important provision is that supply license holders may not purchase electricity from generation or export companies that exceeds 20% of the previous year's total consumption in Turkey. The third provision, aimed at encouraging competition, is that supply companies may not sell electricity at the wholesale or retail level that exceeds 20% of the previous year's total consumption of electricity in Turkey (Erdem, 2014).

2.3. Privatization

The reform of the Turkish electricity market is based on the privatization of distribution assets (TEDAS), followed by the privatization of generation assets (EUAS) as a resulting step. The privatization strategy is presented in the "Electricity Sector Reform and Privatization Strategy Paper" (Strategy Paper) from 2004. The Privatization Administration of the Republic of Turkey is responsible for all procedures relating to the implementation the privatization strategy.

2.3.1 Privatization of distribution companies

The privatization of TEDAS started with the division of the Turkish electricity distribution network into 21 regions. TEDAS then established 20 new companies (one region – Kayseri – was already privately run), based on technical, financial and geographical factors. Each of the 21 companies was engaged in distribution and retail sales activities to end-customers, and operated as a regional monopolist in its own region. According to the Strategy Paper, these companies were to be privatized by no later than the end of 2006. Due to some delays in the privatization process, additional procedures were initiated in 2008 and a new Strategy Paper was published in 2009. Today, all regions are run by private companies (Çelen, 2013, pp. 675-676). The regions and companies established by TEDAS are shown in Table 3, together with their privatization status. It can be noted that regions no. 18, 19 and 20 were privatized in 2009 separately from the privatization procedure of the Privatization Administration. The remaining 18 companies were privatized via tender procedures.

Table 3. Electricity distribution regions in Turkey, distribution companies and the privatization thereof

Region	Provinces	Status

1	Diyarbakir, Mardin, Siirt, Sanliurfa, Batman, Sirnak (Dicle Elektrik Dağıtım A.Ş.)	Privatized by Is Kaya
2	Bitlis, Hakkari, Mus, Van (Van gölü Elektrik Dağıtım A.Ş)	Privatized by Türkerler

Table continues

continued

Region	Provinces	Status
3	Agri, Erzincan, Erzurum, Kars, Bayburt, Ardahan, Igdir (Aras Elektrik A.Ş.)	Privatized by Kiler Holding – Çalık Enerji
4	Artvin, Giresun, Gumushane, Rize, Trabzon (Çoruh Elektrik Dağıtım A.Ş.)	Privatized by Aksa Elektrik Perakende Satış A.Ş
5	Bingol, Elazig, Malatya, Tunceli (Fırat Elektrik Dağıtım A.Ş)	Privatized by Aksa Elektrik Perakende Satış A.Ş.
6	Sivas, Tokat, Yozgat (Çamlıbel Elektrik Dağıtım A.Ş)	Privatized by Kolin-Limak-Cengiz
7	Adana, Mersin, Osmaniye, Hatay, Gaziantep, Kilis (Toroslar Elektrik Dağıtım A.Ş.)	Privatized by Enerjisa (Sabancı – E-on)
8	Kirsehir, Nevsehir, Nigde, Aksaray, Konya, Karaman (Meram Elektrik Dağıtım A.Ş.)	Privatized by Alarko-Cengiz
9	Ankara, Kirikkale, Zonguldak, Bartin, Karabuk, Cankiri, Kastamonu (Başkent Elektrik A.Ş.)	Privatized by Enerjisa (Sabancı – E-on)
10	Antalya, Burdur, Isparta (Akdeniz Elektrik A.Ş.)	Privatized by Kolin-Limak-Cengiz
11	Izmir, Manisa (Gediz Elektrik Dağıtım A.Ş.)	Privatized by Elsan-Tümaş- Karaçak
12	Balikesir, Bursa, Canakkale, Yalova (Uludağ Elektrik Dağıtım A.Ş)	Privatized by Kolin-Limak-Cengiz
13	Edirne, Kirklareli, Tekirdag (Trakya Elektrik Dağıtım A.Ş)	Privatized by IC Holding
14	Istanbul Ili Anadolu Yakasi (İstanbul Anadolu Yakası Elektrik Dağıtım A.Ş)	Privatized
15	Sakarya, Bolu, Duzce, Kocaeli (Sakarya Elektrik Dağıtım A.Ş.)	Privatized by Akkök-Akenerji-CEZ
16	Afyon, Bilecik, Eskisehir, Kutahya, Usak (Osmangazi Elektrik Dağıtım A.Ş.)	Privatized by Yıldızlar SSS Holding
17	Istanbul Ili Rumeli Yakasi (Boğaziçi Elektrik Dağıtım A.Ş.)	Privatized by Kolin-Limak-Cengiz
18	Kayseri Keyseri Elektrik Dağıtım A.Ş. - the distribution company of Kayseri region was already partially private.	The company has held operating rights since 1990. In 2009, the contract of the company was renewed and a license was granted.
19	Aydin, Denizli, Mugla (Menderes Elektrik Dağıtım A.Ş)	Privatized under Law No. 3096
20	Adiyaman, Kahramanmaras (Göksu Elektrik Dağıtım A.Ş)	Privatized under Law No. 3096
21	Amasya, Corum, Ordu, Samsun, Sinop (Yeşilırmak Elektrik Dağıtım A.Ş)	Privatized by Çalık Enerji

Source: Republic of Turkey – High planning Council, Electricity sector reform and privatization strategy paper , 2004; A. Çelen, The effect of merger and consolidation activities on the efficiency of electricity distribution regions in Turkey, 2013, p. 675; Atiyas et al., Competition and Regulatory Reform in the Turkish Electricity Industry. 2012, p.32; Deloitte Türkiye, The Energy Sector: A Quick Tour for the Investor, 2013.

The privatization of distribution companies was carried out using a TOR-backed Share Sale model (TSS model). Following the TSS model, an investor is the sole owner of the shares of the distribution company and is granted a license for the distribution of electricity in the designated region. On the other hand, the investor does not hold ownership of the distribution network; that remains with TEDAS (Lazard, pp. 1-3).

As explained by Mr Mustafa Gozen (September 2014), from EMRA, via email communication, distribution companies were required to unbundle retail sales and generation activities under Law No. 4628, which coincided with the privatization procedure. Distribution companies were required to establish a separate company for retail sales activities, and to obtain a retail sales license. Effective at the beginning of 2013, distribution utilities were legally unbundled, meaning that distribution companies operate under a distribution license, while retail companies perform retail activities under a supplier license. Prior to 2013, distribution companies covered all of the above mentioned activities. Effective January 2016, distribution companies will not be permitted to purchase administrative and support services such as accounting or finance from the companies under the control of the main company. They will also be required to use a different physical environment and information systems infrastructure for their distribution and retail companies.

With regard to revenues from the privatization of distribution assets, it is estimated that total revenue reached the primary goal of raising 10.4 billion Turkish Liras (approximately $7 billion) in order to boost investment in the industry (Invest in Turkey, 2014).

2.3.2 Privatization of generation assets

The privatization of distribution assets was given priority in the privatization process. After a delay, all assets were finally privatized in 2013, while the privatization of generation assets continues.

In 2008, the Privatization Administration (PA) grouped larger power plants into nine portfolios that comprised three thermal portfolios, four hydro portfolios and two mixed portfolios. Although the plan was to sell assets by portfolios, the PA shifted from a portfolio model to the tendering of large-scale thermal power plants separately with the aim of maximizing value and avoiding the risk of tenders being cancelled (as was the case with motorways and bridges because bids were too low). According to the new model, the Kangal (457 MW), Kemerköy (630 MW), Yeniköy (420 MW) and Çatalağzı (300 MW) thermal plants, in addition to the Hamitabat (1,156 MW) and Seyitömer (600 MW) plants, were tendered separately, as presented in Table 4. Thermal power plants are the priority for the PA in the privatization process (Durakoğlu, 2014; EUAS, 2015).

Table 4. Privatization of major thermal power plants 2013-2014

Power plant	Privatization process and new owners	Value
Kangal (457 MW)	Privatized by Konya Seker (local sugar producer that offered $985 million for privatization) via the "asset sale" method. Privatization was completed in August 2013.	$985 million
Kemerköy (630MW) and Yeniköy (420 MW)	The movable properties of the plant will be privatized via the "asset sale" method, while the immovable properties used by the Kemerköy and Yeniköy thermal power plants and the immovable properties used by YLİ were privatized via the same method. The procedures were completed in December 2014. The plant operates as a subsidiary of ICTAS Energy Generation and Trade Inc.	$4.3 billion
Çatalağzı (300 MW)	Privatized by Çates Elektrik Üretim A.Ş. via the "asset sale" method. Privatization was completed in December 2014.	$351 million
Hamitabat (1,156 MW)	Privatized by Limak Doğalgaz Elektrik Üretim A.Ş. via a block sale in the form of the sale of 100% of shares. Agreements were signed in August 2013.	$105 million
Seyitömer (600 MW)	Privatized by Elektrik Üretim A.Ş. via the "asset sale" method, while mine fields were privatized using the TOR model. Agreements were signed in June 2013.	$2.24 billion

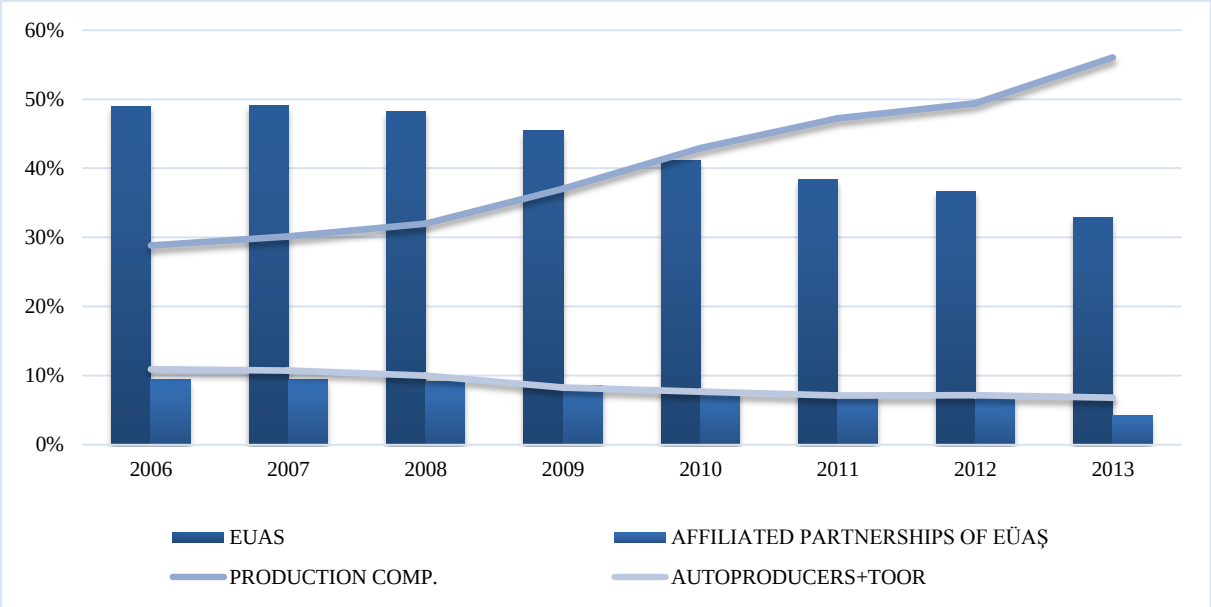
Source: Republic of Turkey Prime Ministry – Privatization Administration, 2014; Today's Zaman – Business, 2015; Invest in Turkey – The Republic of Turkey prime ministry investment support and promotion agency, 2014.

In addition to the above successful privatization procedures, three thermal power plants were privatized in 2015. Konya Seker privatized the 990 MW Soma thermal power plant with a bid of $685.5 million. In addition, Celikler Taahhut privatized the 210 MW Orhaneli and 365 MW Tuncbilek thermal power plants with a bid of $ 521 million (Konya Seker also bid for these two plants, but the highest bidder was Celikler Taahhut) (Equities.com, 2015).

Many other smaller plants (all hydroelectric or so-called "run-of-river" power plants) have also been privatized. In 2008, nine power plants with a total installed capacity of 141 MW were privatized. Later in 2010, 18 portfolios with a total installed capacity of 140 MW were also tendered. However, only 10 portfolios were actually privatized, while other tenders were cancelled. Those were tendered again in 2012 and all were successfully privatized. The most recent successful privatization of hydroelectric power plants was completed in 2014. This include five hydroelectric power plants: Esendal, Isıklar (Visera), Kayaköy, Dere and İvriz. All were privatized under the TOR model for a period of 49 years (Republic of Turkey Prime Ministry – Privatization Administration, 2014).

Through past successful privatization procedures, the market share of EUAS has been gradually reduced, from 57% in 2006 to 37% in 2013 (Figure 5), and continues to decline. The private sector is expected to hold a higher market share in the future.

Figure 5. Proportion of Turkey's total installed capacity accounted for by EUAS 2006-2013



Source: Electricity generation & transmission statistics of Turkey for year 2013, 2014.

3 TURKISH ELECTRICITY MARKET ANALYSIS

3.1 Generation

There are five types of market players on the Turkish electricity generation market (Ergun Benan & Burcu Tuzcu, 2014):

1. State-owned EUAS with its subsidiaries and affiliated partnerships.
2. Build-operate-transfer (BOT) and build-operate-own (BOO) companies. These companies operate under a concession (BOT) or license (BOO) agreement signed between the state and a private company. They do not require a generation license, since their operations are based on agreements with the Ministry of Energy and Natural Resources (MENR) and public authorities.
3. Companies operating under a transfer-of-operating-rights (TOR) agreement. The generation utility is owned by the state and operated by a private entity.
4. Independent power producers (private entities).
5. Autoproducers.

As Table 5 illustrates, around 37% of installed capacity in Turkey is owned by EUAS or its affiliated partnerships and subsidiaries. The remaining 63% of installed capacity is managed (and in some cases owned) by private companies. From a management point of view, the sector is dominated by private companies. However, when BOT and TOR agreements are taken into account (i.e. the state is or will be the owner of these utilities), the state is a major player on the generation market in terms of ownership.

Table 5. Distribution of installed capacity by primary energy resources and market share of electric utilities in Turkey, 2013

UTILITIES / **PRIMARY ENERGY RESOURCES (MW)**	**EUAS**	**AFFILIATED PARTNERSHIPS OF EUAS**	**AUTOPRODUCERS & PRODUCTION COMPANIES (BOO, BOT included) & TOR**	**TOTAL (MW)**
COAL: HARD COAL + IMPORTED COAL + ASPHALTITE	300		4,083	4,383
COAL: LIGNITE	3,690	2,714	1,819	8,223
LIQUID FUELS: FUEL OIL + DIESEL OIL + LPG + NAPHTHA	50		566	616
LIQUID FUELS: NATURAL GAS	1,432		15,739	17,171
RENEWABLES AND WASTES	0		235	235
TOTAL SINGLE FUEL-FIRED	5,472	2,714	22,442	30,628
SOLID + LIQUID			367	367
NATURAL GAS + LIQUID	2,676		4,731	7,407
NATURAL GAS + LIQUID + SOLID			245	245
TOTAL MULTI FUEL-FIRED	2,676	0	5,343	8,019
THERMO TOTAL (SINGLE FUEL-FIRED + MULTI FUEL-FIRED)	8,149	2,714	27,785	38,648
HYDRO TOTAL	12,918		9,371	22,289
GEOTHERMAL TOTAL			311	311
WIND TOTAL			2,760	2,760
GENERAL TOTAL (MW)	**21,067**	**2,714**	**40,227**	**64,008**
ELECTRIC UTILITY MARKET SHARE (%)	**32.9**	**4.2**	**62.9**	100

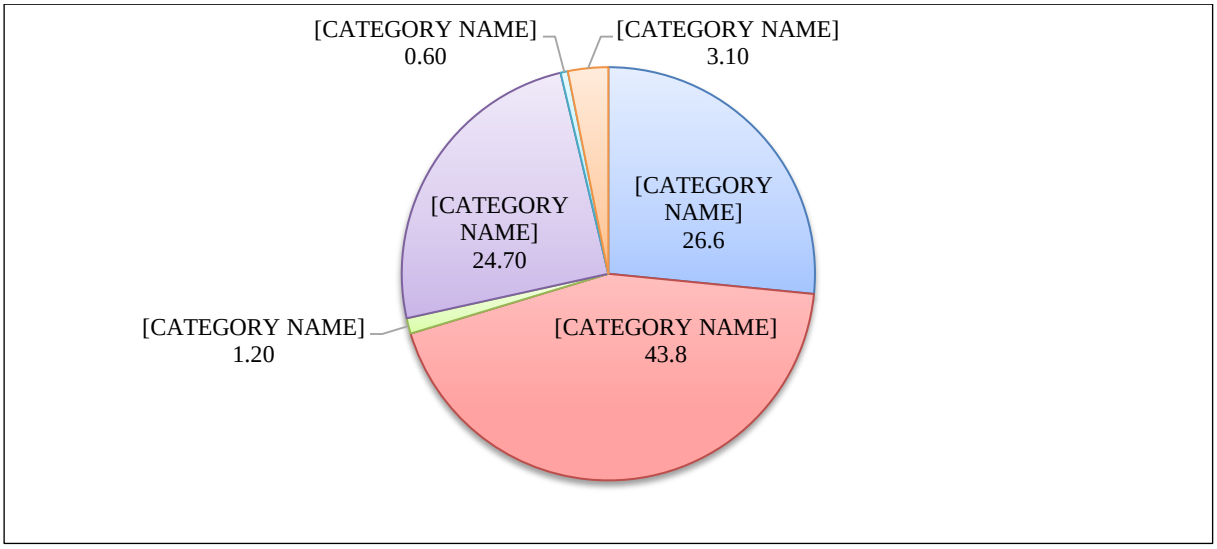
Source: Electricity generation & transmission statistics of Turkey for year 2013, 2014.

According to MENR (2014), BOO, BOT and TOR contracts enjoyed market shares of 9.5%, 3.6% and 1.5% respectively in 2013. Most of the capacities added to the system in 2013 were built by the private sector. In total, this is 6,985 MW of installed capacity, comprising 86 hydro power plants, 29 thermal plants, 11 wind plants, 10 landfill gas and biogas plants and four geothermal plants (MENR, 2014). Turkey is therefore promoting a higher private sector presence and is making an effort to reduce the market share of EUAS.

Currently, a large proportion (44%) of electricity consumed in Turkey is generated from natural gas power plants, followed by coal (27%) and hydropower (25%) electricity generation. A smaller proportion (4%) is generated from renewable energy sources such as wind and geothermal energy (see Figure 7). Turkey is planning to make specific changes in its

electricity generation mix by 2023. The country is aiming to increase the proportion of total energy sources accounted for by renewable energy sources from 20% to 30% by 2023 (Baris & Kucukali, 2012, p. 390). It is also aiming to make two nuclear power plants operational over the long term, although Turkey currently does not have any nuclear power plants. Two major planned projects are the Akkuyu nuclear power plant project (4,800 MW planned installed capacity) and the Sinop power plant project (4,480 MW planned installed capacity). The target is to produce 5% of electricity from nuclear energy by 2020 (MENR, 2014). The primary goal is to reduce the country's dependency on imports.

Figure 6. Electricity generation in Turkey by primary resources, 2013 in percentages



Source: Electricity generation & transmission statistics of Turkey for year 2013, 2014.

A well-functioning generation segment of the electricity market, which complies with EU legislation, is essential for the whole electricity industry, since it represents the basic component of the final retail and wholesale price. Current arrangements of the Turkish electricity generation market are presented by the type of energy source below.

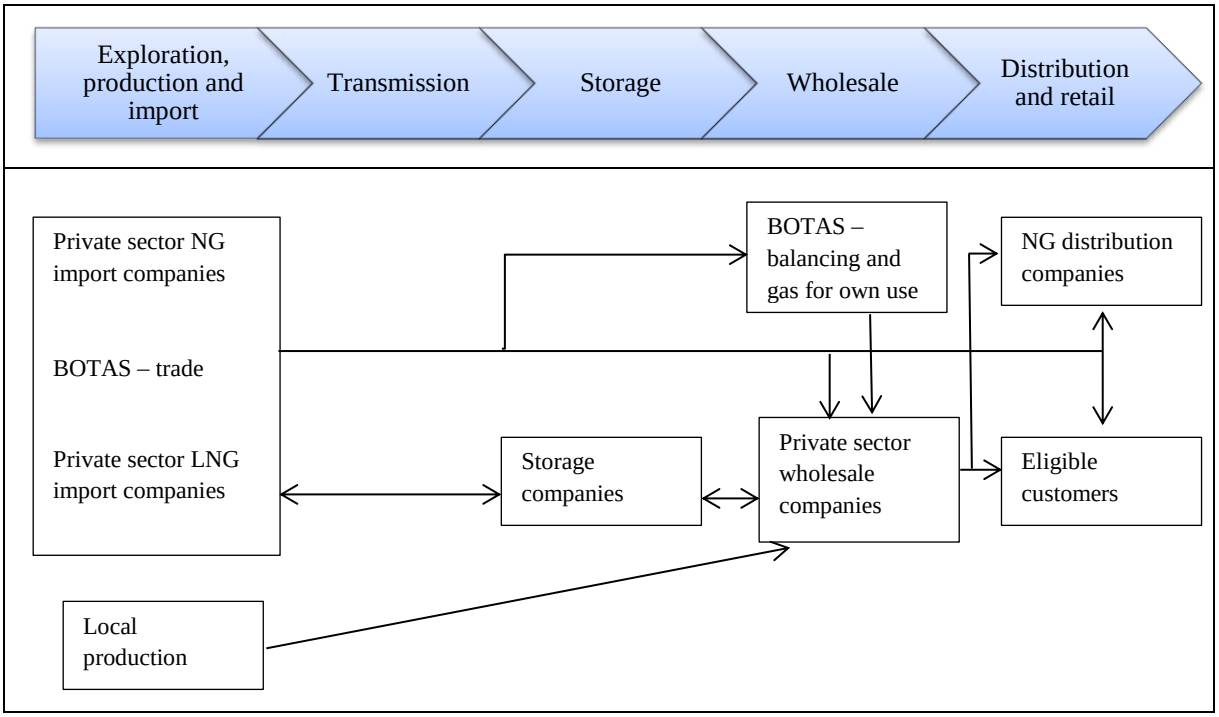
3.1.1 Natural gas

As presented in Figure 6, the majority of electricity in Turkey is produced from natural gas. This link between the two markets affects electricity prices (as presented in the Chapter 4.2). It is therefore necessary to present an overview of natural gas market dynamics and to understand the functioning of the market.

