Electricity Market Reform in Turkey: Developments and Lessons Learned from 2001 to 2013

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Abstract

Turkey made a radical decision in 2001 to liberalize its electricity sector, establishing a competitive market under the regulation and monitoring of an independent regulatory agency (EMRA). Currently, the electricity market operates within the legal framework established by the Electricity Market Law No. 6446 (Law No. 6446). The main market law was Electricity Market Law No. 4628 (Law No. 4628) from March 2001 to March 2013. The Turkish Grand National Parliament introduced a new market law in March 2013 and the Law No. 4628 became an organizational law of EMRA. The main purpose of the Law No. 6446 is to unbundle and liberalize electricity market activities, privatize state owned enterprises, and establish a competitive market. Unlike other countries, the liberalization, privatization, and regulation processes have been carried out together in Turkey and still continue to be carried out in the market. Regarding unbundling of network utilities, initially dense regulations, rather than gradual implementation, were put into effect. The liberalization process in Turkish electricity market, which started in 2001, is still continuing. With the privatization of state owned generation assets, the final stage will be reached in the process of establishing a competitive electricity market envisioned in the Law No. 6446. Among other things, the key lesson learned from 12 year regulation is that reform process in the electricity market needs continuous effort. Moreover, it has to be better implemented gradually and can only be succeed via public support.

1. Introduction

Turkey made a radical decision in 2001 to liberalize its electricity sector, establishing a competitive market under the regulation and monitoring of an independent regulatory agency (EMRA)1. Currently, the electricity market operates within the legal framework established by the Electricity Market Law No. 6446 (Law No. 6446). The design and legal framework of the new market is adapted from that of the European Union (European Union, 2014). The main market law was Electricity Market Law No. 4628 (Law No. 4628) from March 2001 to March 2013. The Turkish Grand National Parliament introduced a new market law in March 2013 and the Law No. 4628 became an organizational law of EMRA.

The main purpose of the Law No. 6446 is to unbundle and liberalize electricity market activities, privatize state owned enterprises, and establish a competitive market. Unlike other countries, the liberalization, privatization, and regulation processes have been carried out together in Turkey and still continue to be carried out in the market. Regarding unbundling of network utilities, initially dense regulations, rather than gradual implementation, were put into effect.

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1 Its full name is Energy Market Regulatory Authority. It is an independent regulatory body which regulates electricity, natural gas, petroleum, and LPG markets in Turkey.
To give further impetus to the liberalization process, in 2004, the Turkish government issued a strategy paper (ETKB, 2014), aiming at speeding the liberalization of the electricity market as per the provisions of the Law No. 4628 in 2004. Later on, in 2009, the government decided to enact a new strategy paper to accelerate the liberalization process as well as introducing some measures required for the security of supply.

This paper aims at sharing Turkey's experience in transforming its electricity market from 2001 to 2013, by comparing the period prior to 2001 with the period from 2001 to 2013, and reveals the possible effects of regulation in Turkey.

This paper is organized as follows. Following the introduction section, the second section explains the methodology of the paper. The third section outlines a brief history and basic features of the Turkish electricity market, including the legal framework, market design, and market opening. The fourth section introduces the changes and developments in the selected parameters. The fifth section makes a detailed analysis of the developments from a regulation point of view and summarizes the lessons learned. The sixth and final section evaluates what has been covered and concludes the paper.

2. Methodology

In this paper, the installed capacity, production and consumption data, the private sector presence in the electricity generation and distribution activities, the eligibility threshold and market openness, and the competitive structure of the market were studied from a regulation point of view.

3. Turkish electricity market from a historical and regulatory perspective

3.1. The market structure until 2001

Electricity production in Turkey began in 1902 for the first time in her history and significant electrical activity was carried out by foreign-owned companies until 1930. In 1930, municipalities have also begun to perform electrical activity. But, due to disorganization and the reason for a central organization in the sector, the Ministry of Energy and Natural Resources was established in 1963.

However, the electrical activity was not sufficient to meet the increasing demands of Turkey. In 1970, in order to increase the efficiency in the sector, the Turkish Electricity Authority (TEK) - a state owned utility - was established to execute generation, transmission, distribution, and trading of electricity. In the establishment of TEK, Electricité de France SA (EDF), a French state owned utility was taken as sample.