Prior to reform in 2001, the Turkish natural gas market was dominated by the vertically integrated, state-owned BOTAS. The company built natural gas pipelines and related facilities, signed long-term natural gas sale and purchase agreements, and also purchased natural gas on foreign spot markets. At that time, distribution companies (state and privately owned) were able to distribute gas, but were unable to import gas from another supplier by bypassing BOTAS. Consequently, the main driver of reform was the introduction of competition on the wholesale market (Atiyas et al., 2012, p. 65).

In 2001, Natural Gas Market Law No. 4646 entered into force with the aim of restructuring the market from a monopolistic structure to a liberalized market with competitive elements. Although the aforementioned law required the state-owned BOTAS to reduce its market share in the import, wholesale and distribution segments, it continues to remain a dominant market player (IEA, 2013b, p. 14; EMRA, 2012, p. 8). The current market structure is presented in Figure 7.

Figure 7. Turkish natural gas market structure



Source: Deloitte Türkiye, The Energy Sector: A Quick Tour for the Investor 2013, 2013, p. 42.

Turkey's domestic production contributes only 2% to total natural gas consumption. The country therefore imports the remaining 98% of natural gas, meaning it is completely dependent on natural gas imports. Its natural gas and LNG import partners are Russia, Iran, Azerbaijan, Algeria and Nigeria. As shown in Table 6, Turkey's first international agreement was signed with Russia, which led to the construction of the first main natural gas transmission line, extending from the Bulgarian border to Ankara (Melikoglu, 2013, p. 394; Natural Gas Europe, 2014). Russia is also the largest natural gas contract partner of Turkey, since more than 55% of total Turkish natural gas consumption is imported from Russia.

Table 6. Natural gas and LNG sale and purchase agreements (BOTAS)

	Original contract volumes/maximum capacity	**Consumption estimates and costs for 2013 – major natural gas contracts**

Agreement	Volume (bcm/year)	Date of signature/end date	Consumption (bcm) – as % of total natural gas consumption	Cost ($ billion) – as % of import costs
Algeria (LNG)	4.4	1988/October 2024	-	-
Nigeria (LNG)	1.3	1995/October 2021	-	-
Iran	9.6	1996/July 2026	8.568 bcm – 18%	$4.88 billion – 21.2%

Table continues

Continued

Agreement	Volume (bcm/year)	Date of signature/end date	Consumption (bcm) – as % of total natural gas consumption	Cost ($ billion) – as % of import costs
Russian Fed. (Black Sea) – "Blue Stream"	16	(1986 – first agreement) 1997/end of 2025	27.132 bcm – 57%	$11.02 billion – 47.9%
Russian Fed. (western line)	14 (4 by BOTAS, 10 transferred to private sector)	1998/end of 2021		
Azerbaijan (Phase – I)	6.6	2001/April 2021	4.284 bcm – 9%	$1.63 billion – 7.1%
Azerbaijan (Phase – II)	6	2011/start in 2017/2018, until 2032/2033	-	-
Domestic natural gas	-	-	0.952 bcm – 2%	n/a
SPOT LNG	-	-	6.664 bcm – 14%	$5.47 billion – 23.8%

Source: Botas, 2014; Natural Gas Europe, 2014.

As evident from Table 7, Iranian gas is the most expensive for Turkey, and represents a source of tension between the two countries. Turkey buys gas from Iran at a price of $507/tcm. This price was agreed after an arbitration procedure in 2009 that was concluded in favour of BOTAS. The procedure covered retrospective price revision in the framework of a discount rate determined by the International Court of Arbitration.[9] Turkey was also awarded $800 million in compensation relating to natural gas purchases from Iran. Moreover, BOTAS filed a request in 2012 for the cessation of gas imports from Iran due to low gas quality, while arbitration procedures are in progress at the ICC, since Turkey wants to lower the Iranian price (Oxford, 2014, p. 29).

Table 7. Natural gas prices for Turkey 2012–2013 (for BOTAS)

Agreement	**Price in 2012, $/tcm**	**Price in 2013, $/tcm (Discount in 2013)**

[9] The court is a branch of the International Chamber of Commerce (ICC).

Iran	530	507 (4.34%)
Russia (Western Line)	446	429 (3.81%)
Russia (Blue Stream)	445	428 (3.82%)
Azerbaijan	354	349 (1.41%)

Source: G. Rzayeva, Natural Gas in the Turkish Domestic Energy Market: Policies and Challenges 2014, p. 29; Table adopted from ZAMAN.

In addition, Turkey buys Russian gas at a discount rate, since Russia applied discounts to its European customers in 2013. Nevertheless, the cheapest natural gas is imported from Azerbaijan, at a price of $349/tcm (Table 7).

All gas contracts are characterized by a "take or pay" obligation, meaning that Turkey is obliged to take a minimum pre-specified proportion of the contracted volume each year, or it pays for the gas even if not taken (Rzayeva, 2014, p. 22).[10] As reported by the "Natural Gas Europe" organization (Natural Gas Europe, 2014), Turkey will abandon this obligation for Azerbaijani gas in the coming year, and for Iranian gas in the coming months. It has also been reported that Turkey abandoned similar clauses for gas supplies from Russia in 2013.

The above described import dependency is leading to concerns about meeting seasonally volatile gas demand, with an absence of sufficient underground storage capacity. In addition, supplier or transit countries could curtail agreed volumes for economic or political reasons (as was the case in 2006, when Ukraine and Iran cut gas exports to Turkey, and in January 2007 and 2008, when Iran reduced the supply of gas twice). When such gas supply interruptions occur, there is a risk of power shortages due to the interdependence of the natural gas and electricity markets. This can be mitigated by the construction of new storage facilities and the diversification of sources (Atiyas et al., 2012, p. 66).

Import dependency is crucial for understanding the Turkish natural gas market and its connection to the electricity market. Nevertheless, other segments of the natural gas market are also important in order to understand the market fully, as explained below (IEA, 2013b, pp. 14-17, Rzayeva, 2014, p. 32; Atiyas et al., 2012; EMRA, 2012, p. 34; PwC Turkey, 2014, p. 8):

- *BOTAS market share*: Under the law passed in 2001, BOTAS is obliged to gradually transfer its import contracts with the aim of reducing its market share to 20% of annual consumption. Consequently, a small portion of natural gas imports from Russia was transferred to seven private companies (in total 10 bcm).[11] Nevertheless, BOTAS currently holds an 80% market share, while the remaining 20% is in the hands of private companies. It is a widely accepted view that it is unrealistic to expect the market share of BOTAS to be reduced to 20%. The amended law from 2013 proposes a reduction to 50%, while there is no specified deadline for BOTAS.

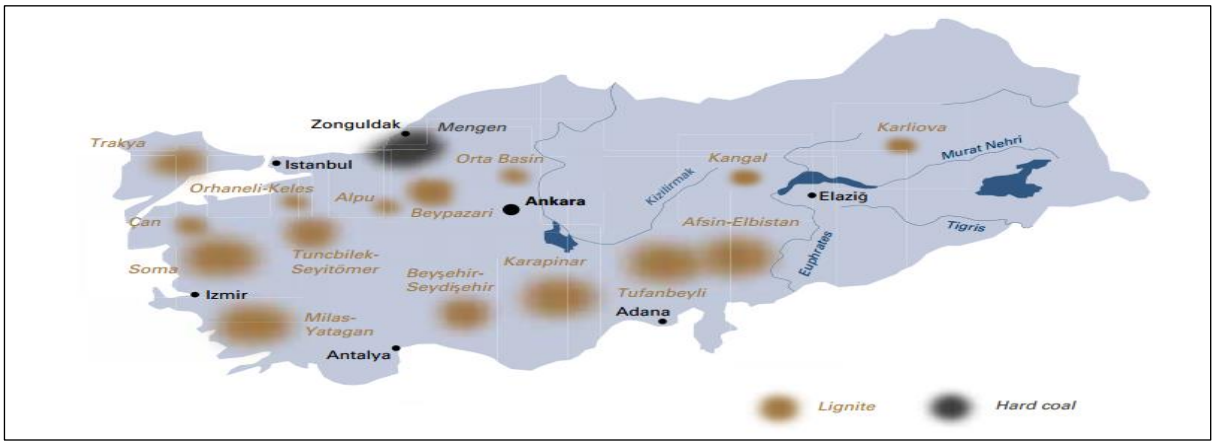
[10] Gas not taken may, however, be taken in a make-up period of 4-5 years.
[11] Enerco Enerji (2.5 bcm), Bosphorus Gaz (0.75 bcm; additional 1.75 mcm in 2012 tender), Avrasya Gaz (0.5 bcm), Shell Enerji (0.25 bcm), Akfel (2.25 mcm, Kibar Enerji (1 mcm), Bati Hatti (1 mcm).

- *LNG imports*: There are two LNG terminals in Turkey (used for storage, gasification and transmission). One is the Marmara Ereglisi LNG Terminal, owned and operated by BOTAS (in operation since 1994 under agreement with Algeria). The second is the Ege Gaz A.Ş. LNG Terminal at Aliaga (in operation since 2006 and operated by the private company Ege Gaz).
- *Storage:* The country has approximately 3 bcm of storage capacity, which is planned to be increased due to the increasing demand for gas.
- *Wholesale market*: There are 42 wholesale companies in Turkey that are not allowed to engage in transmission and distribution activities. Their sales quantities are limited to less than 20% of projected consumption, while they are also required to maintain storage capacities.
- *Retail market*: There are 63 distribution companies that are obliged to purchase natural gas from at least two different sources.
- *Eligible customers:* The threshold level is set to zero for all household customers, except for those who consume less than 100 tcm a year. Inner-city distribution companies have an eligible customer limit of 15 mcm per year for the first five years of operations (since they charge a higher distribution fee to non-eligible customers). Ankara's recently privatized, Baskent Gaz inner-city distribution network enjoys a special eligible customer limit of 800 tcm until August 2017.
- *Pricing (BOTAS)*: In 2008, BOTAS was included in a cost-based pricing mechanism that applies to state-owned enterprises. BOTAS was able to set its wholesale prices for distribution companies and for eligible customers, and was therefore required to publish its tariffs on a monthly basis (reflecting import prices and TL/USD parity). Later, BOTAS was exempted from the mechanism, and began charging subsidized prices to distribution companies and eligible customers, while power plants under BOO and TOR contracts remained unsubsidized.
- *Pricing (wholesale companies):* Wholesale prices are freely negotiated between the buyer and seller. Nevertheless, BOTAS' tariff is used as a benchmark in the pricing process. Such a market situation illustrated that BOTAS' pricing policy caused a distortion of competition, and has also affected its financial position.

3.1.2 Coal

In 2013, installed power plant capacity dependent on coal was 12,606 MW, equivalent to 20% of total installed capacity. Capacity using hard coal and imported coal was 4,383 MW, while capacity using lignite was 8,223 MW (Table 5). The only location in Turkey where hard coal is extracted is the Zonguldak basin (Figure 8). Hard coal resources in the basin are estimated at some 1,314 million tonnes. Although there are no legal restrictions on private sector involvement, the state-owned Turkish Hard Coal Enterprise (TTK) has a de facto monopoly in the production, processing and distribution of hard coal (EUROCOAL, 2015).

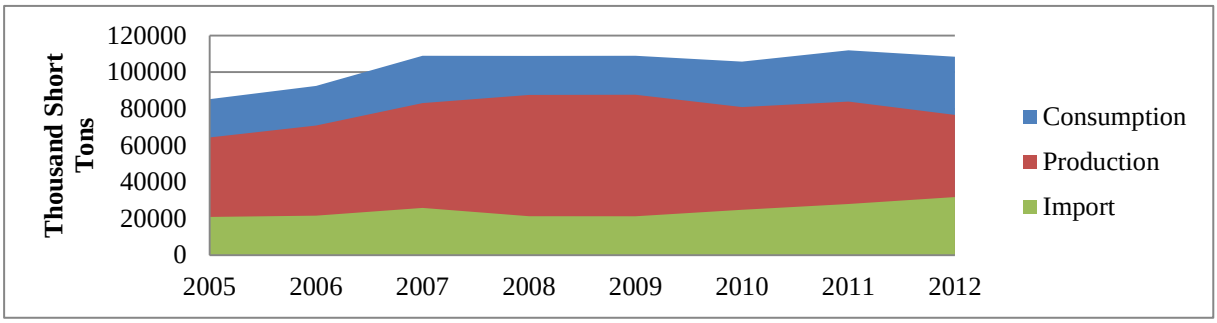
Figure 8. Lignite and hard coal rich regions in Turkey



Source: EUROCOAL, 2015.

Turkey mainly produces lignite, which is its most important indigenous energy resource. Turkey's lignite fields are spread across all regions of the country, with approximately 46% of reserves being located in the Afsin-Elbistan basin (EUROCOAL, 2015; MENR, 2014). Domestically produced lignite accounts for approximately 75% of the country's coal supply (Figure 9).

Figure 9. Production, consumption and import of coal in Turkey, 2005-2012



Source: U.S. Energy Information Administration, International Energy Outlook 2013 with projections to 2040, 2014.

3.1.3 Hydroelectric power

Turkey's hydroelectric power sources are the most important among its renewable energy potentials. According to MENR, total economic hydroelectric power potential in Turkey is 140 billion kWh/year, while currently 35% of that potential is utilized. In 2013, total installed hydroelectric power capacity was 22,289 MW (Table 5), with a total of 467 hydroelectric power plants (HEPPs). In the same year, 25% of total electricity production was generated from hydro sources (Figure 6).

Most of the country's economically feasible hydroelectric power potential is distributed to 14 river basins. The most important is the Euphrates River, which accounts for 30% of county's

hydroelectric power potential and is where Turkey's largest HEPPs were constructed: Ataturk (power of 2,400 MW), Karakaya (power of 1,800 MW) and Keban (power of 1,330 MW). There is also considerable potential in the Black Sea region, where 20% of total projects in Turkey were developed by the private sector (Baris & Kucukali, 2012, p. 381).

In the future, an increase in the number of HEPPs would contribute to reducing Turkey's dependence on foreign sources of energy. Nevertheless, Turkey also faces a challenging problem in this area, i.e. maximizing the utilization of hydroelectric power while maintaining environmental consciousness and sustainable development. The EML (2001) provided for the planning and construction of small HEPPs by the private sector. Consequently, this created a market for companies that draft feasibility reports, for construction companies and for the owners/managers of small HEPPs. Their inadequate water resource management strategies led to the disruption of the natural flows of rivers, since their aim was to generate electricity, with little heed paid to components of the ecosystem and the needs of local residents (Kentel & Alp, 2013, p. 34). In 2008, a regulation was issued concerning HEPPs with installed capacity of between 0.5 and 25 MW. The regulation instructs such HEPPs to draw up an Environmental Impact Assessment (EIA) report if they want to obtain a small HEPP license. Nevertheless, this regulation did not have the intended effect, since many of the licenses for small HEPP were granted prior the entry into force of the regulation (Baris & Kucukali, 2012, p. 382).

Despite the challenges, installed hydroelectric power capacities have developed over the last decade. In 2006, installed hydroelectric power capacity totalled 13.1 GW, while that number reached 22.3 GW in 2013. Turkey's long-term target is to have 180 GW of installed hydroelectric power capacity by 2030 (Figure 13).

3.1.4 Renewables

As already mentioned above, Turkey is heavily dependent on expensive imported energy, in terms of electricity generation, mainly in the form of natural gas and high-quality coal. Its main domestic energy resources are coal (lignite) and hydroelectric power.

Turkey's advantageous geographical location provides for the possible use of several renewable energy sources. The first major source is hydroelectric power, which was presented in the previous subchapter. The other potential renewable energy sources are solar, thermal, wind, geothermal and photovoltaic energy (Yuksel, 2013, p. 1038). In terms of renewable energy sources, 25% of electricity is currently generated from hydropower (59,421 GWh), 1% from geothermal sources (1,364 GWh) and 3% from wind (7,557 GWh), while the remainder (71%) is produced from fossil fuels (Figure 5).

In addition to dependency on imports of fossil fuels, which affects the country's current account deficit and price stability, air pollution also gives rise to severe environmental issues in Turkey as the result of increasing energy consumption. Turkey is addressing these issues in parallel with the need to comply with the Kyoto protocol and EU Directives (Bölük, 2013, p. 153).

The main instruments that promote renewable energy use in the EU are purchase guarantees by feed-in-tariffs, quota applications and energy tax exemptions. Meanwhile, in Turkey, the first instrument was the EML, which allows individuals and small corporate entities to build electricity generation facilities with a maximum installed capacity of 500 KW from renewable energy sources that are exempt from licensing obligations (Baris & Kucukali, 2012, p. 385). With the new EML, maximum installed capacity has been raised to 1 MW, while the Council of Ministers is authorized to increase that level to 5 MW. The second instrument was the Law on the Utilization of Renewable Energy Sources for Electricity Generation (No. 5346, Official Gazette, No. 25819). Under the aforementioned law, several mechanisms were developed in Turkey to support the use of renewable sources (Baris & Kucukali, 2012, p. 386; Atiyas et al., 2012, p. 120):

a) Licensing: In addition to a license exemption for a maximum of 1 MW of installed capacities (from renewable sources) for those who do require a license, only 1% of the licensing cost is paid by the applying entity, which is exempt from annual licensing costs for the first eight years.
b) Land appropriation: Real properties that are deemed forest or the private property of the Treasury receive the right of easement, usage permits or are leased. Moreover, an 85% discount is applied to rent, the right of easement and usage permits, while several costs are not charged for the first ten years.
c) Purchase guarantees: Government guarantees to buy electricity offering a feed-in-tariff of 5-5.5 €c/kWh for utilities that are less than 10 years old.

Law No. 5346 was amended in 2010 by the *Law Amending the Law on the Utilization of Renewable Energy Sources for Electricity Generation* (No. 6094). One major change related to feed-in-tariffs, which were deemed very low. Although much higher feed-in-tariffs were proposed in 2009, the following were confirmed in the framework of Law No. 6094. The new tariffs are applicable to plants built or to be built between 18 May 2005 and 31 December 2015, offering an amount of 5.6 €c/kWh for hydropower and wind, 8 €c/kWh for geothermal, and 10.2 €c/kWh for solar and biomass power plants. Moreover, the domestic manufacturing of equipment used is promoted via feed-in-tariffs ranging from 0.3 to 2.7 €c/kWh (Atiyas et al., 2012, pp. 113-123).

A comparison of Turkey's feed-in-tariffs and those of selected EU Member States is shown in Appendix D. As discussed by Baris & Kucukali (2012, p. 385), Turkey's mechanisms are deemed to be inadequate compared with leading EU countries in the utilization of renewable energy sources. On the other hand, taking into account the opinion of Atiyas (et al., 2012, p. 123) with regard to the difficulties faced by Spain, Germany and Italy, which are considered the highest feed-in-tariffs countries since the financial crisis of 2008, Turkish tariffs may actually be reasonable in terms of long-term stability.

The current utilization of renewable sources in Turkey is analysed below.

- Wind energy

Data show that 2,760 MW of wind capacity was installed in Turkey in 2013 (Table 5). Installed wind capacity is expected to grow at a rate of between 500 and 1,000 MW per year

to reach more than 5 GW by 2015, while the country's goal is to install up to 20 GW by 2023. For this ambitious target to be reached, the transmission structure will have to be upgraded in the future in order to allow such large scale development to be connected to the power grid (Toklu, 2013, p. 462).

According to MENR (2014), wind energy potential in Turkey is estimated to be 48,000 MW. Plants with a capacity of 5 MW can be built in Turkey in areas with a wind speed exceeding 7.5 m/s. Also, as noted in Figure 11, the country is aiming to achieve 40 GW of installed wind capacity by 2030.

- Geothermal energy

With its location on the Alpine-Himalayan belt, Turkey has a high geothermal potential. It has been estimated that 2,000 MW of electricity can potentially be generated via geothermal energy. Current data indicate a total of 706.4 MW of potential capacities for which licenses were obtained from EMRA. Nevertheless, current installed capacity is 404.9 MW, generated by 15 geothermal power plants (MENR, 2014).

- Other potential renewable sources

Turkey is suitable for the use of solar energy, with gross solar potential calculated at 117 GW per year, 40% of which can be used economically (Toklu, 2013, p. 461). There are currently some small-scale photovoltaic solar energy systems in the country that were established primarily for research purposes. MENR is planning to install 3,000 MW of photovoltaic power plants in 2023 in several stages. Licenses for 600 MW will be issued in the first phase, followed by an increase in capacity to reach the 2023 target (MENR, 2014).

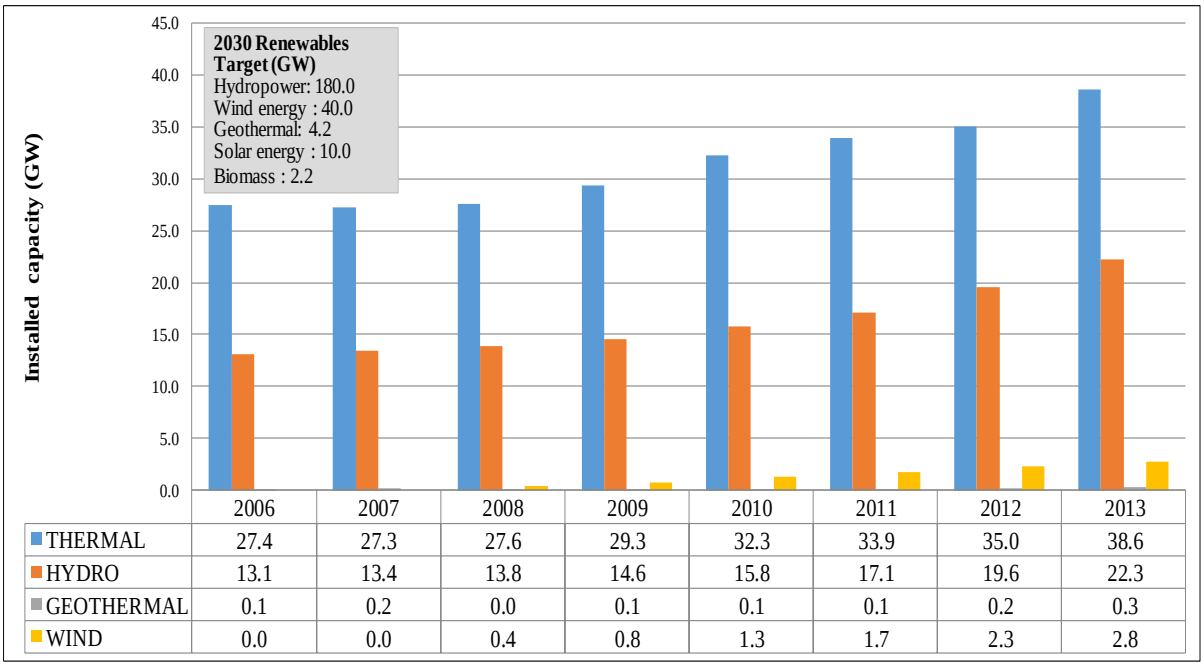
Bioenergy potential, which covers biodiesel, bioethanol, biogas and biomass, is also important for Turkey. Biomass has an annual potential of 42 GW, while 10 GW was actually produced from biomass in 2010. A projection for 2030 indicates that the aforementioned number will increase to 11 GW (Baris & Kucukali, 2012, p. 384).

Figure 10. Turkey's installed renewable capacity and thermal capacity 2006-2013

Source: Electricity generation & transmission statistics of Turkey for year 2013; I. Yuksel, Renewable energy status of electricity generation and future prospect hydropower in Turkey 2013, 2013, p. 1040.

3.2 Transmission

Transmission activities are performed by the state-owned TEIAS, which has a complete monopoly over this segment of the electricity market due to the natural monopolistic

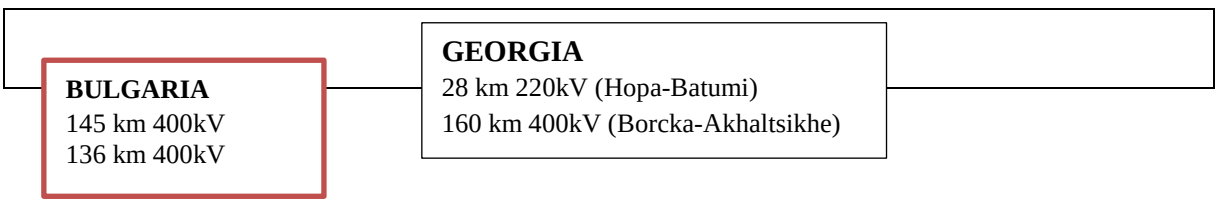


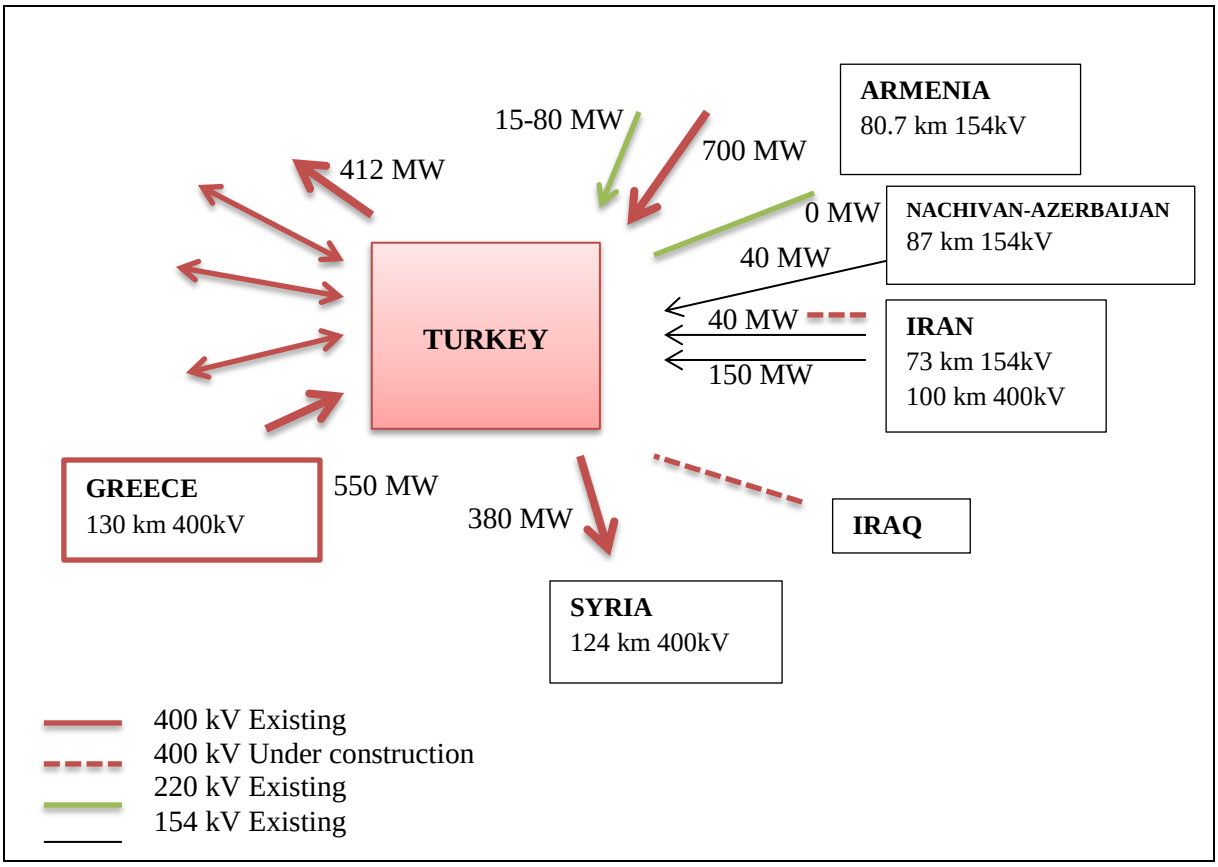
	2006	2007	2008	2009	2010	2011	2012	2013
THERMAL	27.4	27.3	27.6	29.3	32.3	33.9	35.0	38.6
HYDRO	13.1	13.4	13.8	14.6	15.8	17.1	19.6	22.3
GEOTHERMAL	0.1	0.2	0.0	0.1	0.1	0.1	0.2	0.3
WIND	0.0	0.0	0.4	0.8	1.3	1.7	2.3	2.8

characteristics of the transmission infrastructure. TEIAS works under a transmission license and is responsible for all transmission facilities in the country. It also plans load dispatch and operational services (TEIAS, 2014). As stated in the 2013 TEIAS statistical report (2013), Turkey has 51,344 km of transmission lines with several projects in progress. The current lengths of the transmission lines at 380 kV (also referred to as 400 kV), 220 kV, 154 kV and 66 kV voltages are 16,808 km, 84.5 km, 33,942.5 km and 509.4 km respectively (Appendix E).

Turkey is currently interconnected with Greece, Bulgaria, Georgia, Iran, Iraq and Syria. One of the most important interconnections for the country in terms of commercial exchange is the ENTSO-E connection with Greece and Bulgaria. There are two 400 kV transmission lines on the Turkey-Bulgaria interconnection (one 145 km long and the other 136 km long), while there is a 130 km long 400 kV transmission line on the Greece-Turkey interconnection (Figure 11).

Figure 11. Turkey's interconnection with neighbouring countries



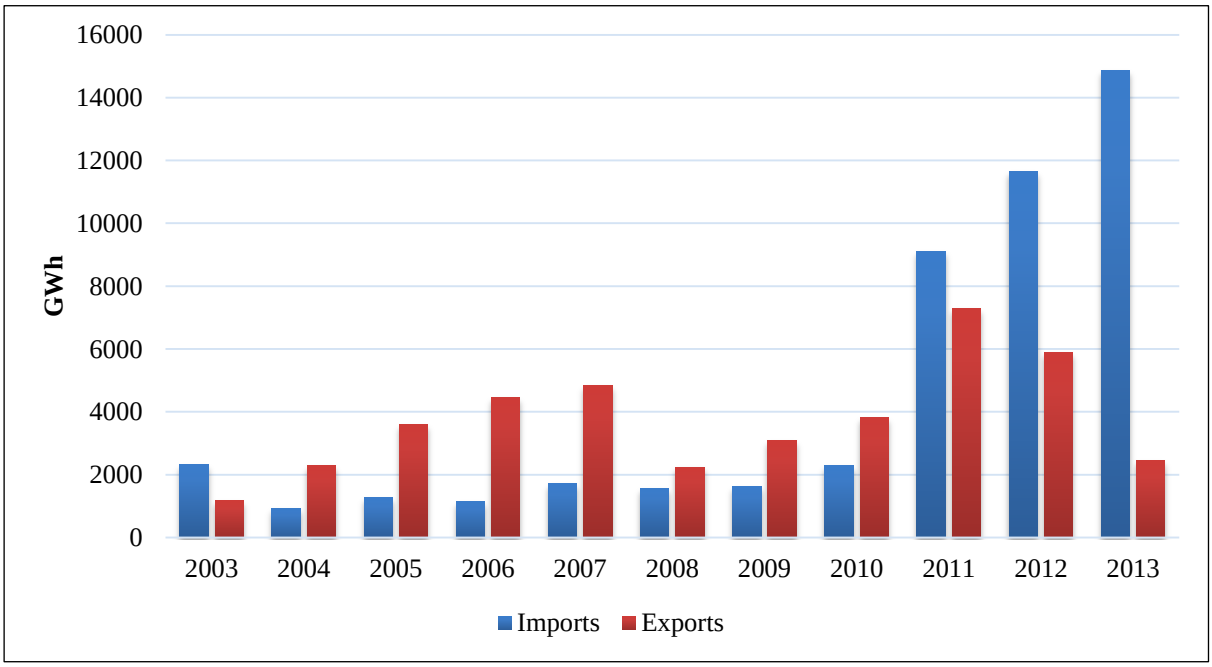


Source: F. Kölmek, Turkish Power Balancing Market 2014; 2014; Deloitte Consulting, Turkey import and export expectations – project report 2, 2013.

Following several stand-alone operational tests, the Turkish system was synchronously connected to Continental Europe in September 2010. A test of the parallel synchronous interconnection was subsequently planned. However, due to technical problems within the Turkish network, trial operations were extended in order to achieve satisfactory compliance with Continental European rules by TEIAS. In June 2011, limited commercial exchanges were successfully performed on the interconnection. Moreover, the capacity available for trade has been gradually increasing, and is currently 550 MW for imports to Turkey and 412 MW for exports from Turkey (Staschus, 2014, p. 41). The long-term plan is to reach 1,200 MW on the both the import and export side, as well as a permanent *synchronous connection* with Continental Europe.

The first commercial exchange with Greece and Bulgaria in 2011 resulted in two changes in overall Turkish cross-border electricity exchange activities. The first was an increase in total electricity imports from 2,288 GWh in 2010 to 9,112 GWh in 2011 (an increase of 300%), and an increase in electricity exports from 3,635 GWh in 2010 to 7,289 GWh in 2011. Secondly, Turkey became a net electricity importer, while it was a net electricity exporter prior to the ENTSO-E connection. In 2013, imports reached 14,858 GWh, with 64% of electricity imported from Greece and Bulgaria. On the other side, exports during the same year were much lower than in 2011 or 2012, reaching 2,453 GWh, with 64% of electricity exported to Continental Europe (Figure 12).

Figure 12. Total electricity imports and exports by Turkey 2003-2013



Source: Electricity generation & transmission statistics of Turkey for year 2013, 2013.

The available transmission capacity (ATC) on both borders is allocated via the explicit auction method. Market participants can submit their bids for capacity via an auction platform and, if the volume of offered capacity is higher than the volume of required capacity, the auction price is €0/MWh. In the opposite case, when congestion occurs, capacity is payable. Capacity auctions are conducted by each country's TSO. A total of 50% of interconnection capacity is auctioned by TEIAS, 32.5% by the Bulgarian TSO (ESO) and 17.5% by the Greek TSO (HTSO) (Deloitte Consulting, 2013, p. 12).

Another important interconnection is Georgia-Turkey. Turkey is interested in increasing electricity trade with Georgia, particularly because of Georgia's rich renewable energy sources, and also because of the Turkey's increasing electricity demand (Deloitte Consulting, 2014, p. 2). Interconnection comprises two lines: the first is the Hopa (Turkey)-Batumi (Georgia), 28 km-long 220 kV transmission line. The second is the Borcka (Turkey)-Akhaltsikhe (Georgia) 400 kV transmission line, which is 160 km long (Figure 12). There is no possibility of synchronous parallel operation between the two countries on this interconnection, since Georgia is not an ENTSO-E member. Two different methods are currently applied on the Hopa-Batumi line (Deloitte Consulting, 2013, p. 18, Electricity Market Import and Export Regulation, Official Gazette, No. 29003):

a) *Directed unit method:* Operation of a generation facility or a unit of a generation facility in the electricity system of the country that electricity is to be imported from/exported to,

in parallel with the national electricity system. No capacity was allocated under this method in 2014.

b) *Isolated region method:* An isolated region is formed in the country that electricity is to be exported to via interconnection lines. In October 2013, EMRA amended the license issued to the private company that holds the right to export on this line. However, the company declared it will start exporting after May 2015. On the other hand, TETAS cannot export energy at present, since its energy trade agreement has not yet been renewed.

For the Borcka (Turkey)-Akhaltsikhe (Georgia) line, the *asynchronous parallel operation* method will apply. The interconnection has been constructed and tests completed. There was 610 MW of capacity available for electricity transmission in December 2014. As a rule between the countries, the exporting country determines to whom the ATC will be allocated, in this case Georgia as it is in the position of exporter. (Deloitte Consulting, 2014). Georgia does not have a day-ahead electricity market and no auction platform. Auctions for the ATC are therefore oral.

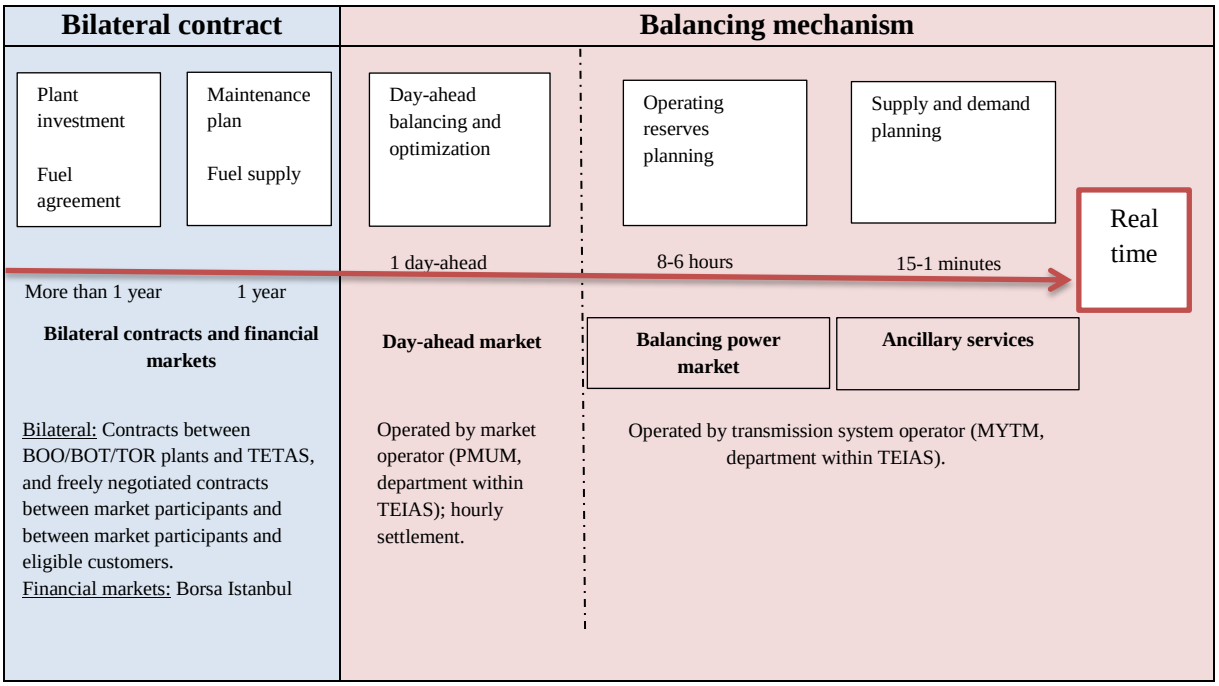
With regard to other neighbouring countries, the Iran-Turkey line (600 MW) back-to-back station is expected to be completed by 2016. In addition, reinforcement of the Iraq-Turkey interconnection line continues, while trade is currently possible via the isolated region method. There is no trade on the Syria-Turkey border.

3.3 Wholesale market

The Turkish electricity market is still in the process of restructuring. Consequently, its current wholesale market structure has not yet shifted to the final phase. Nevertheless, the final market structure proposed under electricity regulations is in line with the EU Internal Energy Market. Figure 13 illustrates the current wholesale electricity market structure in Turkey. It can be noted that the market is based on a bilateral contracts market complemented by a balancing mechanism. An analysis of each segment of the wholesale market will be presented in the following subchapters (Deloitte Consulting, 2012, p. 8).

As a tradable commodity, electricity is unusual in that it cannot be easily stored. The maximum capacity of all electricity-producing plants in a region determines the maximum supply of electricity in that region at a given moment. For a certain region (the so-called control area), demand and supply are first matched. Any excess power may then be sold to other control areas. This excess power constitutes the wholesale electricity market (Hull, 2009, p. 584). Electricity can be traded either physically or financially. Physical trading refers to a situation when the electricity traded is actually produced and delivered, while the purpose of financial trading is to hedge against price volatility (physical delivery does not occur) (Verdugo Penados, 2008, p. 14). In Turkey, most electricity trade is physical, while the financial markets are expected to develop additionaly with novelties in the market, which are explained in Subchapter 3.3.6.

Figure 13. Current structure of the wholesale electricity market



Source: Deloitte Consulting, Turkish electricity market review, 2012, pp. 9-10.

3.3.1 Bilateral contracts and the role of TETAS

The majority of Turkish electricity contracts in place are between a generation company or a wholesale company and a distribution[12] company or an end-customer (bilateral energy sales contracts). Bilateral contracts are not standardized. European Federation of Energy Traders (EFET) standard contracts are therefore not commonly used. Consequently, the form and terms are subject to negotiations between parties, and EMRA has no supervisory power over these contracts. On the other hand, in contrast to private sector wholesale companies, all public contracts of TETAS are subject to EMRA's approval (Ergün & Gökmen, 2013, p. 17). Figure 15 illustrates the bilateral contracts system of Turkey, and its energy flow.

Specifically, three types of bilateral contracts exist on the market (Deloitte Consulting, 2012, p. 10; TETAS, 2013, pp. 20-22):

a) Long-term contracts between BOO/BOT/TOR and TETAS. These private sector power plants have contracts with TETAS, starting from 1989, and are valid for a period of between 15 and 30 years.