In the 1980s, electricity activities, which were carried out by TEK was organized under a vertically integrated structure. In electricity generation, TEK and DSI had a monopoly position. In Turkey until the 1980s, the electrical activity had maintained a structure of public monopoly. However, the demand for electricity had been increasing steadily since the beginning of the 1980s. In 1970, 7% of the total number of villages was electrified; the ratio reached 61% in 1982. However, investment for further electrification was not adequate due to lack of financial resources.

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2 TEK was established in accordance with Law No. 1312 dated July 15, 1970.

3 The abbreviation for Genel Directorate of State Water Works. DSI is the only authority responsible for the management of water sources in Turkey. In the past, it operated hydroelectric power plants as well. The authority is still in operation, but its duties and powers were differentiated and limited to water management.
In 1984, the reorganization of the electricity market was introduced with the Law No. 3086. The basic objective was to overcome the lack of financial resources needed for investment. For this purpose, the monopoly position of TEK was abolished and, in addition to TEK, domestic and foreign private companies were also allowed to establish and operate transmission, distribution and generation activities under the Build-Operate-Transfer (BOT) contract, sell the electricity to TEK for 20 years, transfer the assets to the state free of charge after the term of BOT contract ends. In addition, the operation of existing distribution and generation assets were transferred to private sector for a price initially paid under Transfer of Operating Rights (TOoR) contract on the condition that the ownership of these assets remained in the hands of TEK (Ulusoy, 2005). However, since the structure prescribed by the Law No. 3086 is not well established from a legal point, in practice, the companies experienced major legal problems even they obtained the necessary permits. But the construction of the first power plant started in 1996 under the Law No. 3096.

In the 1990s, the privatization process of TEK was initiated. In this context, TEK was divided into two separate state owned enterprises as TEAS and TEDAS. Thus, the distribution activity had been separated from generation, transmission, and trading activities. In 1994, the privatization process had not been carried out because the Law No. 3974 was cancelled by Constitutional Court on December 10, 1994. With the Law No. 3996 adopted in 1994, the country was divided into 29 distribution regions through TOoR contracts and the privatization process had been initiated. However, the privatization of distribution activity had not taken place due to various legal problems.

The period of 1997 to 1999 had passed with the efforts to solve various legal matters. By 1999, it was understood that the most important problem in front of Turkey to reform the electricity market was the legal issues. In order to overcome these issues, Article 47 of the Constitution was amended on August 1999. With this amendment (Article 47/3), a new provision specified what investments and services could be done by, or be transferred to individuals and legal entities under private law contracts by law. A constitutional guarantee had been provided to the execution of electrical activity without being subject to administrative law. This amendment, which was launched in 2001, had been the legal ground for restructuring and the transition to regulation in the Turkish electricity market. With the aforementioned legal problems and search for solutions after many years, when the year 2000 came in Turkey, the installed capacity was 27.264 MW, the amount of electricity produced amounted to 124.921 million kWh (TEIAS, 2013a). The installed capacity was 28.332 MW in 2001 when the Law No. 4628, which constituted the electricity market reform, was accepted by Turkish Parliament (TEIAS, 2013a).

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4 The Law on Assignment of the Institutions other than the Turkish Electricity Authority for Electricity Generation, Transmission, Distribution, and Trade. The purpose of this law is to regulate the generation, transmission, distribution, and trading of electricity carried out by private companies other than the Turkish Electricity Authority, having the status of domestic and foreign companies subject to the provisions of Turkish Commercial Code.

5 It became in effect on February 22, 1994. It included articles which specified that the contracts in the energy field were subject to private law and would not constitute concession.

6 BOT model - Law No. 3096 - was adopted only for electricity activities. In fact, it is a financing model for public funding. In addition to the electrical activity, the scope of this model has been expanded by Law No. 3996 (Article 2) to cover many other activities. Today, in Turkey, high-cost public investments are carried out in accordance with the provisions of this specific law.

7 Before the constitutional changes in 1999, the Constitutional Court and the Supreme Administrative Court concluded that the contracts signed for the conduct of public service by private individuals could not be subject to the provisions of the special law and they were public service concession contracts of an administrative nature. Finding contrary to the constitution, The Constitutional Court revoked the legal regulations in the Laws of 3096 and 3996, and those which regulated that the contracts signed within the scope of the laws 3096 and 3996 were subject to provisions of private law.
3.2. New market structure after 2001

An entirely different model had been envisaged for the electricity market by the Law No. 4628 in 2001. Firstly, the electrical activity had been envisaged as generation, transmission, distribution, wholesale and retail sales, retail services, import and export activities. However, the separation of vertically integrated structure was aimed.