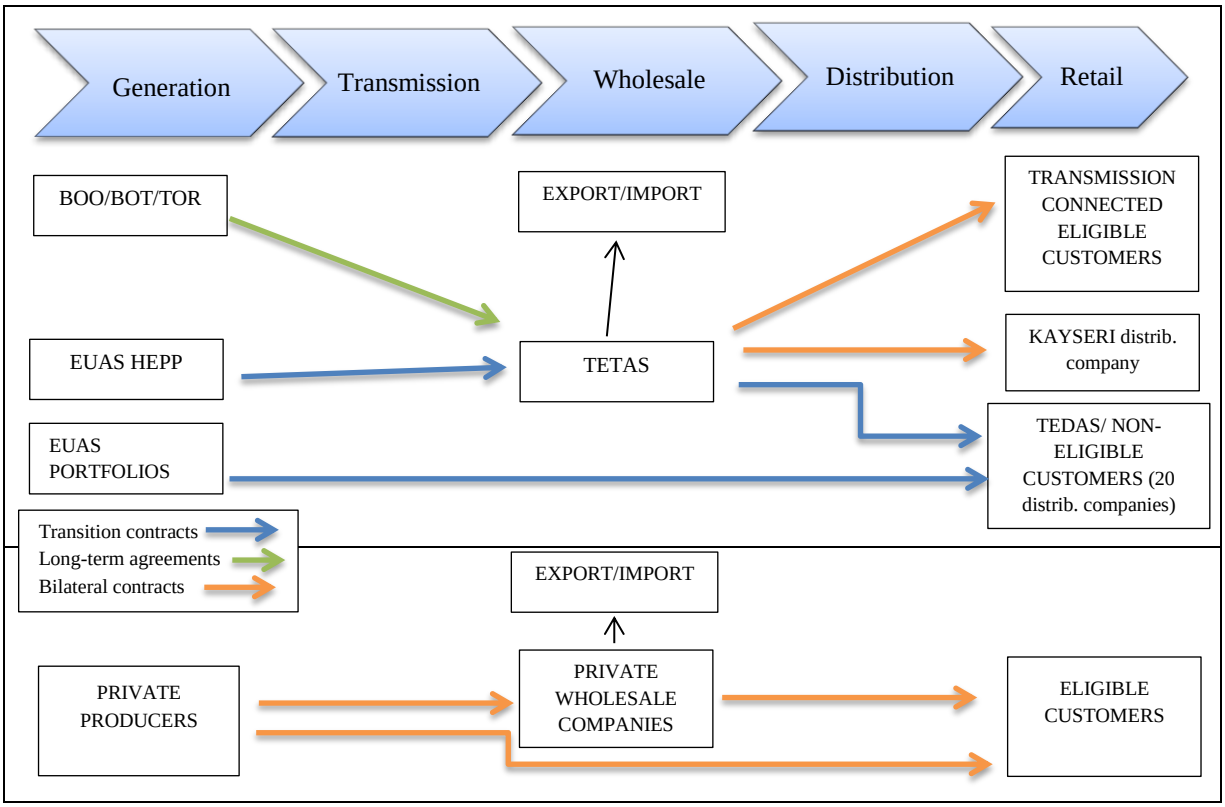
b) Transition period contracts (TPCs) between EUAS, TETAS and distribution companies. The energy flow goes from EUAS to TETAS, and the electricity is delivered to the non-eligible customers of 20 distribution companies. Currently, they operate separately on the market; distribution activities are performed under a distribution license, while retail activities are performed under a supply license (Figure 14). In 2006, an agreement was

[12] Before unbundling, distribution companies also performed retail activities on the market. Since 2013, distribution companies operate under a distribution license (they maintain the distribution network), while electricity is sold to customers by retail companies under a supply license.

made (a transition period contract) under which TETAS purchased 20-23 billion kWh of electricity from EUAS on an annual basis. The agreement was valid until the end of 2012. However, in 2013, new agreements were concluded, and 68,614,230,100 kWh of electricity energy was purchased from EUAS by TETAS.

c) Freely negotiated contracts between market participants and eligible customers.

Figure 14. Bilateral contracts electricity market and energy flow



Source: Deloitte Consulting, Turkish electricity market review, 2012, p. 11.

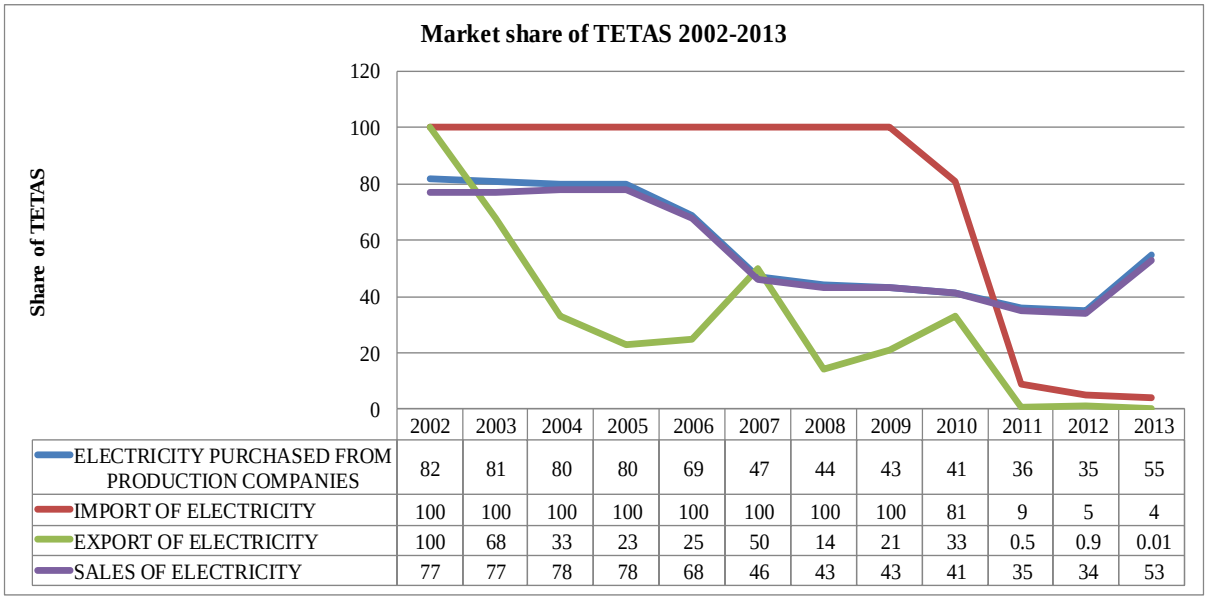
State-owned TETAS plays an important role in the wholesale trading system as it was established in the scope of electricity market reform to carry out wholesale trading and contracting activities. TETAS therefore purchases electricity from EUAS, BO/BOT/TOR plants, other countries (based on import contracts) and the balancing market. It sells energy to electricity distribution companies, electricity retail sales companies, customers connected to the transmission system, other countries (under export contracts) and the balancing market (TETAS, 2013, p. 16).

Table 8. TETAS trading portfolio in 2013 (purchase)

Electricity purchased from	Quantity (GWh)	Percentage
EUAS	68,614	52.3
BOO	42,939	32.8
BOT	13,293	10.1
TOR	3,715	2.8
PMUM (MFSC)	2,242	1.8
IMPORT	227	0.2
TOTAL	131,079	100

Source: TETAS, 2013 Annual Activity Report, 2013, p. 33.

In is evident from the TETAS trading portfolio in 2013 (Table 8) that 98% of electricity purchased in 2013 by TETAS was based on either TPCs or BOO/BOT/TOR contracts. According to a TETAS report (2013, p. 33), a major portion of purchased electricity was sold to retail or distribution companies, while a smaller portion was sold either directly to eligible customers, on the market (PMUM) or was exported.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
ELECTRICITY PURCHASED FROM PRODUCTION COMPANIES	82	81	80	80	69	47	44	43	41	36	35	55
IMPORT OF ELECTRICITY	100	100	100	100	100	100	100	100	81	9	5	4
EXPORT OF ELECTRICITY	100	68	33	23	25	50	14	21	33	0.5	0.9	0.01
SALES OF ELECTRICITY	77	77	78	78	68	46	43	43	41	35	34	53

Figure 15. Market share of TETAS 2002-2013, in percentages

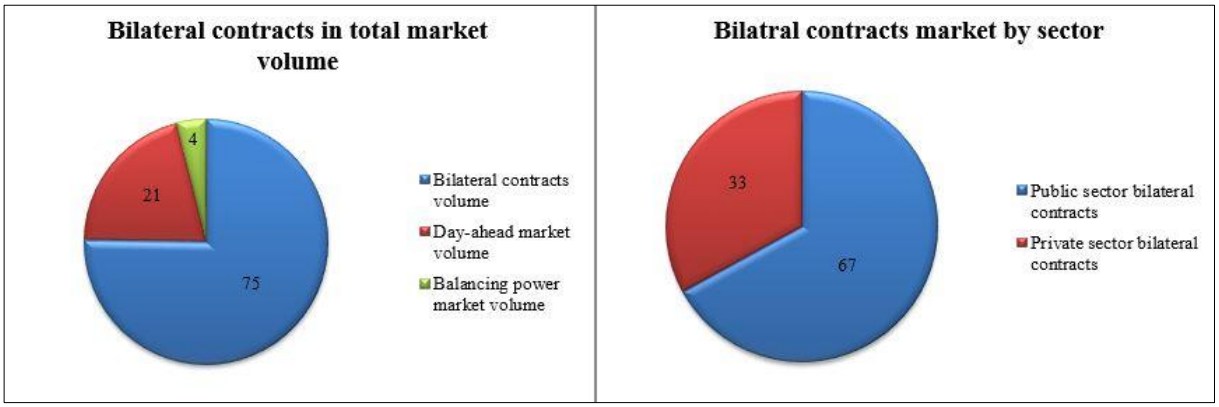
Source: TETAS, 2013 Annual Activity Report, 2013, p. 34.

Since TETAS was expected to help the Turkish electricity market to transition smoothly to a competitive structure, the company retained around 75% of national electricity trade between 2002 and 2006. Despite the enforcement of transition period contracts in 2006, its market share had declined to 35% by 2012 (Karahan in Toptas, 2013, p. 617). In 2013, its market share of national electricity trade exceeded 50%, probably due to additional contracts with

EUAS. In terms of international electricity trade, its market share has fallen significantly due to reform efforts and also due to the possibility given to all the market participants to obtain cross-border transmission capacities. Moreover, only 4% of electricity imports were carried out by TETAS in 2013 and 0% of exports. The remainder of international trade is carried out by wholesale traders. It is expected that TETAS will operate with lower market shares in the sector in the coming years (Figure 15).

The majority of the Turkish wholesale electricity market comprises bilateral contracts. As seen in Figure 16, bilateral contracts accounted for 75% of market volume on a selected date in October 2014. A total of 21% of the electricity was traded on the organized day-ahead market, while a small proportion (4%) was traded via the balancing market. The public and private sectors accounted for 67% and 33% of the bilateral contracts market respectively.

Figure 16. Proportion of the Turkish wholesale electricity market accounted for by bilateral

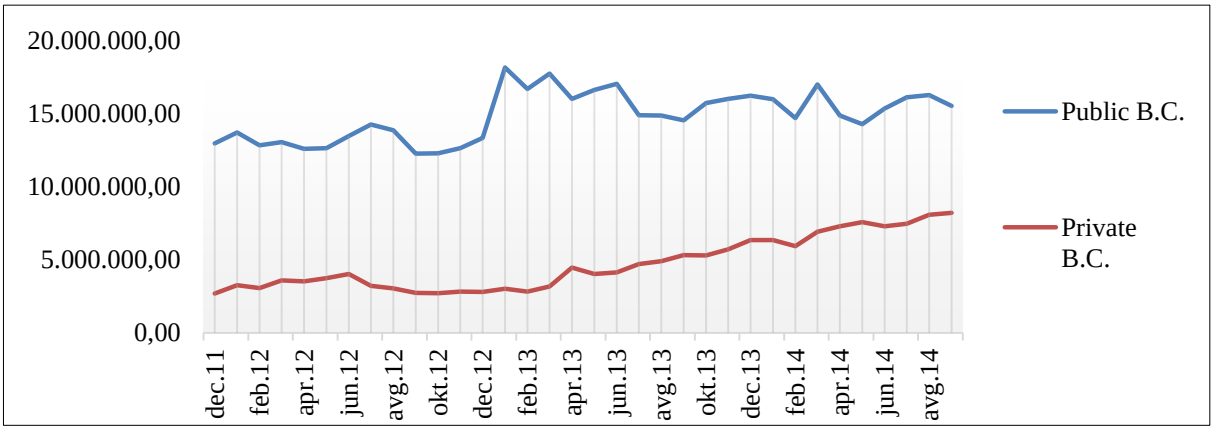


contracts, and bilateral contracts by sector (on 9 October 2014), in percentages

Source: PMUM – General Reports, 2014.

Figure 17 shows the increasing proportion of private bilateral contracts on the market in the period 2011 to 2014. On the other hand, public bilateral contracts dominate the market, with the number of public bilateral contracts in 2014 exceeding the number in 2011. It is a fact that public-sector presence is high on the market, where TETAS plays an important role.

Figure 17. Private and bilateral contracts



Source: PMUM – General Reports, 2014.

3.3.2 Derivatives

Electricity can also be traded financially with the aim of hedging against price volatility. In such cases, physical delivery does not occur. Derivatives traded via the organized market in Turkey are referred to as future power contracts or "base load electricity futures".

Power futures have been traded on the Turkish Derivatives Exchange (TurkDex) since trading started on 26 September 2011. In 2013, trading was transferred to the Borsa Istanbul Futures and Options Market. Power futures represent a small proportion of the total market volume. In 2012, for example, the total traded volume of all contracts on the TurkDex was 62 million, with a total value of $200 billion. In the same year, electricity futures recorded a volume of 928 contacts or 0.0015% of total traded volume (Borsa Istanbul, 2013). The value of those 928 contracts was $9.5 million.

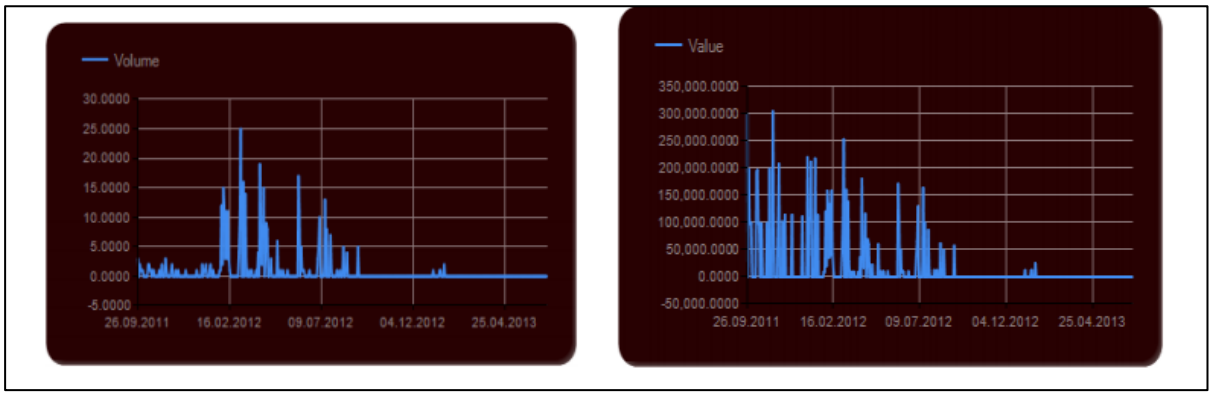


Figure 18. Volume and value of base load electricity futures (2011–2013)

Source: Borsa Istanbul, Borsa Istanbul and the Energy Market, 2013, p. 13.

The reference price for base load electricity futures is the average of the day-ahead hourly prices of the maturity month obtained from TEIAS (Borsa Istanbul – Base load electricity futures, 2015). In practice, these contracts do not attract much interest. It seems that investors believe that prices on the day-ahead market do not reflect the real supply-demand balance. The main reason is the large proportion of state-owned utilities in power generation, and the fact that natural gas market prices are regulated (Bademli, 2013). The low volumes of electricity futures can be seen in Figure 18.

Developed markets, such as Germany with one of the leading energy exchanges in Europe (EEX), have much higher trading volumes for comparable products. At least 200 electricity futures contracts are traded in a single day on the EEX (EEX, 2014).

3.3.3 Day-ahead market

The Turkish day-ahead electricity market began functioning on 1 December 2011. It is "an organized wholesale electricity market for the purchase and sale of electricity to be delivered in the day-ahead timeframe on the basis of a settlement period" (hourly) (Camdan & Kolmek, 2013, p. 63). The day-ahead market is operated by the market operator, Electricity Market Financial Settlement Centre – MFSC (Piyasa Mali Uzlas¸ tırma Merkezi – PMUM). MFSC is a part of the state-owned TEIAS (a department within TEIAS). The law laying down principles and procedures on the day-ahead market is the Electricity Market Balancing and Settlement Regulation drafted by EMRA.

Daily bids and offers are submitted to the market on a portfolio basis. Participants submit their price-volume pairs, with the responsibility to balance their whole portfolio. Both the supply and demand sides may compete on the market, with producers on one side and wholesale or retail companies on the other (Deloitte Consulting, 2012, p. 12).

Participants may submit their offers/bids in three different ways (Electricity Market Balancing and Settlement Regulation, 2009, pp. 33-34; Deloitte Consulting, 2012, p. 15):

a) Single hour purchase or sales

Market participants submit a bid (price-quantity pair) for each hour of the following day (maximum of 32 different price levels for each purchase and sale). Bid quantities are submitted in lots representing 0,1 MW and its folds, while the minimum price limit is "0 TL/MWh" and the maximum limit is "2,000 TL/MWh".

b) Block purchase

The term "block" refers to a constant purchase/sales volume, in terms of hourly MWh, that a market participant is willing to buy/sell for a certain time interval. Market participants are able to offer their customized block bids/offers or to bid/offer a predefined period of time determined by the system operator. The blocks span at least four hours, and participants are allowed to submit at least 50 block bids/offers in a day. For example, a trader may submit a bid covering the hours 2 am to 8 am (block) to purchase 100 MWh at a price of 100 TL/MWh.

c) Flexible sales

These are single hour sales bids that are not associated with a certain hour, and differ from single hour purchase and sales bids. Flexible sales are used by producers, since they allow them to utilize their flexible generation capacity (for example hydro power plants). Bids and offers are submitted in such a way that the technical aspect of the plant is considered, as well as marginal costs for the portfolio. A producer may submit an offer when it is economical to generate at that price, or it may submit a bid when it is more economical to purchase from the market (instead of generating itself). For example, a producer has three power plants in a portfolio with a total capacity 130 MW, and signed bilateral contracts for 80 MW (Table 9).

Table 9. Generation company X's portfolio

Capacity	**Marginal Cost (TL/MWh)**

Power plant 1-60 MW	60
Power plant 2-40 MW	80
Power plant 3-30 MW	90
TOTAL : 130 MW	*Signed contract with its customer for six months (for 80 MW)

Source: Deloitte Consulting, Turkish electricity market review, 2012, p. 15.

Considering its marginal costs, it is economical for it to generate the 80 MW when the price on the market is higher than 60 TL/MWh. On the other hand, when the price is 0 TL/MWh, it is more economical to buy the 80 MW on the market. Table 10 shows its bids/offers on the market, which are flexible according to the producer's portfolio.

Table 10. Example of flexible sales/bids of generation company X

Price (TL/MWh)	0	40	60	70	80	90	100	110
Participant (LOT)	800	800	200	200	0	-500	-500	-500

Note: 1 MW = 10 LOT

Source: Deloitte Consulting, Turkish electricity market review, 2012, p. 15.

As Table 10 shows, generation company X may sell 50 MW when the price is higher than 90 TL/MWh. It produces the contracted 80 MW at a lower price, and then it uses its remaining capacity to sell it on the market, since its marginal costs are lower than the market price.

3.3.4 Balancing market

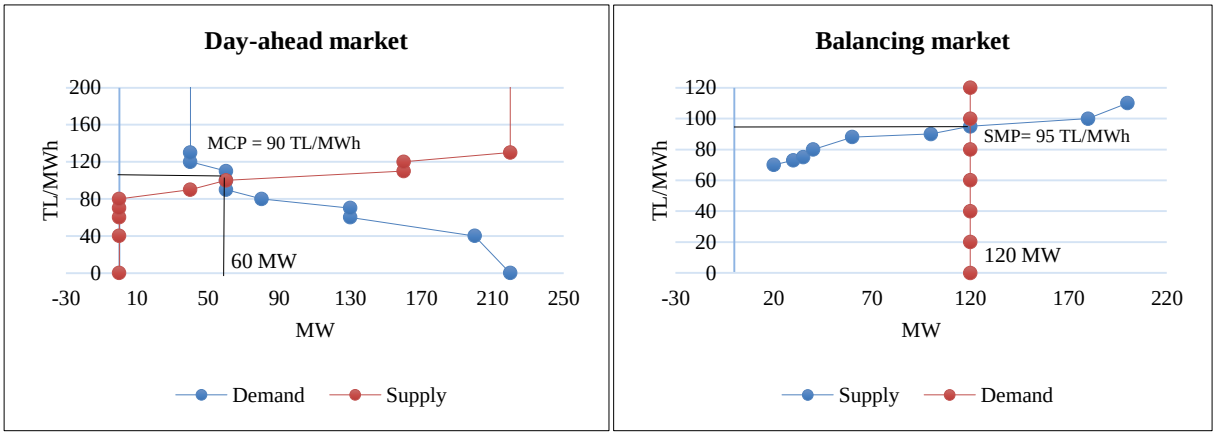
The balancing market is operated by the system operator, the National Load Dispatch Centre – NLDC (Milli Yük Tevzi Merkezi, MYTM). NLDC is a part of state-owned TEIAS (a department within TEIAS).

The balancing market is needed to maintain physical supply and demand equilibrium. Although the system is theoretically in balance after the day-ahead market is closed, market participants may produce below or above their daily accepted bids/offers for different reasons, leading to imbalances in real time. However, in such cases, flexible producers who can load or reload the system on short notice to balance the system are able to submit their bids/offers through a transparent market application, the so-called balancing market (Deloitte Consulting, 2012, p. 19).

Market participants who are able to participate on the market are those who are regarded as balancing entities, meaning that they can independently load or reload the system with 15 minutes' notice. Such entities are gas-fired plants and hydro storage plants, since they have the requisite generation flexibility. Unfortunately, producers who use renewable sources do not have the flexibility required, but are still required to participate on the balancing market, via their finalized daily generation schedules, instead of submitting bids/offers (Deloitte Consulting, 2012, p. 19).

3.3.5 Price determination and market data

The price on the day-ahead market is determined at the intersection of supply and demand.



For each trading hour, a supply curve is formulated from a combination of price-quantity pairs that are listed in ascending order and combined into one offer. The demand curve is formulated in the same manner, but the pairs are listed in descending order. The intersection of the supply-demand curves determines the price of the relevant hour, the so-called market clearing price (MCP) (Figure 19 – left).

Figure 19. Price determination on the day-ahead market (left) and balancing market (right)

Source: F. Kölmek, Turkish Power Balancing Market, 2014; Deloitte Consulting, Turkish electricity market review, 2012, p. 17.

The price of the balancing market depends on whether there is an energy deficit or energy surplus in the system. First, all offers/bids submitted to the balancing market are ranked according to their prices. If there is an energy deficit in the system, the maximum accepted hourly offer price in the system is accepted as the system marginal price (SMP). This situation where a balancing entity sells energy to the system is called up-regulation. On the other hand, when there is a surplus, the minimum accepted bid price is accepted as the SMP. The situation where an entity buys energy from the system in order to correct an imbalance is referred to as down-regulation (Electricity Market Balancing and Settlement Regulation, 2009, pp. 6-7). Figure 19 (right) gives an example where there was an energy deficit in the system, and the SMP was higher than the MCP for the relevant hour after up-regulation instructions.

The wholesale electricity price is influenced by several factors, since electricity cannot be stored and is always produced at the exact moment of demand. Supply and demand drivers therefore have an immediate impact on spot prices. Consequently, the electricity price formulated for the following day is subject to many fluctuations. The main factors affecting the supply side are fuel prices (for coal, gas and oil) and the prices for CO_2 allowances. For power plants using renewable sources, wind and weather are very important as they determine the quantity of generated electricity. In addition, on the supply side, the capacities of power plants, their current technical condition and planned or unplanned outages have an effect on the price. Weather also plays an important rule on the demand side. Customer behaviour is

directly influenced by the temperature and cloud cover. Other demand side price drivers are major public or school holidays. Another important factor is the global economy. For example, demand fell due to the economic crisis, resulting in a drop in electricity prices (RWE – Press and News, 2015).

Based on all relevant findings regarding the Turkish electricity market, the main electricity wholesale price drivers in Turkey are as follows:

- High generation costs: A large proportion of electricity is produced from natural gas. The supply of natural gas is tied to expensive import contracts. In addition, the BOTAS pricing system distorted competition on the market, since there is no competitive pricing on the natural gas market.
- High electricity demand driven by industrialization and urbanization.
- Weather: Demand is higher in the summer due to hot weather and the usage of cooling devices. A similar situation occurs during the cold winter months, when the usage of heating devices increases.
- Islamic holidays: The most important holiday is Kurban Bayram. Electricity consumption is expected to be very low on this day, resulting in low wholesale prices.
- Political influence: The high market share of state-owned companies distorts competition.
- High system losses, especially distribution losses (explained in Subchapter 3.4.).

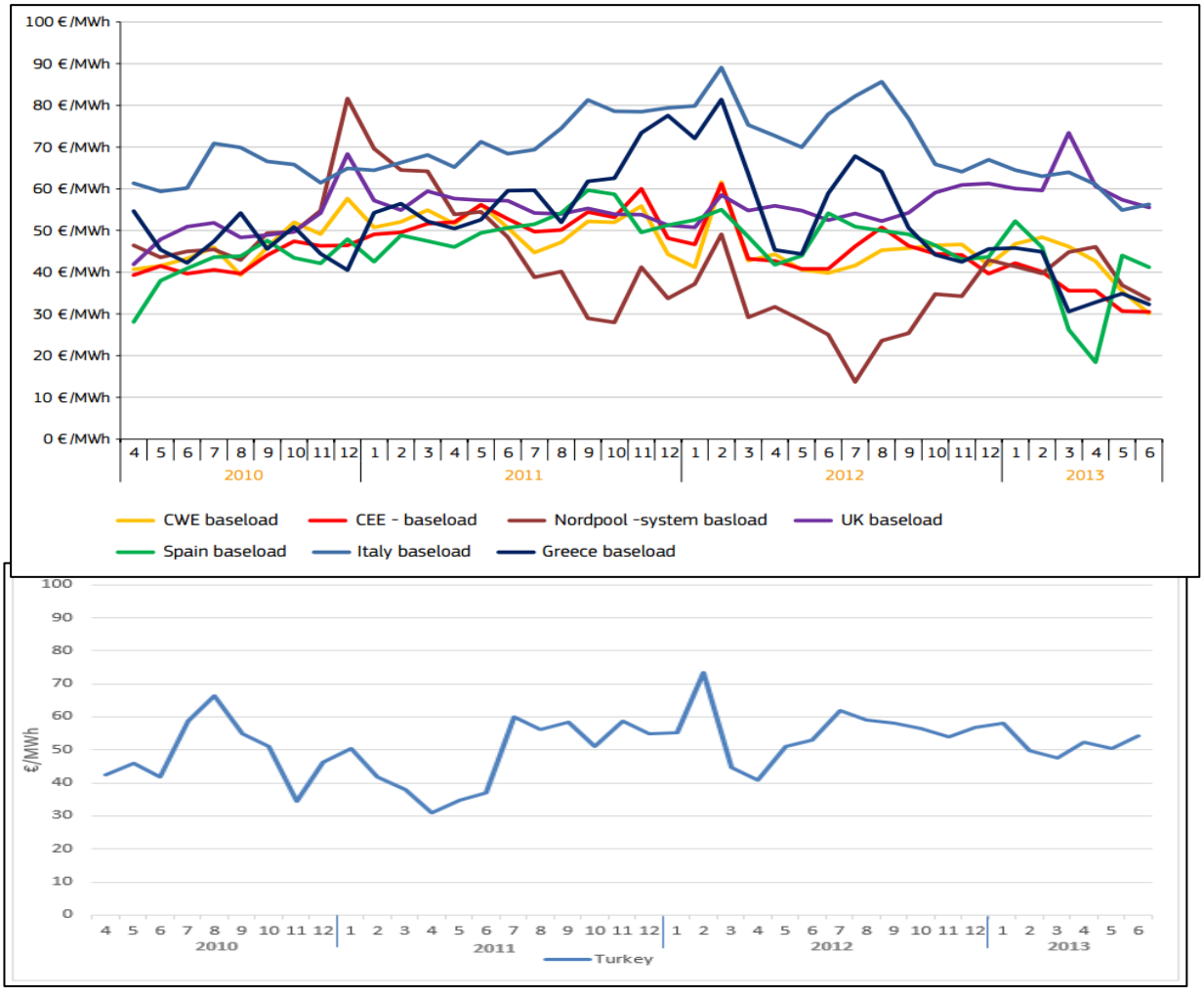
Figure 20 illustrates the development of the Turkish wholesale electricity market price. Peaks are noted during the coldest winter months or on the hottest summer days, probably due to the increased demand arising from increased usage of heating or cooling devices. Turkey's average prices are higher than those of the CEE region. For example, the average CEE wholesale price in February 2012 was €62/MWh compared with €73/MWh in Turkey. Later, in June 2013, CEE prices fluctuated at around €30/MWh, which is much lower than in Turkey where the price was €55/MWh (Figure 22). According to EC quarterly reports (DG Energy – Market Observatory for Energy, 2013), the CEE region is the most dynamic power trading region in Europe. The reason for its low prices in 2013 lies in the limited industrial demand for electricity, which was impacted by the sluggish economic recovery, decreasing generation costs (cheap coal imports and low carbon prices) and abundant renewable supply in Germany.

Figure 20. Turkish wholesale electricity market price

Source: PMUM – General Reports, 2014.

On the other hand, if we compare Turkish prices to the SEE region, more specifically to Greek electricity prices, some similarities are seen in the dynamics of the price curve, although the peaks in 2012 are higher and prices were lower in Greece in 2013. In April 2013, electricity production and consumption were close to their lowest levels in decades in Greece due to the economic situation and weather conditions in that country (DG Energy – Market Observatory for Energy, 2013).

Figure 21. Wholesale electricity market prices of the EU REM (Q2 2013)



Source: DG Energy – Market Observatory for Energy, Quarterly Report on European Electricity Markets, second quarter 2013, 2014, p. 10.

3.3.6 Expected future market developments

The new EML stimulates and accelerates the process of establishing a competitive and fully liberalized market. There are several market changes and developments expected in the near future.

The wholesale market will be operated by three market operators, namely the newly established EPIAS (which holds a market operation license), which will cover the day-ahead and intra-day markets, while the Borsa Istanbul will be responsible for standardized electricity contracts and derivatives markets. The balancing power market and ancillary services market will continue to be operated by TEIAS. Moreover, spot transactions and derivatives will be under one exchange (Boden Law Company, 2013, p. 2). In addition, EPIAS will cover financial settlement obligations for the markets operated by TEIAS and EPIAS.

EPIAS was established as a joint-stock company at the beginning of 2015, with total capital of 61,572,779 Turkish liras (approximately €21 million). A total of 30% of shares were bought by TEIAS (Type-A shares) and BOTAS equally, while 30% of shares were bought by the Istanbul Stock Exchange (Type-B shares). The remaining 40% of shares (Type-C shares) were bought by private energy companies. The main agreements are currently being signed. Following the registration of shares, EPIAS will be able to start with its first transactions (Herdem, 2015).

Table 11 shows the difference between the old and new market structure.

Table 11. Comparison of the current and new wholesale electricity market structure

Market	Current structure	New EML structure
Wholesale market organization	Hybrid: bilateral contracts, day-ahead and balancing market covered by TEIAS (MFSC; NLDC); derivatives on Borsa Istanbul.	EPIAS covering day-ahead (including bilateral contracts) and intraday exchange, TEIAS covering balancing market and Borsa Istanbul operating the derivatives market. Clearing house is Taksabank.
Market operators	TEIAS (MFSC and NLDC), Borsa Istanbul.	EPIAS, TEIAS and Borsa Istanbul.
OTC markets	Not defined by the EML, energy transactions under bilateral contracts.	Also not defined by the new EML.
Licensing	Generation, transmission, retail sales, distribution, autoproducer and autoproducer group license.	Preliminary license, generation license, supply license, market operation license, autoproducer license.

Source: Own

Although the new EML brings positive changes for the organized wholesale market, OTC markets have been left out. The aforementioned law excludes OTC markets from the definition of wholesale markets. Electricity trading is recognized based on bilateral contracts, as it was under the 2001 EML (Boden Law, 2013, p. 2). Moreover, all contracts relating to the organized wholesale markets are exempt from the stamp tax duty. Because OTC markets are not defined by the EML, they cannot benefit from that exemption (Bademli, 2013).

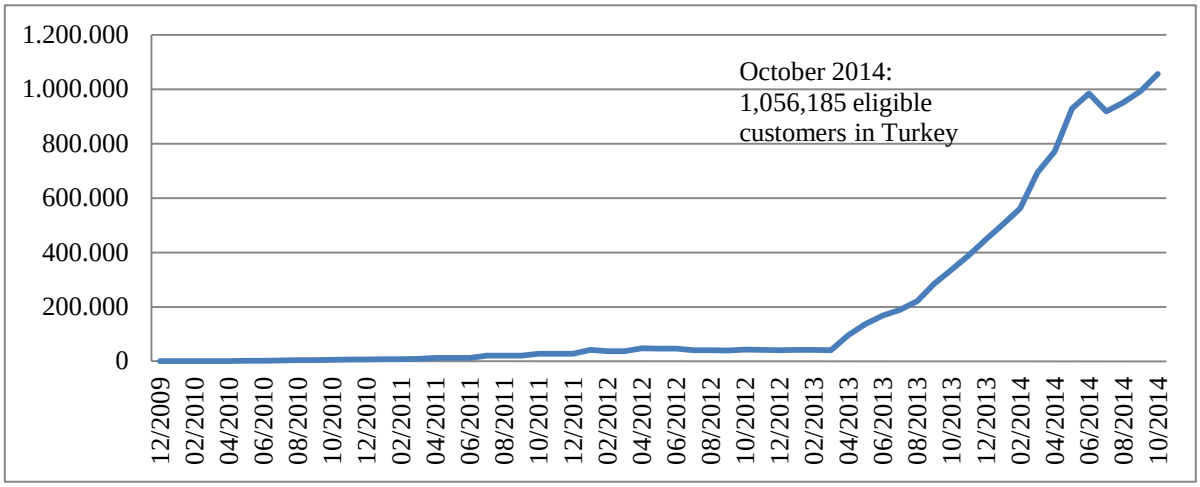
In addition to the aforementioned changes and updates expected in the near future, there has already been some progress in terms of market transparency. The current platform used for day-ahead and balancing market bids (operated by TEIAS – NLDC and MFSC) has been upgraded. In the past, it was possible to enter bids and see the prices of the day-ahead and balancing market, while the platform is now more transparent and offers information about: daily reports, Outage and Maintenance Notification Reports, Congestion Cost Reports and Market Development Reports (number of eligible customers, types of licenses and number of market players etc.). With such information available, analysts and traders have the opportunity to evaluate the forecasted market price better, and to understand the functioning of the overall market (PMUM – General Reports, 2014).

3.4 Distribution and retail markets

The distribution and retail markets were explained to some extent in Chapter 2.3. To summarize, distribution and retail activities were legally unbundled in 2013. There are 21 distribution regions in the country, while each region has its own distribution company that was initially publicly owned and later privatized using a TOR model. There are currently 21 private distribution companies operating under distribution licenses. Nevertheless, TEDAS is the sole owner of distribution assets. The same companies are also entitled to perform retail activities under a separate license. The market is also open to any private company that obtains a supply license to sell electricity to eligible customers. On the other hand, wholesalers are also allowed to sell electricity to eligible customers.

The Turkish retail market is not yet fully liberalized. The eligible customer threshold level was gradually decreased from its initial level of 9 GWh/year to 4,500 kWh/year in 2014. Full opening of the market is expected by the end of 2015 (Deloitte, 2013, p. 30, Enerjisa, 2015). The data for October 2014 shows that the number of eligible customers in Turkey exceeded one million (Figure 22), meaning that the degree of market opening is currently 85%.

Figure 22. Retail market opening in Turkey



Source: PMUM – General Reports, 2014.

With the gradual opening of the market and increased cross-border trading with Continental Europe, we can see an increase in the number of registered private-sector retail and wholesale market participants. There are currently 42 private companies operating on the retail market under supply licenses, and 152 companies operating on the wholesale market, likewise under supply licenses. In terms of distribution, 21 privatized companies are operating the distribution network under distribution licenses (PMUM – General reports, 2014).

Expectations from privately run distribution companies include a reduction in system losses and an improvement in reliability. Turkey incurs high system losses (technical and illegal use). According to TEIAS data, distribution losses have been historically high, from 6.9% in 1984 to the highest level of 16.8% recorded in 2000. A 13.3% distribution loss was recorded in 2013, higher than the 12.7% loss in 2011 and 2012. In addition, transmission losses average 2.5%, meaning that total system losses (distribution and transmission) account for an average of 16.5% of total consumed electricity. Power outages are also common in Turkey and affect economic activity. Interruptions are most common in eastern and south-eastern Anatolia. With regard to illegal use, households that report no expenditure are located in provinces with high network losses (Atiyas et al., 2012, p. 6, p. 55; Electricity generation & transmission statistics of Turkey for year 2013).

- **Tariffs and prices**

As stated in the Electricity Market Tariffs Regulation, transmission and distribution activities on the market, as well as the sale of electricity or capacity or the provision of retail services to non-eligible customers are regulated by EMRA through tariffs. There are six types of regulated tariffs as follows (Electricity Market Tariffs Regulation, Official Gazette, No. 25929, p. 4; Atiyas et al., 2012, p. 27):

1. Transmission connection tariff: The tariff is drawn up and proposed by TEIAS.

2. Distribution connection tariff: The tariff is drawn up and proposed by a licensed distribution company. Distribution and transmission connection tariffs are both intended to cover costs incurred when users connect to the grid. Moreover, users of the distribution system are subject to a standard connection charge (depending on connection capacity and distance).
3. Transmission tariff: The tariff is drawn up by TEIAS and includes three additional components. The first is the "use of transmission" price, which covers the investment, operation and maintenance of the network. It is calculated separately for each region, and separately for customers and producers. The second is the "transmission system operation" price, which covers the costs of operating the NLDC and ancillary services (uniform prices across all regions). The third component is the "market management" price, which covers and reflects the costs of operating the MFSC. All of the components are regulated using a revenue cap method.
4. Distribution tariff: The tariff is drawn up by licensed distribution companies and includes the use of a distribution system price. It is subject to a hybrid revenue and price cap.
5. Retail tariff: The tariff is drawn up by supply license holders for the sale of electricity and/or capacity to non-eligible customers, and includes retail prices and service prices. The retail sales price reflects the average cost of energy purchased by retail companies plus a gross profit margin cap. The retail service price covers the costs associated with the provision of retail services, and is regulated via a revenue cap. The retail tariff also includes an average loss and theft price cap. It is quite problematic in terms of the model due to the different loss ratios between regions.
6. Wholesale tariff of TETAS: This tariff is intended to cover the average cost of wholesale electricity bought by TETAS and to ensure the financial viability of TETAS.

All of the above listed tariffs must be approved by EMRA. Retail tariffs only apply to non-eligible customers and to those eligible customers who haven't chosen their own suppliers yet via bilateral contracts. All tariffs for bilateral contracts at the retail level are determined freely (Atiyas et al., 2012, p. 26). This also means that retail prices for eligible customers are determined freely.

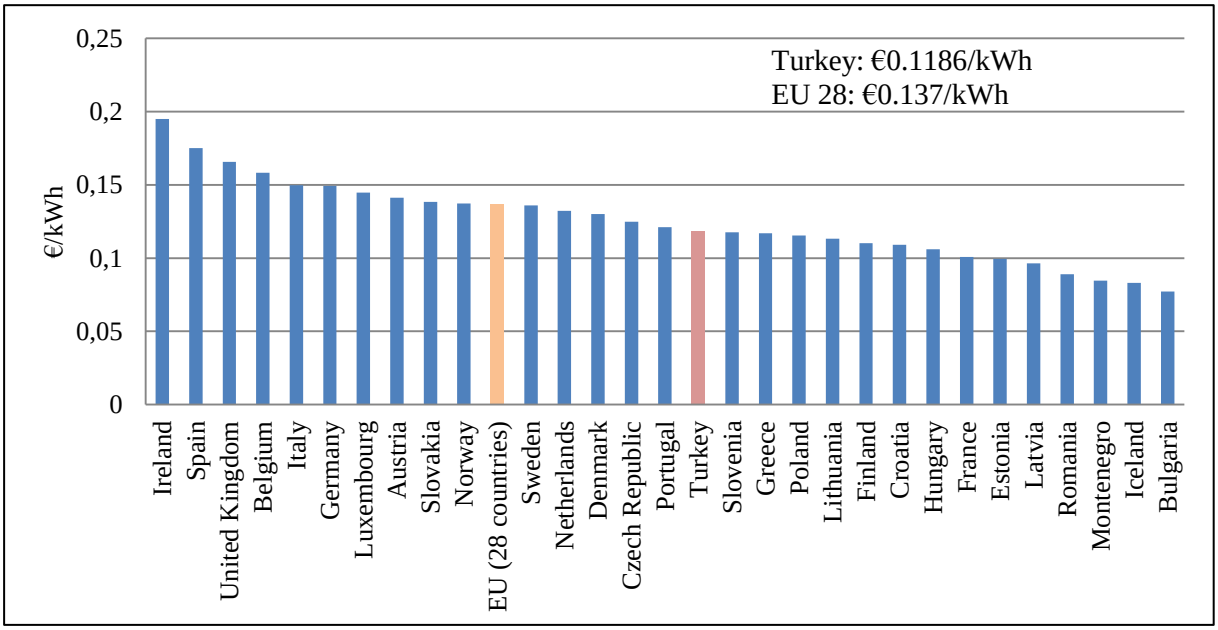
With regard to tariffs drawn up by distribution license holders, the so-called "transitional price equalization mechanism" is applied in order to protect customers against price differences that may arise due to cost differences between distribution areas. The transitional period for the price equalization mechanism has been extended until the end of 2015 (Ergun Benan & Burcu Tuzcu, 2014).

In addition to the tariffs described above that are determined freely (eligible customers) or that are regulated (non-eligible customers), the final retail price also includes taxes. Value-added tax (VAT) accounts for 18% of the consumption bill, and is calculated on the basis of consumed quantity of electricity. Other taxes specific for the sale and consumption of electricity include an electricity consumption tax (at rates of 1% and 5%, depending on the type or purpose of electricity consumption) and the Turkish Radio and Television Corporation (TRT) tax (tax is calculated on the consumed quantity of electricity at a rate of 2%) (Eurelectric, 2012, p. 69).

In 2014, the European Commission published its "Energy prices and costs in Europe" report, in which primarily data for 2012 are analysed. The report covers EU Member States, Turkey and other selected countries. The report shows that the final price paid by electricity customers in Turkey was €0.147/kWh. The price includes the cost of energy, network costs and taxes. Energy represents 56% of the final price or €0.083/kWh. This part of the price is negotiated freely for eligible customers, while this tariff is approved by EMRA for non-eligible customers. The total amount of network-related costs was €0.034/kWh or 23% of the total retail price. The remaining 20%, or €0.03/kWh, is accounted for by taxes (European Commission, 2014a, p. 183).

The data for 2013 show that the average retail price (excluding taxes) for household customers in Turkey was €0.1186/kWh, which is slightly above the EU 28 average. The price falls in the range of prices of Portugal, Greece, Poland and the Czech Republic (Figure 23). In addition, the average retail price (excluding taxes) for industrial customers was €0.0891/kWh in the same year. Turkey is below the EU 28 average, and falls in the range of the prices of Poland and Denmark (Figure 24).