In 1993, TEDAS carried out distribution activities while TEAS conducted other electrical activities after the legal unbundling of TEK into TEAS and TEDAS. With the Law No. 4628, TEAS was divided into three companies, EUAS for generation, TEIAS for transmission, and TETAS for trading. Thus, along with TEDAS, the number of state owned companies in operation in the market had risen to four. Current market structure is shown in Figure 1.

Figure 1. Current market structure.

Note: BO - Built and Operate model, BOO - Built, Operate, and Own model, TOOR - Transfer of Operating Rights model

The Law No. 4628 aimed an electricity market operating in a competitive environment and pursuant to the provisions of private law. Additionally, the licensing mechanism - granting license to domestic and foreign companies - has been envisaged for the conduct of market activities subject to the provisions of private law. Thus, the production, import and export, wholesale and retail sales activities are opened to competition and distribution activities will be carried out by the private sector. However, TEDAS will own the assets of distribution network on behalf of public and the operating right of distribution network will be transferred to private sector. All of these activities will be subject to licensing and regulation, and this task will be fulfilled by EMRA.
On the other hand, it is intended that the state will withdraw from the electricity market, except for the transmission activity and the market be left to private sector. In this context, the generation, distribution, and trading activities should be transferred to private sector. The privatization was selected as a method to achieve this aim.

Also, the concept of "eligible consumers" was developed. Accordingly, a consumer whose consumption is over the threshold determined by EMRA board has been defined as eligible consumers. These consumers are allowed to select their own suppliers and purchase cheaper electricity if they want freedom to negotiate with generators or other suppliers of electricity, thus changing suppliers. Thus, the target was the occurrence of long-term competitive pressure on prices in the market.

The market structure formed by the Law No. 4628 had been partially revised in 2013 with the Law No. 6446 after a 12 year of implementation. However, this revision, instead of being a new market reform, mainly aimed at the development of existing market structure revealed by the Law No. 4628.

3.3. A short summary of current market structure

As noted earlier, the legal basis for the current market is the Law No. 6446\(^8\), which is a framework law. This law regulates, among other things, market entry, licensing, third party access, tariffs, auditing, monitoring, competition, and the rights and obligations of market participants.

Any legal entity established in accordance with Turkish Commercial Law may engage in electricity market activities through obtaining relevant license from EMRA. Separate licenses are required for each market activity and for each facility. Market entry mode is licensing which is transparent, open, and publicly known. For generation activity, pre-license is granted first and then generation license. The progress of the construction of a power plant is monitored until the power plant is completed. If there is more than one application for the same connection point for wind and solar license applications, competition for the market – a tender procedure – is organized by transmission system operator (TSO)\(^9\) to select who will be eligible to enter the market.

In accordance with the provisions of the Law, EMRA regulates the tariffs of TEIAS, 21 regional distribution utilities, assigned regional retailers, and TETAS for transmission, distribution, retail prices for captive customers and wholesale energy selling price, respectively. Revenue cap for the income of TEIAS is being implemented currently. The types of tariffs under the regulation of EMRA are connection and use-of-system tariffs, transmission tariffs, distribution tariffs, wholesale tariffs, and retail tariffs applied to captive consumers.

By the Law, the activities in the market, except for network activities are open to competition under the supervision of, and regulated by EMRA. The electricity market is based on bilateral agreements complemented with the balancing and settlement market. The private sector may participate in all segments of the electricity market, except for transmission, by obtaining the relevant licenses from EMRA. Third party access to the network without discrimination is in place under the supervision of EMRA. The law foresees an independent transmission system operator. According to the Law No. 6446, the ownership, operation, and maintenance of investments in the national grid remain in the hands of TEIAS. TEIAS also acts as the market operator. In addition, TEIAS will remain as the sole transmission system operator and asset owner.

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\(^8\) *The Law No. 6446' and 'The Law' are interchangeably used in this paper.

\(^9\) Turkish Electricity Transmission Company - TEIAS - operates as both system operator and market operator in the market.
The Law makes distribution utilities responsible for distribution network planning, construction and operation. Distribution utilities are required to prepare regional demand forecasts, and submit them to TEIAS. TEIAS is required by the Law to prepare its transmission planning and capacity generation projection based on these demand forecasts and submit them to EMRA for approval. The distribution utilities were legally unbundled in the beginning of 2013 and as a result of the legal unbundling, the newly established retailers are assigned with the responsibility of ‘supplier of last resort’. They are entitled to engage in retail business and/or retail sale services for consumers.