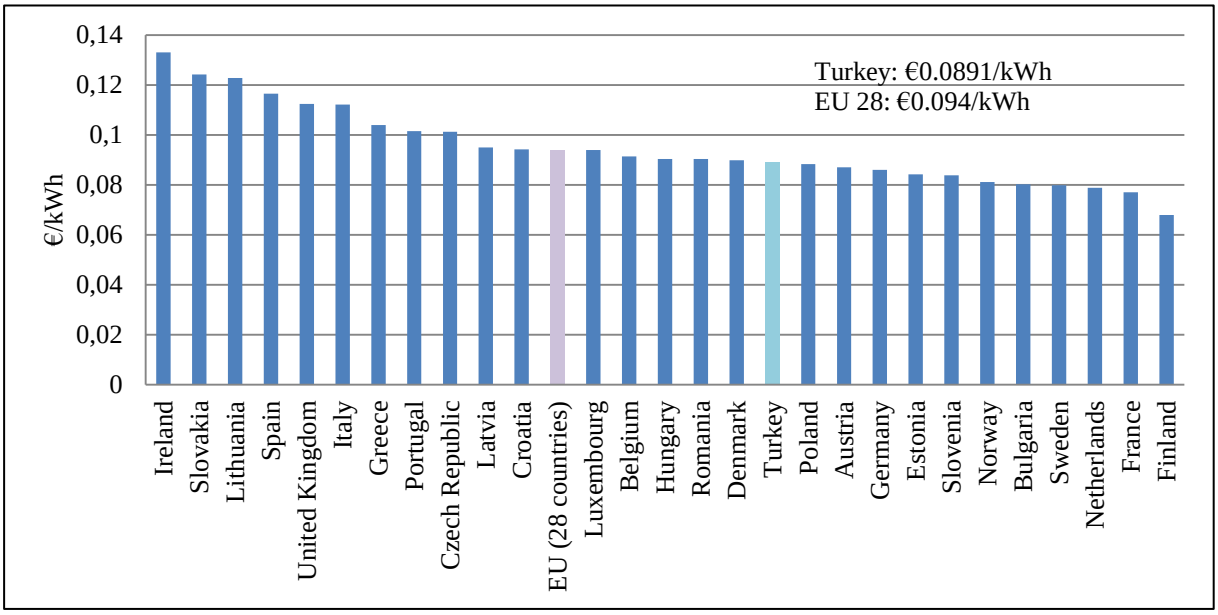
Figure 23. Retail prices for household customers in Turkey and EU countries (2013)



Note: Average national price in €/KWh, excluding taxes, applicable for the first semester of the year for medium-sized household customers.

Source: Eurostat – Energy price statistics, 2014.

Figure 24. Retail prices for industrial customers in Turkey and EU countries (2013)



Note: Average national price in €/kWh, excluding taxes, applicable for the first semester of the year for medium-size industrial customers.

Source: Eurostat – Energy price statistics, 2014.

Figure 25 illustrates prices for industrial and household customers between 2010 and 2014.

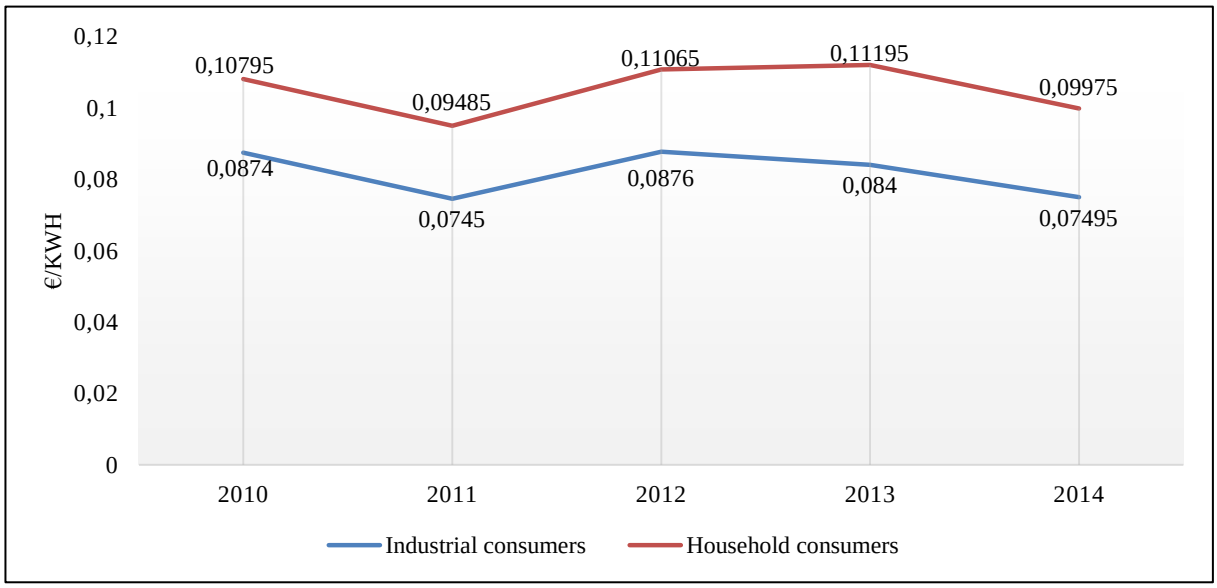


Figure 25. Retail prices for industrial and household customers in Turkey (2010–2014)

Note: Average national price in €/kWh, excluding taxes and levies, for medium-sized industrial and household customers. The average price of two published Eurostat estimates is calculated for a selected year.

Source: Eurostat – Energy price statistics, 2014.

4 ASSESSMENT OF ELECTRICITY MARKET DEVELOPMENTS IN TURKEY

4.1 Level of harmonization of Turkey's electricity market with EU legislation and practices

Turkey's first alignment with the EU acquis on electricity market liberalization came with the enactment of the 2001 EML (No. 4628). In terms of vertical unbundling, TEAS was divided into TEIAS, TETAS and EUAS. Each of the new entities was organized as a separate legal entity. The elements of unbundling required under the First Electricity Directive were the separation of management and the unbundling of accounts. Hence, the EML exceeded this requirement through legal unbundling. In addition, the TSO requirement was also met, since TEIAS was responsible for transmission facilities, investments in the transmission infrastructure, and balancing and settlement procedures. TEDAS was responsible for the distribution of electricity, but it also covered some retail trading activities (which were later transferred to TETAS) (Atiyas & Dutz, 2004, p. 11).

The EML also met the target regarding market opening. All customers who consumed more that 9GWh a year were designated as eligible customers. Moreover, the newly established authorization procedure provided entry opportunities in the areas of generation, wholesale, distribution, retail, import and export. This was also in line with First Electricity Directive requirements. In addition, the EML required an rTPA regime to access the transmission and distribution networks. The EML also brought about a new market structure based on bilateral contracts, but did not envisage a power exchange in the near future (Atiyas & Dutz, 2004, pp. 10-12).

As was the case in EU Member States, many challenges remained to be overcome following the implementation of the Fist Electricity Directive. Monopolies on the market and a lack of competition were major problems. According to Atiyas & Dutz (2004, p. 14), the main challenge in Turkey was to find an exit from the old system. The state was the owner of generation assets, and was also involved in other parts of the electricity industry, including trade, transmission and distribution. For this reason, competition was not enabled. In addition, financial difficulties arose in the distribution segment due to an inefficient tariff system.

Although EU Member States were required to designate an independent regulator under the Second Electricity Directive, Turkey fulfilled this condition with the 2001 EML through the establishment of EMRA. Moreover, amendments to the EML adopted in 2008 brought full compliance with the Second Electricity Directive (EBRD, n.d., p. 165). The exceptions were cross-border trading and the market opening rate. Nevertheless, Turkey has accelerated the liberalization process since 2008. The privatization of distribution companies has been completed. Generation companies are also in the process of privatization, while the market opening rate reached 85%. The main reasons for the delayed privatization of distribution assets are the insufficient infrastructure in distribution regions, highly divergent loss and theft ratios between regions and increasing electricity demand (Cetinkaya, Basaran & Bagdadioglu, 2015b).

Cross-border trading has increased as well. Moreover, Turkey's electricity network has been fully and permanently integrated with Continental Europe since April 2014. With expected 100% market openness in 2016, Turkey is moving towards integration with the EU and its practices. In 2013, a new EML was enacted with the primary objective of establishing a stable, competitive and transparent market. With the implementation of all recent amendments to the relevant legislation, Turkey is expected to be compliant with the Third Electricity Directive.

Nevertheless, there is still room for improvement on the market. Each year, the European Commission prepares a Turkey Progress Report, as a part of its Enlargement Report, in which it assess the progress made over the last year by candidate countries for EU accession. Such reports reflect a country's ability to assume the obligations of membership outlined in the 33 chapters of the acquis, one of them being the Energy Chapter, which has not yet opened due to a veto by the Republic of Cyprus (Öztürk, 2014). Table 12 summarizes the current status of Turkey regarding the Energy Chapter, with a focus on electricity.

Table 12. Harmonization with EU legislation and practices

Harmonization with EU standards	**Current status (2014)**
Electricity market prices	Automatic pricing mechanisms that link end-user prices to a cost-based methodology are envisaged. Nevertheless, the government continues to set end-user prices (the period was extended until the end of 2015) and has thus effectively suspended automatic pricing mechanisms.
Privatization	Privatization activities were stepped up (total volume of completed transactions increased from €2.3 billion in 2012 to €9.2 billion in 2013). The privatization of generation assets has remained limited due to difficulties experienced by potential investors in securing the necessary financing.
Security of supply	Completion of electricity interconnections with Bulgaria and Georgia. Turkey contributed to the energy security stress test carried out by the EC.
Internal energy market	Turkey's legislation is in line with the EU acquis; the majority of pending implementing regulations were adopted with the new EML.
Customer eligibility	Threshold level is 4,500kWh for 2014, which corresponds to a theoretical market opening rate of 85%. The aim is to reach full market opening by 2016 to be in line with EU practices.
Energy exchange	EPIAS was established (privately and publicly owned).
Renewables – feed-in tariffs	Prolonged for 10 years, starting in 2016.
Other activities and instruments related to renewables	EMRA issued an invitation for pre-licence applications for 3,000 MW of wind power plants. Evaluation of the pre-license applications for 600 MW continued.
Nuclear energy	Turkey and Japan signed an agreement in October 2013 to build the country's second nuclear power plant in Sinop (4,500 MW). Turkey and Japan also signed an agreement to use the nuclear energy for peaceful purposes.

Source: European Commission, Turkey Progress Report, 2014b, pp. 23-28.

Specifically, improvements need to be made in the areas of electricity prices, privatization, transparency and market openness. Cross-subsidization between customers in the wholesale and retail electricity markets should be further avoided.

4.2 Future challenges

Although Turkey took concrete steps related to the development of its electricity market, particularly with the adoption of the new EML, several challenges remain to be overcome in the future.

At the retail level, there are still some shortcomings that are causing a distortion of competition. Two major deficiencies are the high level of distribution losses (loss and theft ratio) and the current tariff regulation. There are major regional differences between the loss and theft ratios of the 21 distribution regions. For example, regions in Eastern Turkey, such as Dicle and Vangolu, are the most challenging, since they recorded loss and theft ratios of 75% and 55% respectively in 2012. Annual electricity consumption was approximately 61 million MWh in 2012, while overall distribution losses were 25% or 24 million MWh. The highest losses were between June and August, which are the hottest months of the season (Cetinkaya et al., 2015b). Figure 26 shows loss and theft ratios for 2013, where again the Dicle and Vangolu regions recorded extremely high losses. The majority of other regions recorded losses was below 10 %.

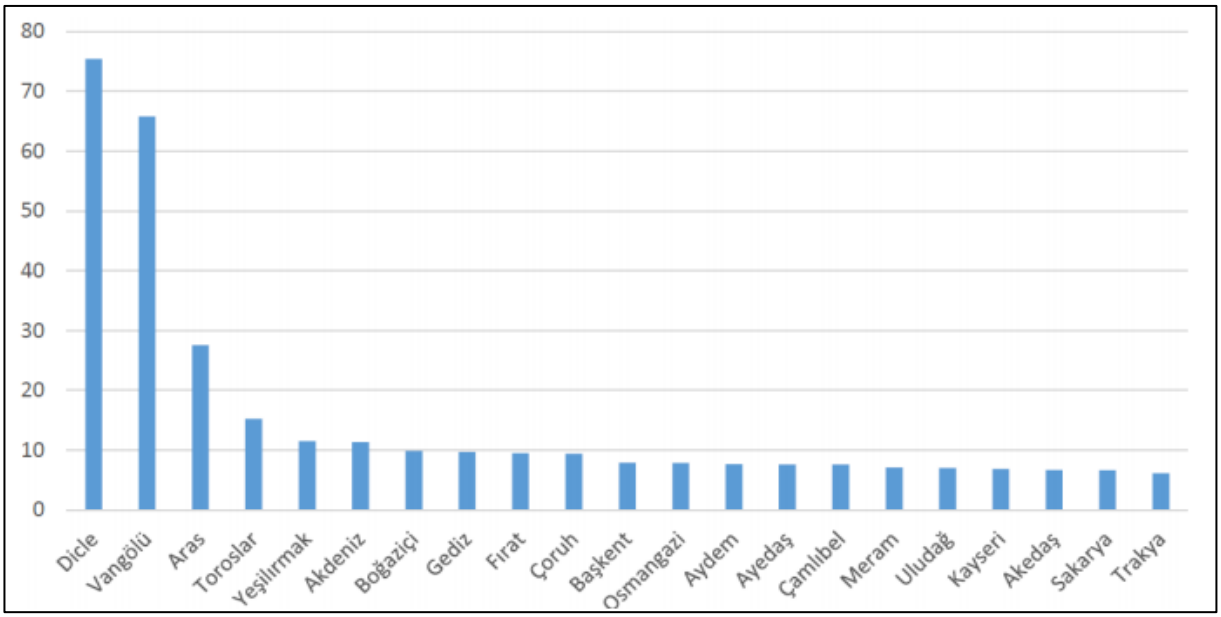


Figure 26. Distribution losses (loss and theft ratios), 2013 in percentages

Source: M. Cetinkaya et al., Barriers to competition in the Turkish electricity market, 2015a, p. 12.

In 2013, Turkey experienced total system losses equal to 16.5% (13.3% in distribution and 2.5% in transmission) of total electricity output (TurkStat, 2014). Those numbers are much lower in EU Member states. For example, Germany, Italy, Slovenia, Austria, Finland and

Greece recorded losses of 4%, 7%, 5%, 6%, 3% and 5% respectively (World Bank data, 2014). On the other hand, all SEE contracting parties are experiencing the same problems as Turkey in terms of high system losses. As shown in Table 13, all countries have system losses above 10%, with Albania recording exceptionally high losses of more than 45%.

Table 13. System losses by SEE contracting parties, 2013 in percentages

Contracting parties	Ukraine	Serbia	Montenegro	Moldova	Macedonia	Bosnia and Herzegovina	Albania
Losses in transmission	2.42	2.40	4.28	2.90	2.00	1.81	2.3
Losses in distribution	10.17	14.90	18.96	10.70	16.40	11.55	45.04
Total system losses	12.59	17.3	23.24	13.6	18.4	13.36	47.34

Source: Energy Community Secretariat, Annual Implementation Report 2013/2014, 2014.

According to the paper of Tasdoven, Fiedler & Garayev (2012, pp. 230-232), grants and public information could be an effective solution to the illegal use of electricity in Turkey, in addition to economic regulation and privatization. The paper proposes government-awarded grants that should be given to private institutions and universities. They would carry out a three-stage research project. The first stage involves research of the real reasons for distribution losses. Although there is statistical data available regarding the number of losses and underlying reasons, the experiences of many developing countries have shown that government-affiliated agencies may provide biased information if they want to limit public knowledge of theft. The second stage would involve identifying fraudulent use. The aim of stage three is to design and conduct surveys in order to determine to what extent citizens are aware of consumption that is harnessed separately from regulated transmission lines and is thus considered a crime. All of these data would then be publicly disclosed or delivered to customers via public campaigns aimed at influencing the behaviour of the target audience.

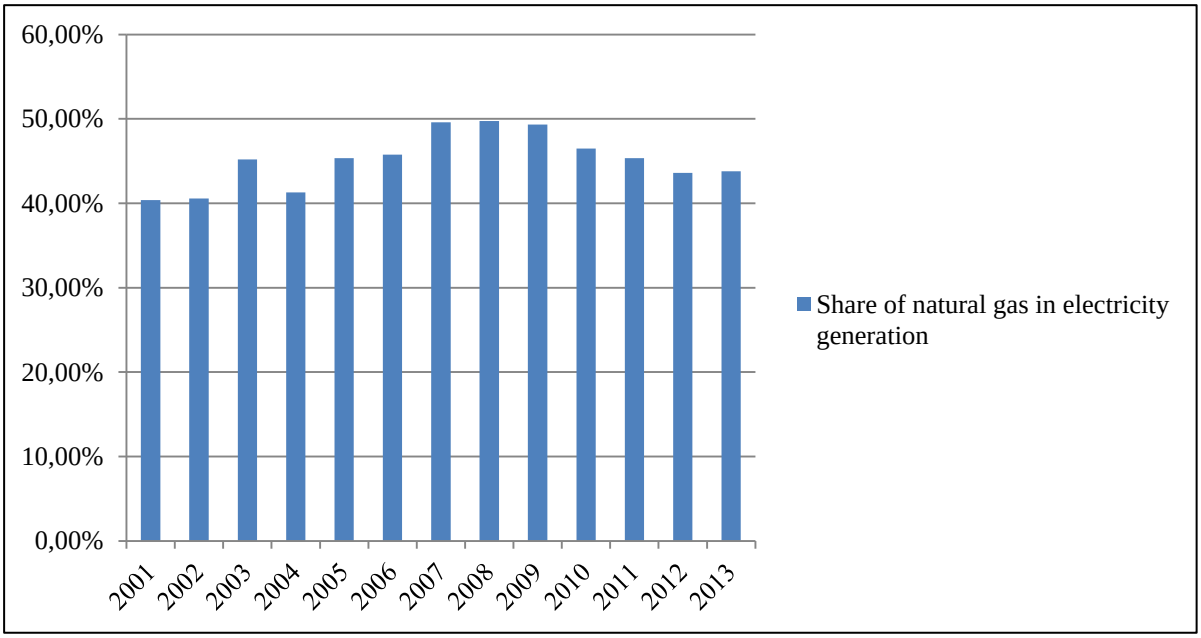
The most important issue relating to loss and theft ratios is the current tariff structure. Since an equalization mechanism is applied, prices are the same for all regions. Consequently, the losses incurred by higher-cost regions are borne in part by the customers of low-cost regions. The costs of regions with high losses are cross-subsidized by regions with low losses. Such a policy is not sustainable in the long run, although it is acceptable in the short term for privatized firms, whose interest it is to recoup the high amount of investments required for the privatization process. Privatized distribution companies have a regulatory obligation to achieve target annual loss and theft ratios. However, actual ratios are not in line with the commitments made by those companies. Current EMRA policy is therefore not appropriate for overcoming the problem of high distribution losses (Cetinkaya et al., 2015a, p. 12).

In term of electricity generation, the completion of the privatization process for generation assets and source diversification represent future challenges, as well. The Turkish

government has tried to attract foreign investors to participate in tenders for generation assets. Interest, however, was very limited. In the end, mainly domestic construction and energy companies submitted bids in 2014, with much lower figures than in 2013. This was due to the depreciation of the Turkish lira vis-à-vis foreign currencies. In terms of financing, international banks have not been active, while the political elections in 2014 also slowed several economic activities (Durakoğlu, 2014). The successful completion of the privatization process can help reduce the government's influence over the electricity market, resulting in increased competition (Cetin, 2014, p. 104).

Turkey's population is forecasted to exceed 83 million in 2020. The country also faces increasing electricity demand, which will have reached 435 TWh by 2020 (Bilgili, 2009, p. 246). To that end, it is important to ensure a sufficient electricity supply for the future. Currently, Turkey is highly dependent on imported natural gas (Figure 27). This is a very big challenge in terms of source diversification and the security of supply. One of the problems of natural gas dependency is that when natural gas supply becomes limited, the price of electricity on the spot market is expected to rise due to the associated scarcity, resulting in the increased use of alternative (and expensive) generation sources (Camdan & Kolmek, 2013, p. 68). In 2012 (13 February), for example, there were heavy winter conditions, resulting in a significant decrease in the natural gas supply from Azerbaijan and Iran, which was accompanied by a simultaneous sharp rise in domestic consumption. Thus, gas-fired power plants faced problems in generation, and the price on the day-ahead market reached 2,000 TL/MWh, which is 10 times higher than the average high level of 200 TL/MWh (Camdan & Kolmek, 2013, p. 68).

Figure 27. Share of natural gas in electricity generation



Source: TurkStat, 2014.

It is therefore important for Turkey to strive to reduce its dependence on natural gas imports. The aim of its national energy strategy is to further increase the use of hydro, wind and solar energy resources, since its potential for renewable energy resources is substantial. Secondly, the gradual introduction of nuclear power into the country's energy mix is also a part of the strategy (Republic of Turkey – Ministry of Foreign Affairs, 2015). Nevertheless, the liberalization of the natural gas market also plays an important role, particularly in terms of reducing the market share of BOTAS and thus enabling competition.

The wholesale market is rapidly transforming into a competitive market, which has resulted in the identification of manipulation risks. In general, electricity markets can be manipulated for several reasons, including: (i) a lack of elasticity on the electricity markets, which results in unexpected price volatility when a small decrease in distribution occurs; (ii) storage difficulties, which lead to an obligatory well-balanced electricity market; (iii) generation companies may gain market power as price determinants when transmission issues arise; (iv) producers usually operate at maximum capacity with regard to their marginal cost, and are thus unable to adapt to price increases (Herdem, 2014).

Due to the potential manipulation risks stated above, it is necessary to have an authorized body that deals with such potential manipulation. The EU has enacted the Regulation on Energy Market Integrity (REMIT), while ACER is authorized to collect data and observe markets. In Turkey, there is a lack of REMIT-type rules that require market participants to regularly report their wholesale market contracts. Thus, new secondary legislation is urgently needed in the future to stimulate market confidence (Herdem, 2014; Santos, 2015).