The electricity market was opened on March 3, 2003. All customers directly connected to the transmission system as well as consumers with consumption of more than 4,500 kWh for 2014 are deemed as eligible customers. The corresponding theoretical market opening is 85%.

Turkey is giving high importance to the electricity generation from renewable energy sources in order to utilize the domestic sources and lower the import dependency on energy sources. For this purpose, a renewable promotion law was enacted in 2005. RES based power plants are supported by feed-in tariff. In addition, up to 1 MW of renewable based power plants is exempted from licensing and establishing companies. Excess generation from unlicensed power plants is priced at feed in tariffs.

4. Electricity market after 2001: A comparative analysis

Turkey has one of the fastest growing energy markets in the world. The share of domestic production of energy accounts for about 30% of the national demand in Turkey. This makes Turkey an import dependent country on energy. As end of 2013, the total installed capacity of electricity increased to 64 GW in Turkey. Currently, various state owned enterprises continue to dominate the sub sectors of electricity market, such as EUAS with around 37% share in installed capacity basis in generation and TETAS with over 50% in market share basis in electricity trade, including import and export from neighboring countries.

4.1. Generation and installed capacity

The total electricity generation capacity was 28.332 MW at the end of 2001. Out of this figure, 21.063 MW is owned by the public, corresponding 74.3% share. 7.269 MW, which is 25.7% of the installed capacity in 2001, is owned by the private sector (TEIAS, 2013a).

However, electricity generation capacity has increased significantly for the last 12 years. First, 1.398 licenses were granted for electricity generation by EMRA. With regard to the licenses issued, each licensee is obliged to submit a progress report every 6 month, January and July until the power plant is completed. If deemed necessary, an on-site supervision by EMRA staff has been made. In order to execute investments in timely manner and use natural resources more efficiently, the licensee is required to submit a letter of bank guarantee. Company guarantees are recorded as revenue if the power plant cannot be completed within the time period determined by EMRA and the license is cancelled. In this context, approximately 70 letters of guarantee were cashed within 12 years. As a result of above applications, 1.398 power plants were completed and put into operation within 12 years.

As end of 2013, Turkey’s total power generation capacity reached 64.044 MW (TEIAS, 2013a). Thus, within 12 years, the installed capacity has increased by 2.2 times. 6.895 MW new capacity is added to electricity market in 2013. The share of public and private sectors in the total capacity in 2013 is faced with a situation almost exactly the opposite of the situation before 2001. Out of 64.044 MW capacity, 23.782 MW (37.1%) is owned by the public, 40.262 MW (62.9%) is owned by privately owned companies (TEIAS, 2013a). Within the 12 year of regulation period, the electricity generation capacity owned by the private sector has increased to 40.262 MW from 7.269 MW. In other words, the amount of installed capacity owned by private sector has increased by 5.5 times. Figure 2 shows the shares of public and private sector in the installed capacity over years.
However, the installed capacity of the public has not changed significantly. In 2001, 21.063 MW of installed power was publicly owned while the same figure was 23.782 MW at the end of 2013 (TEIAS, 2013a). Therefore, the capacity owned by private sector increased by about 33,000 MW while the capacity owned by public increased 2,719 MW within 12 years. The following figure, figure 3 shows the developments in electricity generation capacity in the last 12 years in Turkey. Referring to figure 3, the capacity added to the market has increased drastically especially after 2007 when the day-ahead market became operational.

**Figure 3.** New capacity additions by private sector over years.

![New capacity additions by private sector over years.](image-url)
Despite all these developments, 64,044 MW capacity are not sufficient to meet consumption, particularly in the cold days of winter. The most important reason for these is the components of the installed power capacity. Out of 64,044 MW, 25,593 MW of installed capacity is based on renewable energy sources; approximately 24,000 MW is based on natural gas fired power plants. Despite this, natural gas has a large share in electricity generation and in 2013, approximately 44% of electricity generation came from natural gas based power plants.

As noted above, natural gas based power plants can lead to significant problems in the cold days of winter because Turkey is 97% dependent on imported natural gas. During winter, the amount of natural gas supply available for electricity generation is reduced for various reasons whereas the demand for electricity in households is rising. As a result, in order to meet the needs of households during winter, the natural gas supply to industrial consumption and natural gas based power plants are interrupted. At the end, this significantly reduces the production of electricity. For example, 12 February 2012 and 6 to 13 December 2013 are examples of this situation. On the dates given, electricity was alternately provided to consumers and this caused temporary power outages in the country.