CONCLUSION

This master's thesis offers an analysis of the Turkish electricity market following the major reform thereof. Turkey's harmonization with EU legislation and practices is also reviewed.

The EU restructured its energy markets via three energy packages adopted in 1996, 2003 and 2009. The three electricity directives were the main instruments in the process of introducing competition to national markets. The main objective of the electricity directives was to introduce competition to the market, and to ensure the transparency and financial stability of the markets and the security of supply. Regional markets represented the next step towards creating an internal electricity market. EU Member States formed seven electricity regions that share a similar economic and political environment.

In addition to the seven electricity regions, which cover the electricity markets of EU Member States, an eighth region was also established. It is also referred to as the SEE region and covers the Energy Community contracting parties, as well as neighbouring EU countries. Turkey has the status of Energy Community observer, with the goal of becoming an EU Member State, as well as Energy Community contracting party. Turkey is thus following EU practices in order to ensure competition on the market.

The first major change on the Turkish electricity market occurred with the enactment of the EML in 2001. The EML vertically unbundled TEAS into the following new publicly owned entities: TEIAS (transmission), TETAS (trading) and EUAS (generation). In addition, the regulator EMRA was established and the concept of eligible customer defined. A new market structure was also introduced, comprising bilateral contracts and a balancing mechanism. The EML was subsequently amended in 2008, while a new EML entered into force in 2013. Both were aimed at accelerating the liberalization process and achieving compliance with EU legislation and practices.

The role of the publicly owned EUAS is decreasing in the generation segment, where a higher private-sector presence is expected in the future, since new plants are being built by the private sector. In addition, several EUAS power plants are currently included in the privatization process. Electricity is mainly generated from natural gas, coal and hydro sources. Although the country is historically dependent on imported natural gas, renewables are gradually achieving a higher market share and enabling Turkey to diversify its resources for electricity generation. In addition, two nuclear power plants are expected to be built and operational in the future.

Transmission lines are operated by the publicly owned TEIAS, Turkey's TSO. It maintains the transmission network and it conducts auctions for transmission capacities.

Major changes have occurred recently on the wholesale market. The market is currently being transformed into a competitive, financially stable and transparent wholesale market. The current hybrid model, which comprises bilateral contracts and a balancing mechanism, will be replaced by the EPIAS power exchange, which will cover the spot market on a day-ahead and intraday basis. Derivatives will continue to be traded on the Borsa Istanbul, while TEIAS will be responsible for the balancing market. With more available capacities expected on the Bulgarian and Greek borders (ENTSO-E connections), through improved transparency and with its own power exchange, the Turkish power market is likely to become a leader in the region.

The retail and distribution markets were recently unbundled. There are now 21 privatized distribution companies, each acting as a DSO for its own region. The retail market has been separated, and enables private companies to enter the market and sell electricity to eligible customers. The current rate of market opening is 85%, with the market expected to be fully open in 2016.

As can be noted, Turkey has put major efforts into the process of transforming its former vertically integrated electricity market into a fully competitive and transparent electricity market. It is following the example of EU Member States, and is trying to offer market players a competitive market place. Nevertheless, this is a complex process and Turkey still has many challenges to overcome.

The most concerning are the level of distribution losses, which are extremely high in some regions (up to 75%). Related to those losses are inappropriate regulated tariffs that are equal for all the regions. This is not efficient over the long run, since the losses of higher-cost regions are borne by the customers of the low-cost regions.

Moreover, dependence on imported natural gas should be reduced, since electricity prices are affected by potential changes on the gas market. Accordingly, the natural gas market in Turkey should be liberalized and made more competitive with the aim of achieving more competitive prices. Wholesale electricity markets are also exposed to manipulation risks, and should implement REMIT-type rules in order to stimulate market confidence.

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APPENDIXES

LIST OF APPENDIXES

APPENDIX A: Summary – Povzetek v slovenskem jeziku (na osnovi magistrskega dela)

Glavni lastnosti trgov z električno energijo sta bili ekonomija obsega v proizvodnji električne energije in dejstvo, da mora slednja preko obsežnega prenosnega in distribucijskega sistema, preden je dobavljena končnim odjemalcem. Zaradi teh karakteristik so v dvajsetem stoletju trge električne energije obvladovala podjetja, ki so bila v državni lasti. Obenem so bila ta podjetja vertikalno integrirana v vse dejavnosti elektrogospodarstva in imela monopol na trgu (Kopsakangas – Savolainen in Svento, 2012, p. 5).

Zaradi velikega nezadovoljstva, povezanega s takšno organiziranostjo trga, je veliko držav začelo z reorganizacijo delovanja trgov električne energije. Obstajalo je veliko empiričnih in teoretičnih dokazov, predvsem o prednostih konkurence in o nevmešavanju države v delovanje trga. Dejavniki, ki so omogočili reforme v elektrogospodarstvu, pa so bili: nove proizvodne tehnologije (te so zmanjšale optimalno velikost elektrarn), zahteve po povečanju stroškovne učinkovitosti monopolnih podjetij in splošno prepričanje, da država ni ustrezen lastnik (predvsem zaradi prepočasnega odzivanja na ekonomske in tehnološke spremembe) (Hrovatin in Zorić, 2011).

Skupaj z globalnim trendom je tudi Evropska unija (EU) začela s prestrukturiranjem trgov električne energije v državah članicah. Glavni cilj EU je ustvariti notranji trg z učinkovito konkurenco, ki prinaša dobrobit potrošnikom (zaradi konkurence se cene električne energije nižajo) in udeležencem na trgu (zaradi preprečevanja monopolistične situacije na trgu) (Bockers et al., 2013, str. 7). Splošno gledano se v procesu liberalizacije trgov z električno energijo odvijejo štirje glavni koraki, ki vodijo k bistvenih spremembam na trgu (Jamasb in Pollit, 2005, str. 13):

- Prestrukturiranje: vertikalna ločitev proizvodnje, prenosa, distribucije in dobave električne energije končnim kupcem.
- Konkurenca in trgi: oblikovanje trga na debelo in trga na drobno, uvedba konkurence.
- Regulacija: ustanovitev neodvisnega regulatorja trga, dostop do omrežja, regulacija za distribucijsko in prenosno omrežje.
- Lastnina: privatizacija državnih podjetij in omogočanje vstop novim, zasebnim podjetjem na trgu.

Vsi zgoraj navedeni koraki so bili v državah članicah EU sproženi z reformo, ki je bila izvedena z dvema vzporednima procesoma. Prvi je bil uvedba smernic za vzpostavitev notranjega trga električne energije v EU (Direktiva 96/92/EC, Direktiva 2003/54/EC in Direktiva 2009/72/ES). Drugi proces pa je bil vzpodbujanje razširitve čezmejnih prenosnih povezav skupaj z izboljšavo pravil za čezmejno trgovanje (Karan in Kazdagli, 2011, str. 13; Jamasb in Pollitt, 2005, str. 17).

Zahteve Direktiv EU o oblikovanju notranjega trga z električno energijo so predstavljene v tabeli 1.

Tabela 1. Direktive EU o oblikovanju notranjega trga z električno energijo

Določbe	Prva direktiva (1996)	Druga direktiva (2003)	Tretja direktiva (2009)
Proizvodnja (gradnja novih proizvodnih zmogljivosti)	Omogoča novim igralcem na trgu izgradnjo na podlagi dovoljenja ali razpisa	Dovoljenje	Dovoljenje Razpis (energetska učinkovitost, menedžment povpraševanja)
Prenos (T) , distribucija (D) (dostop do omrežja)	Regulirani TPA, izpogajani TPA, edini kupec	Regulirani TPA	Regulirani TPA
Dobava (vertikalna ločitev)	Ločitev računovodskih izkazov	Funkcionalna ločitev od prenosa in distribucije	Funkcionalna ločitev od prenosa in distribucije
Uporabniki (odpiranje trga)	Izbira za upravičene odjemalce (do 1/3 končne porabe)	Vsi negospodinjski odjemalci od leta 2004, vsi odjemalci od leta 2007	Vsi
Ločitev T **Ločitev D**	Računovodski izkazi	Pravna ločitev	Lastniška (T) Pravna (vertikalno integrirana podjetja (T) in upravljavska, neodvisna SOPO (T) Pravna (D)
Čezmejna trgovina	Pogajanja	Regulirana	Regulirana, ENTSO
Regulacija	Ni določena	Regulatorni organ (NRA) European Regulators' Group for Electricity and Gas (ERGEG)	Močno povečana neodvisnost in pristojnosti NRA Ustanovljena ACER

Vir: N. Hrovatin in J. Zorič, 2011, Reforme elektrogospodarstva v EU in Sloveniji, str. 7.

Kot je prikazano v tabeli 1, so se spremembe v EU uvajale postopoma. Po uvedbi prve direktive (1996) je bilo na trgu namreč še veliko pomanjkljivosti, predvsem gre omeniti pomanjkanje transparentnosti in tehnične težave, ki so onemogočale dostop do omrežja. Polega tega pa so bili monopoli še vedno prisotni na trgu (Kovacs, 2011). Z uvedbo druge direktive sta bila omogočena konkurenca na trgu proizvodnje električne energije in dostop do omrežja, vendar je bilo prisotno veliko pomanjkanje konkurenčnih in likvidnih trgov prodaje električne energije na debelo. Sistemski operaterji prenosnega omrežja (SOPO) in sistemski operaterji distribucijskega omrežja (SODO) v praksi še vedno niso bili vertikalno ločeni, monopolistične situacije pa so še vedno predstavljale težave za nemoteno delovanje trga, saj so onemogočale konkurenco (Thomas, 2006; Jakovac, 2012, str. 321). Z uvedbo tretje direktive so se razmere na trgih električne energije v EU občutno izboljšale, saj so danes vsi trgi liberalizirani, prisotna je večja transparentnost in zanesljivost. Stopnja konkurence je občutno višja, prav tako pa so trgi bolj likvidni.

Ne glede na dosežke prestrukturiranja trgov električne energije v EU so prihodnji izzivi za trge prodaje električne energije na drobno predvsem: heterogenost nacionalnih energetskih politik, ki se odraža v raznolikosti cen električne energije znotraj EU (katerih sestavni del so davki in dajatve za omrežje), nesodelovanje potrošnikov pri menjavi dobavitelja električne energije in potreba po platformi, ki bi omogočala primerjavo cen v EU. Poudariti pa je potrebno tudi pomembnost transparentnih računov, ki jih potrošniki prejmejo na dom (ACER, 2014).

Nekaj priložnosti za izboljšavo delovanja trga je tudi na trgih prodaje električne energije na debelo. Za namen integracije nacionalnih trgov, na poti do notranjega trga električne energije EU, so se izoblikovali regionalni trgi. Ti so sestavljeni iz držav, ki jih druži predvsem podobno ekonomsko in politično okolje. Oblikovanih je sedem regionalnih trgov, ki združujejo delovanje NRA, komisije in SOPO-ov. Tako imenovane Regionalne iniciative (RI) prinašajo izmenjavo informacij in dobrih praks kot tudi implementacijo Kodeksov omrežja (ACER, 2013, str. 16). ACER želi na regionalnih trgih doseči implementacijo štirih ciljnih modelov, ki bi izboljšali čezmejno sodelovanje in integracijo trgov. Ti modeli se navezujejo na spajanje trgov, trgovanje znotraj dneva, dolgoročne čezmejne prenosne zmogljivosti (ČPZ) in metode za izračun kapacitet. Pozitivni učinki uvedbe teh modelov so predvsem učinkovita uporaba ČPZ in zvišanje konvergence cen električne energije na debelo (ACER/CEER, 2014, str. 16). V prihodnje se torej pričakuje implementacija ciljnih modelov na vseh regionalnih trgih na debelo.

Poleg sedmih regionalnih trgov pa je nastala tudi tako imenovana osma regija ali regija Jugovzhodne Evrope (regija SEE). Države SEE združujejo podobni energetski problemi, kot so: majhni energetski trgi, energetsko intenzivna gospodarstva, slaba infrastruktura in razlikovanje nacionalnih energetskih politik od politik EU (Karova, 2011, str. 81). Države SEE so vse podpisnice Energetske skupnosti (*ang.* Energy Community) (Albanija, Bosna in Hercegovina, Makedonija, Kosovo, Moldavija, Črna gora, Srbija in Ukrajina), poleg pa so še sosednje države članice EU (Bolgarija, Hrvaška, Grčija, Italija, Madžarska, Romunija in Slovenija). Gruzija ima status kandidatke, medtem ko imajo Turčija, Armenija in Norveška status opazovalke (Energy Community, 2014).

Turčija je šestnajsto največje gospodarstvo na svetu in šesto največje gospodarstvo v primerjavi z EU v 2013. V letu 2013 je bil njen BDP 820 milijarde USD, populacija pa 76,7 milijonov ljudi z 1,12-odstotno stopnjo rasti (Invest in Turkey, 2014; TurkStat, 2014). Glavna razloga za visoko povpraševanje po energiji v Turčiji sta torej naraščajoč BDP in naraščajoča populacija. Slednja naj bi po ocenah dosegla 84 milijonov do leta 2023. Zaradi naraščajočega povpraševanja po električni energiji, ki temelji na industrializaciji in urbanizaciji, ima Turčija enega od najhitreje rastočih trgov električne energije na svetu. Povpraševanje po električni energiji se je v zadnjih desetih letih podvojilo. Leta 2000 je bilo povpraševanje 128 TWh, v letu 2013 pa 246 TWh (Deloitte, 2014, str. 5; Statistical data, 2013).

V primerjavi z ostalimi državami regije SEE ima Turčija največjo proizvodnjo električne energije, saj je v letu 2013 proizvedla približno 240 TWh (240.154 GWh), medtem ko je bila proizvodnja v regiji SEE sledeča: Albanija (5.956 GWh), Bosna in Hercegovina (16.303 GWh), Makedonija (5.676 GWh), Moldavija (748 GWh), Črna gora (389 GWh) in Srbija

(27.537 GWh) (priloga C). Glede na to, da je likvidnost ena bistvenih komponent trgov za trgovanje z električno energijo na debelo, Turčija pozitivno vpliva na regijo SEE, saj ji povečuje likvidnost.

V preteklosti je na turškem trgu električne energije (kot tudi drugod po svetu) delovalo vertikalno integrirano podjetje, monopolist na trgu z imenom Turkiye Elektrik Kurumu (TEK). Ta je bil ustanovljen leta 1970 z namenom združitve proizvodnje, prenosa, distribucije in dobave električne energije pod en integriran sistem. Kasneje je bil TEK ločen na dve podjetji, TEAS (podjetje za proizvodnjo električne energije) in TEDAS (podjetje za distribucijo, prenos in dobavo električne energije) (TEIAS, 2014).

Izvedenih je bilo veliko poskusov, ki bi lahko pritegnili zasebni kapital na trg, a v večini primerov je bila privatizacija blokirana, ker država ni želela tujih investitorjev v tako strateški industriji. Prisotnost zasebnega sektorja na trgu električne energije je bila omogočena šele v letu 1984 z zakonom št. 3096, ki je vpeljal dva nova tipa pogodb na trg (Cetin in Oguz, 2007, str. 1763):

- BOT (*ang*. Build-Operate-Transfer): S to pogodbo je zasebnemu podjetju podeljena koncesija za izgradnjo in upravljanje elektrarne za obdobje do 99 let (kasneje skrajšano na 49 let). Po izteku tega obdobja se sredstva predajo državi, in sicer brez stroškov.
- TOR (*ang*. Transfer of operating rights): Ta pogodba omogoča zasebnemu podjetju, da upravlja z že obstoječo elektrarno ali distribucijskim omrežjem, ki je v lasti države.

Z zakonom št. 4283 je bil vpeljan še en tip pogodbe, in sicer BOO (*ang*. Built-Operate-Own). Ta pogodba se nanaša na termoelektrarne, in sicer je zasebnemu podjetju dodeljena licenca, s katero lahko izgradi, upravlja in si na koncu tudi lasti elektrarno.

Zgoraj opisane pogodbe so imele veliko pomanjkljivosti, predvsem pa niso prispevale k oblikovanju konkurence na trgu. Poleg tega je bil tu prisoten še vpliv iz tujine, predvsem s strani mednarodnih institucij, kot so IMF, OECD in Svetovne banke. Le-te so poudarjale potrebo po reformah na trgu električne energije v Turčiji. Ravno tako pa je reforma trga električne energije eden od predpogojev za izpolnitev dolgoročnega cilja, in sicer članstva v EU (Erdogdu, 2006, str. 986). Vsi ti sprožilci so pripeljali do prvih resnejših ukrepov, ki so omogočali konkurenco na trgu.

Leta 2001 je bil sprejet zakon št. 4628, EML (*ang.* Electricity Market Law). Ta je prvi pripeljal konkretne reforme na turški trg električne energije. Tako kot v drugih državah je imela tudi Turčija kar nekaj težav z izhodom iz starega sistema delovanja. Sledil je posodobljen zakon v letu 2008. Tudi za tem je ostalo kar nekaj pomanjkljivosti na trgu, zato je bil leta 2013 sprejet zakon št. 6446, novi EML. Določbe zakonov so predstavljene v tabeli 2.

Kot je predstavljeno v tabeli 2, je turška zakonodaja sledila zgledu EU in skušala biti usklajena s prakso EU. Proces prestrukturiranja trga z električno energijo je kompleksen in dolgotrajen, zato so se spremembe na trg uvajale postopoma. Turčija je vzporedno z določbami EML izvajala tudi privatizacijo državnih podjetij, zato je v letu 2008 začela s privatizacijo proizvodnih enot (EUAS) in distribucijskih podjetij (TEDAS).

Tabela 2. EML 2001, 2008 in 2013

Določbe	**EML 2001 (in posodobitev v letu 2008)**	**EML 2013**
Vertikalna ločitev državnih podjetij	TEAS je bil pravno ločen na TEIAS (prenos), TETAS (trgovanje) in EUAS (proizvodnja). TEDAS je določen za distribucijo.	Sredstva TEDAS so privatizirana, elektrarne EUAS pa so v procesu privatizacije. Vsa podjetja, ki imajo več kot eno licenco, morajo imeti ločene računovodske izkaze, distribucija in dobava pa morata biti z 2016 popolnoma ločeni (lastniško, upravljavsko).
Regulacija	Ustanovljena EMRA (neodvisni regulator).	EMRA
Trg električne energije na debelo	Nov model delovanja: bilateralne pogodbe in izravnalni trg z električno energijo.	Nov model delovanja: Ustanovitev EPIAS (borza za trgovanje z električno energijo, fizično), finančno trgovanje na Borsa Istanbul, izravnalni trg pa ima TEIAS.
Licence	Nove licence: proizvodnja, prenos, distribucija, dobava končnim kupcem, proizvajalci, ki proizvajajo za lastno rabo.	Nove licence: predhodna licenca za proizvodnjo, licenca za oskrbo, licenca za upravljanje trga. Poleg navedenih so ostale še: licenca za proizvodnjo, prenos, distribucijo.
Uporabniki	Opredeljen je upravičen odjemalec. Vsi ki porabijo več kot 9 GWh na letni ravni.	Meja za upravičene odjemalce se je znižala na 4500 kWh porabe na leto, trenutno je trg odprt 85-odstotno. V 2016 se pričakuje 100-odstotno odprtost.
Dostop do omrežja	Regulirani TPA	Regulirani TPA
Čezmejna trgovina	Monopol državnih podjetij (TETAS, TEIAS)	Sinhronizirana povezava z omrežjem ENTSO-E (Bolgarija, Grčija), omogočeno komercialno čezmejno trgovanje, vsem akterjem na trgu
Proizvodnja (gradnja novih proizvodnih zmogljivosti)	Dovoljenje	Dovoljenje

Vir: EMRA, Electricity Market Report 2010, n.d., str. 3; Atiyas et al., Competition and Regulatory Reform in the Turkish Electricity Industry, 2012, str. 23; Electricity market law No.4628, Official Gazette No. 24335.

Najprej se je, v letu 2008, začela izvedba privatizacije distribucijskih podjetij. Turško distribucijsko omrežje se je razdelilo na 21 regij. TEDAS je nato ustanovil 20 novih podjetij, saj je bilo eno podjetje oziroma regija že predhodno v privatni lasti – Kayseri. Vsako podjetje se je takrat obnašalo kot regionalni monopolist na svojem območju in je izvajalo tako

distribucijske aktivnosti kot samo dobavo električne energije. 18 podjetij je bilo privatiziranih preko javni pisnih ponudb za nakup, ostali dve pa sta bili privatizirani v sklopu drugih postopkov (Celen, 2013, str. 675 – 676). Privatizacija je bila izvedena z modelom TOR, torej je TEDAS ostal lastnik distribucijskega omrežja, zasebno podjetje pa upravljalec omrežja. Privatizirana podjetja so morala ustanoviti ločeno podjetje za izvajanje dobave električne energije končnim potrošnikom, to dejavnost opravljajo z licenco za oskrbo. Za distribucijske aktivnosti jim je bila dodeljena distribucijska licenca. Z letom 2016 pa se zahteva tudi fizična ločitev delovanja, torej uporaba ločenih prostorov ter ločenih računovodskih in pravnih služb.

Uspešni privatizaciji distribucijskih podjetij je sledila privatizacija proizvodnih enot EUAS-a, vendar je tu prišlo do zamud, zato je še danes veliko postopkov v teku. Kljub temu so bile večje elektrarne privatizirane, in sicer: Kangal (457 MW), Kemerkoy (630 MW), Yenikoy (420 MW), Catalgzi (300 MW), Hamitabat (1156 MW), Seyitomer (600 MW), Soma (990 MW), Orhaneli (210 MW), Tuncbilek (365 MW).

V nadaljevanju sledi pregled trenutnega delovanja trga v obdobju po reformah in privatizaciji.