The foregoing description shows that the increase in the total installed power of a country is not enough alone to meet electricity needs. However, the installed power components are also important, especially for countries like Turkey, dependent on natural gas based power plants. This requires that natural gas supply chain must be large and diversified. Particularly, natural gas storage facilities should be adequate.

4.2. Consumption

There have been significant improvements in power consumption in parallel with generation in the regulation period. Turkey’s electricity consumption was 121 billion kWh\(^{10}\) in 2001 and by the end of 2013; this amount reached 245 billion kWh\(^{11}\) (TEIAS, 2013b). Average annual consumption growth is between 6% and 8%. The table 1 below shows the developments in net consumption by years.

<table>
<thead>
<tr>
<th>Years</th>
<th>Net consumption (GWh)</th>
<th>Increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>97,070</td>
<td>-1.2</td>
</tr>
<tr>
<td>2002</td>
<td>102,948</td>
<td>6.1</td>
</tr>
<tr>
<td>2003</td>
<td>111,766</td>
<td>8.6</td>
</tr>
<tr>
<td>2004</td>
<td>121,142</td>
<td>8.4</td>
</tr>
<tr>
<td>2005</td>
<td>130,263</td>
<td>7.5</td>
</tr>
<tr>
<td>2006</td>
<td>144,091</td>
<td>10.6</td>
</tr>
<tr>
<td>2007</td>
<td>155,135</td>
<td>7.7</td>
</tr>
<tr>
<td>2008</td>
<td>161,948</td>
<td>4.4</td>
</tr>
<tr>
<td>2009</td>
<td>156,894</td>
<td>-3.1</td>
</tr>
<tr>
<td>2010</td>
<td>172,051</td>
<td>9.7</td>
</tr>
<tr>
<td>2011</td>
<td>186,099</td>
<td>8.2</td>
</tr>
<tr>
<td>2012</td>
<td>194,923</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Source: (TEIAS, 2013b)

As a result, it could be said that electricity consumption showed an increase of 100% during the 12 year regulation period.

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\(^{10}\) It refers to gross consumption.

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4.3. Distribution and retail activities

In Turkey, electricity distribution and retail activities were conducted by TEDAS from 1993 until April 1, 2006. Therefore, as of 2001, the entire distribution and retail activities were carried out by the public. However, obsolete network had led to frequent power outages and network substantially consisted of overhead lines. In terms of duration and frequency of power outages, great difficulties had been experienced. In order to overcome these difficulties, the investment had to be made for the replacement and improvement of network. However, sufficient capital for these investments could not be allocated. In addition, on average, more than 20% leakage rate and losses all over Turkey could not be prevented and high losses posed TEDAS significant costs.

However, significant changes in terms of distribution and retail activities have been envisaged in the Law No. 4628. Firstly, public will withdraw from distribution and retail operations and leave them to private sector under the supervision and monitoring of EMRA. However, the ownership of distribution network will remain in TEDAS, whereas distribution and retail operations will be transferred to the private sector for the execution. To reach this goal, the privatization method is adopted.

However, since the operation of Turkey's all electricity distribution and retail sales activities by a single entity awarded through a tender was seen impossible, 21 distribution regions had been established by the decision of the Higher Planning Council in 2004 and a separate distribution utility was formed for each distribution region to act as natural monopolist, considering the geographical and economic situation in the country. The newly established regional distribution utilities were state owned utilities. Then, TEDAS transferred the duties and powers of distribution activities to these regional utilities on April 1, 2006. For this reason, today there are still 21 distribution regions in Turkey and there are 21 distribution companies.

When it comes to 2013, all 21 distribution companies were privatized\(^\text{12}\). The privatized distribution companies and retail activities are subject to the regulation of EMRA. All income and expenditures of these companies are determined by regulated tariffs.

When considered in terms of pre and post regulation periods, significant differences in terms of distribution investments had occurred in the electricity distribution in Turkey besides the execution of distribution activity services and quality of service.

As stated earlier, even though TEDAS delegated its authority for distribution activities to newly established 21 distribution companies on April 1, 2006. From this date, the distribution activity had continued to be carried out by the public because newly established utilities were also state owned. However, only two of them could be privatized during the period of 2008 and 2009. Other distribution companies could be privatized significantly between the years of 2010-2013. Thus, a sufficient time has not been passed to observe the effects of regulation on distribution sector due to the late privatization of distribution activities in Turkey. Furthermore, this case indicates that a sufficient time must pass to assure the effects of regulation in the market.

However, the investments made in the distribution sector during the period of 2006-2010 amounted to TL 3 billion. In contrast, the amount of the planned investments in the distribution for the period of 2011-2015 is TL 8.5 billion\(^\text{13}\). During the years of 2011-2012, an investment of over TL 3 billion was completed in the distribution sector and 75% of it was carried out by private sector (Elder, 2013). In the case of realization of all investments amounting to TL 8.5 billion, 2 times more investment will be made in the period of 2011-2015, compared to the amount of investment made by the public in the electricity distribution during 2006-2010.

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\(^{12}\) These are Baskent Electricity Distribution Company and Sakarya Electricity Distribution Company.

\(^{13}\) It is important to note that currently a significant portion of this amount of investment had been realised.
On the other hand, the leakage rate in electricity distribution has not fallen to the desired level yet in Turkey. The leakage rate is around 25% in 2001 and by the end of 2013, this ratio decreased to about 12%. However, the leakage rate is quite high in some distribution regions. For example, while this ratio was 52% in Vangölü Electricity distribution region, it is 73% in Dicle distribution region. Since these two distribution regions are newly privatized, there are great expectations of significant decreases in this ratio among the public in coming years.

4.4. Legal separation of distribution and retail operations

As mentioned above, until 2001, the distribution and retail operations were conducted by TEDAS. According to the Law No. 4628, it is foreseen that both distribution and retail sales activities are carried out by distribution companies holding a retail license. However, depending on developments in EU energy related legislation and for the formation of a competitive market, the legislator made an amendment in the Law No. 4628 and by this amendment, all distribution utilities were required to separate commercial activities and carry them under a separate legal entity from the beginning of 2013. Indeed, until 2013, distribution and retail operations were legally unbundled in the framework of principles and procedures determined by EMRA. Thus, there are 21 distribution companies and 21 assigned retailers in Turkey as of the beginning of 2013.

The new Electricity Market Law No. 6446 also assigned regional retailers as 'supplier of last resort'. Also, with the arrangements made by EMRA in secondary legislation, the relationships between distribution utilities and assigned retailers are regulated. It is aimed that distribution company operates as an independent network operator. In addition, the necessary precautions are taken to avoid the use of distribution company's dominant position by assigned retailers in the retail market.

In the case of Turkey, contrary to the implementation of EU countries, a specific regulation determined at the very beginning has been envisaged for the legal unbundling of distribution and retail activities (CEER, 2013). In other words, the relationships between the two companies are intensively subjected to regulation and then it is intended that the regulation is reduced gradually after the market is matured enough. In this way, it is though that both companies will have a perception of "the identity of being two different companies".

4.5. Wholesale market and bilateral agreements

During the regulation period of 2001-2013, one of the most developed parts of the market is bilateral agreements and wholesale market. Before 2001, Turkey's electricity trading activities were conducted by TEAS, a public company. This company had two major tasks. The first one was to sell the energy produced by power plants under the umbrella of EUAS and collected in its own portfolio. The other was to purchase the electricity generated by the power companies which had signed a concession agreement with the Ministry of Energy and Natural Resources under purchasing obligation, and sell them to TEDAS.

However, after the entry into force of the Law No. 4628, as mentioned earlier, TEAS was divided into three as TEIAS, EUAS, and TETAS. Out of them, TETAS is tasked with wholesale. More precisely, TETAS has been given the duty of purchasing the electricity generated under the umbrella of EUAS and the electricity generated by private companies under concession agreements with purchasing obligation on behalf of public and selling them to TEDAS, alternatively regional distribution utilities after April 1, 2006. However, the Law No. 4628 regulated that private sector entities obtaining suppliers license\(^\text{14}\) from EMRA had the opportunity to perform wholesale, export and export activities and sell electricity directly to eligible customers. Also, according to the Law No. 4628, generation companies had the opportunity to sell directly to eligible consumers.

\(^{14}\) Formerly, wholesale license or retail sale license.
As end of 2013, besides TETAS, there are 150 companies with a supplier license to perform above mentioned activities. However, totally 932 generation license holders in operation can sell directly to consumers and perform the wholesale market. In other words, before 2001 there was a single supplier, which was TEAS. By the end of 2013, there have been 1.082 suppliers active in the market. Except for approximately 100 power plants under the organization of EUAS, state owned power plants and TETAS, all other suppliers are privately owned.