- Proizvodnja električne energije

Z vidika lastništva je na trgu proizvodnje pet vrst akterjev, in sicer: državno podjetje EUAS, podjetja ki delujejo s pogodbami BOO in BOT, podjetja, ki delujejo s pogodbami TOR, neodvisni proizvajalci in proizvajalci, ki proizvajajo za lastno rabo. Velik igralec na trgu je še vedno EUAS, čeprav se situacija spreminja. Od privatizacijskih postopkov, ki so še v teku, pa pričakujejo večjo prisotnost zasebnih podjetij na trgu. Poleg tega pa so vse novo izgrajene elektrarne v letu 2013 v lasti zasebnikov, in sicer gre za približno 7000 MW nameščenih zmogljivosti (MENR, 2014).

V letu 2013 je skupna proizvodnja električne energije v Turčiji znašala 240 TWh. Večina električne energije je bila proizvedena iz zemeljskega plina (105 TWh), sledita premog (64 TWh) in voda (59 TWh). Manjši delež v proizvodnji predstavljata veter (8 TWh) in geotermalna energija (1 TWh) (Electricity generation & transmission statistics of Turkey for year 2013, 2014).

44 % električne energije v Turčiji je proizvedene iz zemeljskega plina. Ta je večinoma uvožen iz Alžirije, Nigerije, Irana, Azerbajdžana in Rusije. Največji pogodbeni partner je ravno Rusija, s katero je podpisana dobava skupno 30 bcm na leto, in sicer do leta 2025. Odvisnost od uvoza zemeljskega plina je zaskrbljujoča, saj povezanost med trgoma vpliva na cene električne energije (Botas, 2014). Na primer: ko postane dobava zemeljskega plina omejena, je pričakovan dvig cene na trgih električne energije. Takšen primer se je zgodil 13. 2. 2012, ko se je zaradi težkih vremenskih pogojev znižala dobava plina iz Azerbajdžana in Irana, na drugi strani pa se je močno dvignila domača potrošnja. Posledično so imele termoelektrarne težave pri proizvodnji, cena na trgih z električno energijo pa je dosegla 2000 TL/MWh, kar je desetkrat višje od povprečnih cen (Camdan in Kolmek, 2013, str. 68). Zaradi opisanega je dolgoročni cilj Turčije zmanjšati odvisnost od uvoza in doseči večjo konkurenco na trgu plina.

Drugi največji vir proizvodnje je premog (26 % v letu 2013). Turčija ima bogate vire lignita, ki prispevajo 75 % k celotni oskrbi z premogom. Črni premog pa se nahaja samo v regiji Zonguldak, kjer je državno podjetje TTK monopolist pri pridobivanju in distribuciji le-tega (EUROCOAL, 2015).

Eden izmed zelo pomembnih virov za proizvodnjo električne energije pa je tudi voda. Turčija ima bogate vodne vire, njen potencial vodne energije naj bi bil 140 milijarde kWh na leto, le 35 % tega potenciala pa je dejansko izkoriščenega. V letu 2013 je bila skupna nameščena zmogljivost 467 hidroelektrarn, to je 22.289 MW. Leta 2006 je bilo v Turčiji nameščenih le 13,1 GW zmogljivosti, medtem ko se je v letu 2013 številka dvignila na 22,3 GW. Dolgoročno ima Turčija namen namestiti 180 GW skupnih zmogljivosti hidroelektrarn (do leta 2030).

Za zagotovitev diverzifikacije svojih virov proizvodnje pa se Turčija zanaša tudi na ostale obnovljive vire energije, predvsem na veter, sonce, geotermalno energijo in biomaso. Cilji za leto 2030 so, da bi imeli nameščenih 40 GW vetrnih, 4,2 GW geotermalnih in 10 GW sončnih zmogljivosti ter 2,2 GW biomase (Yuksel, 2013, str. 1040). Da bi se zmanjšala odvisnost od uvoženega zemeljskega plina, načrtuje Turčija tudi izgradnjo dveh nuklearnih elektrarn s skupno zmogljivostjo 9280 MW, do leta 2020 pa naj bi se 5 % električne energije proizvedlo z nuklearno energijo (MENR, 2014).

- Prenos električne energije

Oskrba prenosnega omrežja in ostale aktivnosti, povezane z omrežjem, so odgovornost državnega podjetja TEIAS (TEIAS, 2014). Turčija ima 51.344 km daljnovodov, povezana je z Grčijo, Bolgarijo, Gruzijo, Iranom, Irakom in s Sirijo. Najpomembnejši povezavi sta Grčija in Bolgarija, saj je preko njiju Turčija povezana z omrežjem ENTSO-E, kar ji omogoča trgovanje z državami regije SEE.

Turčija je neto uvoznik električne energije. V letu 2013 je namreč uvozila preko 14.000 GWh električne energije, izvozila pa le nekaj več kot 2.000 GWh. V preteklosti, pred povezavo z ENTSO-E, je bila neto izvoznik (do leta 2011). Ena izmed zanimivih povezav za Turčijo je tudi Gruzija, predvsem zaradi bogatih obnovljivih virov, ki se nahajajo v tej državi, in pa zaradi visokega povpraševanja po električni energiji v Turčiji (Deloitte Consulting, 2014, str. 2).

- Veleprodajni trg električne energije

Trg električne energije na debelo je v fazi razvoja, pričakovati je namreč spremembe, predvsem z začetkom delovanja EPIAS-a. Trenutno trg deluje na dveh ravneh, ena je trg za bilateralne pogodbe, druga je izravnalni trg. Pomemben akter na trgu je državni TETAS, ki s starimi pogodbami z EUAS-om in s podjetji, ki delujejo s pogodbami BOO, zavzema velik tržni delež. V letu 2013 je imel preko 50 % celotnega nakupa in prodaje na trgu, medtem ko so se čezmejne aktivnosti TETAS-a zmanjšale zaradi komercialnih avkcij ČPZ.

Poleg fizičnega trgovanja z električno energijo, ki vključuje fizično dobavo električne energije, pa obstajajo tudi finančni trgi, ki služijo za zavarovanje, predvsem pred cenovnimi

tveganji na trgu. Finančno trgovanje z električno energijo se je v Turčiji začelo šele v letu 2011 na TurkDex (*ang.* Turkish Derivatives Exchange), kasneje pa se je trgovanje prestavilo na Istanbulsko borzo (Borsa Istanbul).

V letu 2012 je bil celoten volumen trgovanja na Istanbulski borzi 62 milijonov pogodb, s skupno vrednostjo 200 milijard USD. V istem letu je bil volumen trgovanja s terminskimi pogodbami za električno energijo le 928 pogodb z vrednostjo 9,5 milijonov USD (Borsa Istanbul, 2013). Te vrste pogodb ne pritegnejo dovolj interesa, predvsem zato, ker investitorji menijo, da cene na trgu ne odražajo realnega ravnovesja ponudbe in povpraševanja (Bademli, 2013).

Kar se tiče veleprodajnih cen na turškem trgu električne energije, so v povprečju višje kot tiste v regijah SEE in CEE (DG Energy – Market Observatory for energy, 2014, str. 10). V Turčiji je kar nekaj dejavnikov, ki vplivajo na veleprodajne cene. Vreme vpliva tako na ponudbo kot tudi na povpraševanje po električni energiji. Ko so poletja vroča, se zaradi večje uporabe klimatskih naprav poveča povpraševanje po električni energiji. Enak učinek imajo tudi hladne zime, ki povzročijo večjo uporabo naprav za ogrevanje. Vreme sicer vpliva tudi na nivo ponudbe, predvsem na trgih, kjer je velik delež obnovljivih virov energije. V Turčiji tako lahko vpliva na proizvodnjo v hidroelektrarnah in na vetrno proizvodnjo. Velik vpliv predstavljata tudi odvisnost od uvoženega zemeljskega plina in slabo razvita konkurenca na trgu plina. Uvozne pogodbe so drage, cene na trgu plina pa zaradi slabe razvitosti trga nekonkurenčne. Poleg navedenega se v času verskih praznikov, kot je na primer bajram, povpraševanje zelo zmanjša, kar lahko pripelje tudi do cene 0 TL/MWh v določenih urah dneva. Za Turčijo so značilne tudi visoke izgube v omrežjih, ki posredno vplivajo na veleprodajne in maloprodajne cene električne energije.

- Distribucija in dobava električne energije končnim potrošnikom

Distribucijska dejavnost je ločena od dejavnosti dobave električne energije šele od leta 2013. V državi je 21 distribucijskih regij, v vsaki je eno podjetje z distribucijsko licenco, ki upravlja omrežje. Ne glede na to pa je država (TEDAS) še vedno lastnik omrežja.

Največja težava, s katero se spoprijemajo podjetja za distribucijo in posledično tudi podjetja za dobavo, so visoke izgube električne energije v distribucijskem omrežju. Med regijami so velike razlike v izgubah, najbolj težavni pa sta Dicle s 75-odstotnimi in Vangolu s 55-odstotnimi izgubami v letu 2012. Izgube v ostalih regijah znašajo v povprečju okrog 10 % ali manj. Gre predvsem za tehnične izgube in krajo električne energije iz omrežja (Cetinkaya et al., 2015 b). Skupaj z izgubami pa obstaja še dodaten problem, in sicer neprimerne tarifne strukture. V Turčiji je v veljavi mehanizem izenačevanja (*ang.* equalization mechanism), kar pomeni, da je končna tarifa enake za vse regije. Stroške regij posledično - z visokimi izgubami - financirajo regije, ki imajo nizke izgube. Takšna politika je dolgoročno nesprejemljiva, kljub temu da trenutno zadovoljuje podjetja, ki so veliko investirala v procesu privatizacije (Cetinkaya et al., 2015a, str. 12). Spremembe pričakujejo v letu 2016, ko naj bi bil mehanizem izenačevanja ukinjen.

Za neupravičene odjemalce so cene regulirane, medtem ko so cene za upravičene odjemalce (tisti, ki imajo potrošnjo vsaj 4500 kWh na leto) svobodno izpogajane med kupcem in prodajalcem (Atiyas et al., 2012, str. 26).

Cena električne energije pa je le sestavni del končne maloprodajne cene, ki jo plača potrošnik. Cena električne energije torej predstavlja 57 % računa za električno energijo, 23 % gre za dajatve za omrežje, preostalih 20 % pa so davki. Ti davki so: DDV, davek na porabo električne energije in davek TRT – Radio in televizija (European Commission, 2014, str. 183).

V povprečju so turške maloprodajne cene tako za gospodinjstva kot tudi za industrijske odjemalce malo pod povprečjem EU 28. V zadnjih treh letih pa lahko opazimo tudi upadanje maloprodajnih cen v Turčiji. Za gospodinjske odjemalce so v letu 2012 cene padle z 0,11065 €/kWh na 0,09975 €/kWh. Za industrijske odjemalce pa so cene padle z 0,0876 €/kWh, na 0,07495 €/kWh (Eurostat – Energy price statistics, 2014).

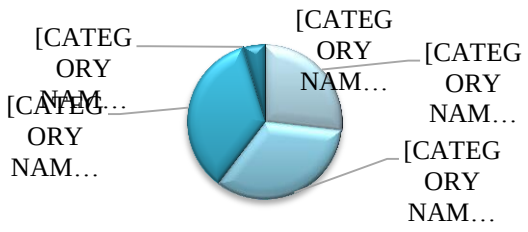
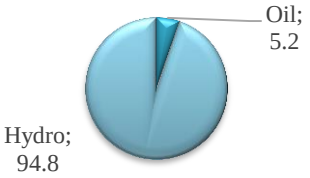
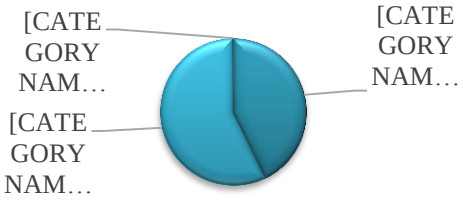
Kljub napredkom na trgu električne energije v Turčiji čaka državo še kar nekaj dela in izzivov v prihodnosti, da bi lahko zagotovila višji nivo konkurence na trgu in večjo transparentnost oziroma zaupanje trgu. Komisija EU predvsem opozarja, da so potrebne izboljšave na področju cen (neprimerne tarife), zaključek privatizacijskih postopkov, več transparentnosti in seveda 100-odstotna odprtost trga (European Comission, 2014 b, str. 28).

APPENDIX B: List of abbreviations

Abbreviation	Definition
ACER	Agency for the Cooperation of Energy Regulators
BOO	Build – operate – own
BOT	Build – operate – transfer
BOTAS	Petroleum Pipeline Corporation
CEE region	Central East European region
DSO	Distribution system operator
EML	Electricity Market Law
EMRA	Energy Market Regulatory Authority
ENTSO-E	European Network of Transmission System Operators for Electricity
EPC	European Price Coupling
EPIAS	Energy Markets Operation Joint Stock Company
ERGEG	European Regulators' Group for Electricity and Gas
ERI	Electricity Regional Initiative
EU	European Union
EUAS	Electricity Generation Company
GDP	Gross domestic product
IEM	Internal energy market
MCP	Market clearing price
MENR	Ministry of Eenergy and Natural Resources
MFSC	Market Financial Settlement Centre *(tr.* PMUM)
NLDC	National Load Dispatch Centre (*tr.* MYTM)
NRA	National Regulatory Authorities
nTPA / rTPA	Negotiated third-party access / Regulated third-party access
SEE region	South East Europe region
SMP	System marginal price
TEAS	Turkish Electricity Generation Company (before EUAS)
TEDAS	Turkish Electricity Distribution Company

TEIAS	Turkish Electricity Transmission Company
TEK	Turkish Electricity Authority
TETAS	Turkish Electricity Trading and Contracting Company
TOR	Transfer of operating rights
TPC	Transition period contracts
TSO	Transmission system operator

APPENDIX C: Table illustrating the Turkish electricity market and selected SEE electricity markets (the Energy Community Contracting Parties)

Country	Electricity generation / Gross electricity consumed / Total electricity customers	Installed capacity by energy sources in 2013 (%)
Turkey	240,154 GWh / 194,923 GWh / 66,505,050	
Albania	5,956 GWh / 7,957 GWh / 1,161,626	
Bosnia and Herzegovina	16,303 GWh / 11,088 GWh / 1,492,215	

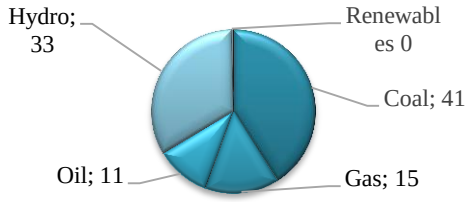
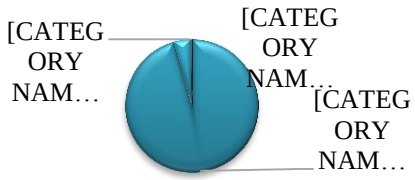
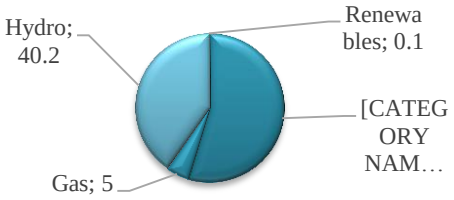
Former Yugoslav Republic of Macedonia	5,676 GWh / 6,989 GWh / 682,356	
Moldova	748 GWh / 3,551 GWh / 1,319,706	
Montenegro	3,809 GWh / 3,323 GWh / 378,073	100; Hydro

Table continues

continued

Country	Electricity generation / Gross electricity consumed / Total electricity customers	Installed capacity by energy sources in 2013 (%)
Serbia	37,537 GWh / 27,998 GWh / 3,580,579	

Source: Electricity generation & transmission statistics of Turkey for year 2013, 2014; Energy Community Secretariat, Annual Implementation Report 2013/2014, 2014.

APPENDIX D: Table of feed in tariffs (for selected countries)

<table>
<tr><th>Country</th><th>Feed-in-tariff wind</th><th>Feed-in-tariff hydro</th><th>Feed-in-tariff geothermal</th></tr>
<tr><td>Turkey</td><td>On and offshore: approx. €ct 5.3 per kWh
Local-content bonus: approx. €ct 0.4-2.7 per kWh</td><td>Feed-in tariff: approx. €ct 5.6 per kWh
Local-content bonus: approx. €ct 0.7-1.8 per kWh</td><td>Feed-in tariff: approx. €ct 8.1 per kWh)
Local-content bonus: approx. €ct 0.5-2.1 per kWh</td></tr>
<tr><td>Denmark</td><td>Onshore: €ct 4.95 – 8.90 per kWh (according to duration of payment) (§ 49 par. 1 EEG 2014) minus €ct 0.4 per kWh
Offshore: €ct 3.9 – 19.4 per kWh (according to duration of payment and scheme chosen by plant operator) (§ 50 par. 1-3 EEG 2014) minus €ct 0.4 per kWh (§ 37 par. 3 no. 2 EEG 2014).</td><td>/</td><td>/</td></tr>
<tr><td>Greece
NS=no support, WS= with support of government (fiscal, financial, subsidy)</td><td>
<table>
<tr><th>Wind</th><th>Interconnected systems</th><th colspan="3">Non-interconnected islands</th></tr>
<tr><td>€/MWh</td><td>NS</td><td>WS</td><td>WS</td><td></td></tr>
<tr><td>up to 5 MW</td><td>105</td><td>85</td><td>90</td><td></td></tr>
<tr><td>> 5MW</td><td>105</td><td>82</td><td>90</td><td></td></tr>
</table>
</td><td>
<table>
<tr><th>Hydro</th><th>NS</th><th>WS</th></tr>
<tr><td>up to 1 MW</td><td>105</td><td>85</td></tr>
<tr><td>1 MW-5 MW</td><td>105</td><td>83</td></tr>
<tr><td>5 MW-15 MW</td><td>100</td><td>80</td></tr>
</table>
</td><td>
<table>
<tr><th>€/MWh</th><th>NS</th><th>WS</th></tr>
<tr><td>Low-temperature (between 25°C - 90°C)</td><td>143</td><td>130</td></tr>
<tr><td>High-temperature (above 90°C)</td><td>110</td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Hungary</td><td>Wind power plants over 50 kVA can be connected to the grid only if there is a call for tender. The tariff is set by the result of the tender.</td><td>Plants below 5 MW:
peak period: approx. € 0.12
valley period: approx. € 0.10
deep-valley period: approx. € 0.04
Plants of more than 5 MW
peak period: HUF 22.58 per kWh (approx. € 0.07)
valley period: HUF 14.45 per kWh (approx. € 0.05)
deep-valley period: HUF 14.45 per kWh (approx. € 0.05)</td><td>Plants below 20 MW:
peak period: approx. € 0.12
valley period: approx. € 0.10
deep-valley period: approx. € 0.04
Plants between 20 and 50 MW:
peak period: approx. € 0.09
valley period: approx. € 0.08
deep-valley period: approx. € 0.03</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>Plants of more than 50 MW
<u>peak period</u>: approx. € 0.07
<u>valley period:</u> approx. € 0.05
<u>deep-valley period:</u> approx. € 0.05</td></tr>
<tr><td>Slovenia</td><td>The uniform annual price is €ct 9.538 per kWh for all plant sizes</td><td>Uniform annual price: €ct 9.261 – 10.547 per kWh, depending on the capacity of the plant.</td><td>Uniform annual price: €ct 15.247 per kWh.</td></tr>
<tr><td>Great Britain</td><td><table><tr><th>Capacity</th><th>GBP per kWh</th></tr><tr><td>≤ 1.5kW</td><td>0.16 (approx. 0.2 €/kWh)</td></tr><tr><td>1.5 kW - 15 kW</td><td>0.16 (approx. 0.2 €/kWh)</td></tr><tr><td>15kW - 100kW</td><td>0.16 (approx. 0.2 €/kWh)</td></tr><tr><td>100kW - 500kW</td><td>0.1334 (approx. 0.17 €/kWh)</td></tr><tr><td>500kW - 1.5MW</td><td>0.0724 (approx. 0.092 €/kWh)</td></tr><tr><td>> 1.5MW</td><td>0.0307 (approx. 0.039 €/kWh)</td></tr></table></td><td><table><tr><th>Capacity</th><th>GBP per kWh</th></tr><tr><td>up to 15kW</td><td>0.1901 (approx. 0.2411 €/kWh)</td></tr><tr><td>15kW - 100kW</td><td>0.1775 (approx. 0.2252 €/kWh)</td></tr><tr><td>100kW - 500kW</td><td>0.1403 (approx. 0.1780 €/kWh)</td></tr><tr><td>500kW-2MW</td><td>0.1096 (approx. 0.1390 €/kWh)</td></tr><tr><td>> 2MW</td><td>0.0299 (approx. 0.0379 €/kWh)</td></tr></table></td><td>/</td></tr>
</table>

Portugal	Indicative average rate for existing installations is € 74-75 per MWh.	For existing traditional hydro power plants (up to 10 MW), the indicative average rate is € 91-95 per MWh. For existing wave hydro power plants (pilot-projects) up to 4 MW, the indicative average rate is € 260 per MWh. Plants (pre-commercial) up to 20MW: Indicative average rate: € 191 per MWh. Commercial plants: Indicative average rate: € 131 per MWh for the first 100MW and € 101 per MWh for the subsequent 150MW	For existing installations (i.e. plants up to 3 MW), the Indicative average rate is € 270 per MWh.
Croatia	/	**For capacities below 5 MW:** ≤ 300 kW: approx. €ct 13.9 per kWh > 300 kW and ≤ 2 MW: approx. €ct 12.1 per kWh > 2 MW: approx. €ct 11.4 per kWh **For capacities above 5 MW** the amount of the tariff depends on the reference price	The tariff amounts to approx. €ct 15.6.

Source: Legal sources on renewable energy, 2015.

APPENDIX E: Transmission lines in Turkey

Source: Entose, 2014