Another important issue is the eligibility limit and the number of eligible consumers, in addition to the number of suppliers in terms of bilateral market. Before 2001, direct energy sales by TEAS to large consumers such as State Railways, which is connected at transmission level and publicly owned, was possible. Other consumers were getting their energy from TEDAS because distribution activity and retail sales had been carried out only by TEDAS. According to the Law No. 4628, enacted in 2001, eligible consumers were defined as consumers directly connected to the transmission system and with consumption of more than 9 million kWh. However, the threshold is reduced by EMRA board in January of each year. Accordingly, the eligibility limit was reduced to 4,500 kWh in January 2014. According to the strategy paper (ETKB, 2014), published in 2009 by the government, everyone is expected to be eligible in the beginning of 2015. The figure 4 below shows the changes in the eligibility limit and the corresponding market opening.

**Figure 4. Eligibility limits and market opening over years.**

![Figure 4](https://www.epdk.org.tr)

As seen in the figure 4 above, the market opening increased to 85% in 2014. In other words, assuming that all eligible consumers choose their own suppliers, the percentage of the energy requested by all eligible customers corresponds to 85% of total demand in the country. However, the theoretical market opening is around 25% in Turkey. Thus, the actual market opening is significantly lower than

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15 For detailed information, please refer to the internet site of Turkish energy regulator, EMRA, www.epdk.org.tr.

16 Eligible customer is defined as customers whose consumption is above the threshold determined by the board of energy regulator - EMRA, or customers directly connected to the transmission system or organized industrial zone legal entity.
theoretical market opening. This difference is mainly the results of insufficient infrastructure and lower supply available for bilateral contracts.

From the experience of 12 year regulation period, the actual number of consumers using their right of selecting suppliers has shown a significant increase in parallel to the reduction in the eligibility limit. License holders who can sell electricity to eligible customers by bilateral agreements had been generation licensees and suppliers other than assigned regional retailers until the end of 2012. However, following the legal unbundling of distribution and supply activities, the assigned retailers became suppliers to all eligible customers without any regional limit in the country. For this reason, since the beginning of 2013 the number of eligible consumers has increased enormously (TEIAS, 2013c). This shows that assigned retailers have a competitive advantage in the market and clearly reveals the vital importance of legal separation of commercial activities from network utility. Figure 5 shows the number of eligible customers and meters by years.

Figure 5. Number of eligible customers and meters over years.

On the other hand, one of the most important issues of bilateral contracts market during 2001 and 2013 is that the distribution utility has been unable to read all meters of switching customers within the due date on a regular basis. In the case of reading meters late, eligible customers switch back to assigned regional retailers - retail arm of distribution utilities. This shows that distribution utilities are the entrance gate to the market in terms of a competitive market.

4.6. Liberalization and privatization practices

Despite major advances in privatization and liberalization which started between the years 2001 and 2013, they have not been completed yet. In the electricity markets of Western European countries, at the end of 1990s or at the beginning of 2000s, except for extreme cases such as France, privatization and liberalization activities had been completed. Following EU energy related directives published in 1996, many European countries started the privatization in order to quickly withdraw the public from the market and the process of privatization had been completed by the beginning of the 2000s. As this application has some major advantages, it has brought significant drawbacks as well. With very rapid
progress of privatization, market liberalization has accelerated the process. However, after the withdrawal of public monopolies, private monopolies have replaced them significantly. In most European countries, the electricity market is controlled significantly by a few companies. Thus, it is understood that these private monopolies will continue to be a problem in front of the establishment and development of a competitive market in the Western European countries (Turkish Competition Authority, 2010).

Even though the regulation of the Turkish electricity market started in 2001, the privatization started in 2008. As the end of 2013, the privatization of electricity distribution was completed whereas the privatization of 16.200 MW capacity out of 24.200 MW which is in the hands of EUAS, a public company has just started. The purpose is to privatize 8.000 MW capacity, except for large dams, until the end of 2015.

However, as noted earlier, the share of private sector in the electricity generation has increased to 63% from 20% during the 12 year regulation period. This increase was due to new installed capacity by private sector. In the electricity distribution, the share of private sector was around 3% in the beginning of 2001; it reached 100% at the end of 2013.

Liberalization and privatization have been carried out together in Turkey since the beginning of the reform. Although this caused delays in the full liberalization of the market, the process of liberalization and privatization was carried out carefully in order not to establish a private monopoly in a manner similar to that of Western European countries (European Union, 2014).

Regulation and privatization of the electricity market have been significant consequences in terms of public investment budget. A significant difference has been observed in the budgets of the Ministry of Energy and Natural Resources for 2001 and 2013. For example, the total budget of the Ministry of Energy and Natural Resources for 2013 is 59.021 billion TL. The share of energy in the 2013 budget is 5.000 TL, corresponding a share of 8.5% in terms of all energy related investments.

5. Results and lessons learned from 2001 to 2013

Considering Turkey's experience in the electricity market liberalization, the key results and lessons learned are summarized below.

There is a high increase in demand for electricity in Turkey. The average increase is 6% to 8%. Considering the security of supply issue in the country, the question is "How to solve it under electricity market conditions?" Which has the first priority? Security of supply comes first? or establishing a wholly competitive market? This could be a difficult question for the country to answer in the future depending on the economic development and the financial volatility.

Turkey's electricity generation rose to 239.8 billion kWh in 2013 from 122.7 billion kWh in 2001, representing an increase of approximately 100%. The share of natural gas in the electricity generation mix is almost 50%, which makes Turkey highly dependent on import since it does not have significant gas reserve. Despite the high installed power capacity, there are risks of power outages during winter due to dependence on natural gas. Taken into consideration Turkey's dependence upon foreign direct investment due to lower rate of savings and increasing current account deficit, a manageable mix of sources and fuels is a challenging issue for energy policymakers.

While the installed capacity was 28.332 MW in 2001, it reached 64.044 MW in 2013. In addition, the share of private sector in terms of installed capacity increased to 62.2% from 25.7%. In this context, the budget of the Ministry of Energy and Natural Resources was the lowest budget in 2013 while it was one of the largest budgets in 2001 in the country.
Full market opening is planned at the beginning of 2015. There is a significant difference between theoretical and realized market openings due to insufficient infrastructure and lower supply available for bilateral contracts. Insufficient metering and communication infrastructure delays the liberalization in the market.

The Law No. 6446 foresees the liberalization and privatization at the same time.

The state still has a dominant position in the electricity trade with around 50%. The transmission utility is wholly owned by the state. Currently, all electricity distribution regions are run by private entities.

Handling of existing contracts (BO, BOT, and TOoR) is one of the major concerns of the country.

Uniform national tariff for retail tariffs is applied as transitional implementation until December 31, 2015. The Council of Ministers is authorized by the Law No. 6446 to extend the duration until the end of 2020. The Law No. 6446 allows cross subsidy among regional electricity distribution regions with lower and higher losses.

Loss and leakage rates in distribution system were, on the average 14.5% in 2013, but in some regions it was as high as 70%.

Liberalization and restructuring in the electricity markets resulted in several organizations with different responsibilities. Coordination and cooperation among stakeholders is a must for the success of the market liberalization.

Training of market participants is another issue to redefine attitudes compatible with liberal market philosophy. There is an obvious need to inform all stakeholders about the market model and developments in the market.

Countries like Turkey are, in general, developing countries. That means that significant capital is required for new investments and modernization in both generation and network. Success in the liberalization of electricity market depends on how successfully investments are financed. This requires investments which provide acceptable returns to investors and are attractive enough to be financed by financial institutions. The critical factor is “bankable regulatory framework” for the energy regulators. Then the question is how regulators will develop it? In addition, countries should deal with a volatile financial environment. Collaborating with financial institutions in developing sound legislation is a must.

The market is dynamic and participants develop new tools to remain in the market as well. Then regulators must respond to market demands and amend the regulations if deemed necessary.

The number of renewable power plants financed by project financing is increasing. In general, banks base their financing decisions on feed in tariff developed to support the electricity from renewable power plants.

6. Conclusions

The liberalization process in Turkish electricity market, which started in 2001, is still continuing. With the privatization of state owned generation assets, the final stage will be reached in the process of establishing a competitive electricity market envisioned in the Law No. 6446. Reform process in the electricity market is always a challenging issue. It requires political commitment and necessitates a comprehensive restructuring process. Among other things, the key lesson learned is that reform process in the electricity market needs continuous effort. It has to be
better implemented gradually. It can be succeeded via public support. Every country has its own dynamics and needs. Thus, the reform process for each country should be tailor-made. As a regulatory framework, there is no unique solution which fits all and can be implemented without geographic limitation.

References


