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# **TURKISH ENERGY INDUSTRY REPORT**

**AUGUST 2010**



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## 1. Executive Summary

The Turkish energy sector is widely seen as the most promising and attractive field of investment in the Turkish economy. The market experiences a transition into a competitive market structure in order to attract private sector investments. The energy market is witnessing rapid growth and liberalization process with the recent privatizations, licensing tenders and strategic partnerships. The sector has been remarkably active recently and offers major opportunities to investors.

Energy consumption in Turkey is low when compared with Western European countries. However, the large, young and increasingly urban population together with expected industrial development potential in Turkey represents a significant growth potential. Currently, Turkey is a major energy importer, as the increase in its energy consumption has outpaced domestic production. Substantial investment in the energy sector will be required in near future in order to meet the increasing demand in Turkey. The energy consumption in Turkey has reached a level of 102 million tons of oil equivalent, or 1,420 kg of oil equivalent per head in 2008 (which is still below the level of developed countries) with an increasing trend between 2004 and 2008. Given the slowdown in the economy since mid-2008, the increase in energy consumption slowed from 5.3 percent y-o-y in 2007 to 1.4 percent in 2008. The decline continued in 2009 with a fall of 5.3 percent due to the global recession; however an increase of 2.5 percent annually is expected between 2010 and 2013<sup>1</sup>.

The Turkish electricity market is one of the fastest growing in the world. Installed capacity has continued to rise regularly between 1998 and 2009 from 23,354 MW to 44,766 MW respectively with a CAGR of 6.1 percent<sup>2</sup>. In line with the increase in the number of natural gas fired power plants and hydro electric plants, both constitute the highest share in energy resources with 34 percent each, followed by hard coal and lignite forming 24 percent together.<sup>3</sup>

Turkey's domestic oil and gas production meets less than 3 percent of its energy requirements, making the country a major importer of oil and gas. 90 percent of Turkey's crude oil is imported, mainly from Saudi Arabia, Iran, Iraq and Russia. 70 percent of domestically produced oil is provided by the state-run Turkish Petroleum Corporation (TPAO), with the remainder produced mainly by Royal Dutch/Shell. As regards natural gas, Turkey is dependent on imports from Russia which corresponded to 63 percent of the total in 2007. Other suppliers include Iran, which accounted for 17 percent and Azerbaijan for 4 percent of the total.<sup>4</sup>

The natural gas market in Turkey is shaped by the Natural Gas Market Law which was enacted in 2001. Accordingly, a gas release program was initiated and the transfer of the rights under 4.75 bcm (billion cubic meters) of BOTAS's contracts (14 percent of actual gas imports) was completed. These rights were acquired by four private sector companies, which won the public tender and have now started gas imports. The state-owned pipeline operator and gas supplier BOTAS previously handled all oil and gas imports and owns the distribution infrastructure, though its dominant share of the market is planned to be further reduced in the coming years in line with Natural Gas Market Law. The share of the private sector in gas imports and wholesale activities should thus rise as the share of the state (BOTAS) reduces.

Coal is mainly used for power generation in Turkey. 30 percent of the total primary energy consumption in Turkey is derived from coal. Only one-half of the coal used is produced domestically in Turkey which makes Turkey's coal market dependent on imports. The coal market is largely considered to be a monopoly operated by Turkish Coal Works (TKI) and Turkish Hard Coal Enterprises (TTK) although minor parts of production, processing and distribution activities are contracted to the private sector.

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<sup>1</sup> EIU (Economist Intelligence Unit)

<sup>2</sup> TEIAS (Turkish Electricity Transmission Company) and TETAS (Turkish Electricity Trading and Contracting Company) Sector Report – March 2010

<sup>3</sup> TEIAS (Turkish Electricity Transmission Company)

<sup>4</sup> EIU (Economist Intelligence Unit) – Turkey Energy Report, March 2010



Ongoing transformation and liberalization of the energy markets has led to increased private investments, from both domestic and foreign investors.

State-owned generation and distribution assets are to be privatized, new power plants are to be built by the private sector, tenders for licenses in natural gas distribution are to be held and certain natural gas import agreements of the state are (as described above) to be transferred to the private sector.

In the past five years, Turkey has accommodated an efficient investment environment as many foreign investors have made greenfield investments, formed partnerships with local players and acquired state-owned and private companies. Turkey has also a significant potential for renewable energy. Due to substantial renewable energy resources and recent developments in renewables legislation and liberalization in the electricity market, there is a suitable environment for renewable energy investments. The renewable energy sector is further analyzed in ISPAT’s “Environmental Technologies and Renewable Energy Industry Report”.

## 2. Sector Overview

### 2.1 Global Sector

Global energy consumption reached a level of 10,464 million tons of oil equivalent in 2008 with a CAGR of 2.4 percent between 2004 and 2008. Coal consumption showed the highest growth in 2008 with a growth rate of 4.2 percent. Energy exporting regions such as the Middle East and Africa have also experienced growth in energy consumption.<sup>5</sup> However, in 2009, primary energy consumption in the world marked a decline of 1.4 percent as a result of the global financial downturn.<sup>6</sup> This was the first decline experienced in energy consumption since 1982. The decline has mainly resulted from the decrease seen in the OECD countries and the territory of the Former Soviet Union (FSU).<sup>7</sup> The fall in consumption is mainly concentrated in oil, natural gas and nuclear power. Coal consumption did not show significant movements, while renewable energy sources, in particular the usage of hydroelectric power, increased by 1.2 percent in 2009.<sup>6</sup>

Oil has the highest share within global energy consumption corresponding to approximately 35 percent of the total followed by coal, natural gas and hydroelectricity.<sup>5</sup>

Figure 1 - World Energy Industry Key Consumption Figures

World Energy Industry						
	2004	2005	2006	2007	2008	2009
Energy consumption (kg oil equivalent per head)	1,958	1,988	2,006	2,049	2,059	2,010
Total energy consumption (million tons oil equivalent)	9,530	9,802	9,989	10,310	10,464	10,314
% change	4.6%	2.9%	1.9%	3.2%	1.5%	(1.4)%
Electricity consumption (kWh per head)	2,933	3,023	3,110	3,225	3,252	3,215
Total electricity consumption (trillion kWh)	14	15	16	16	17	17
% change	4.5%	4.2%	4.0%	4.5%	1.9%	0.0%
Coal consumption (million metric tonnes)	5,343	5,554	5,832	6,149	6,404	6,368
% change	6.4%	3.9%	5.0%	5.4%	4.2%	(0.6)%
Natural gas consumption (billion cubic meters)	2,418	2,429	2,462	2,518	2,527	2,456
% change	3.9%	0.5%	1.3%	2.3%	0.4%	(2.8)%
Petroleum consumption (million b/d)	73	74	75	76	76	73
% change	3.6%	1.6%	0.8%	1.9%	(0.5)%	(3.7)%

Source: Economic Intelligence Unit (Jan 2010)

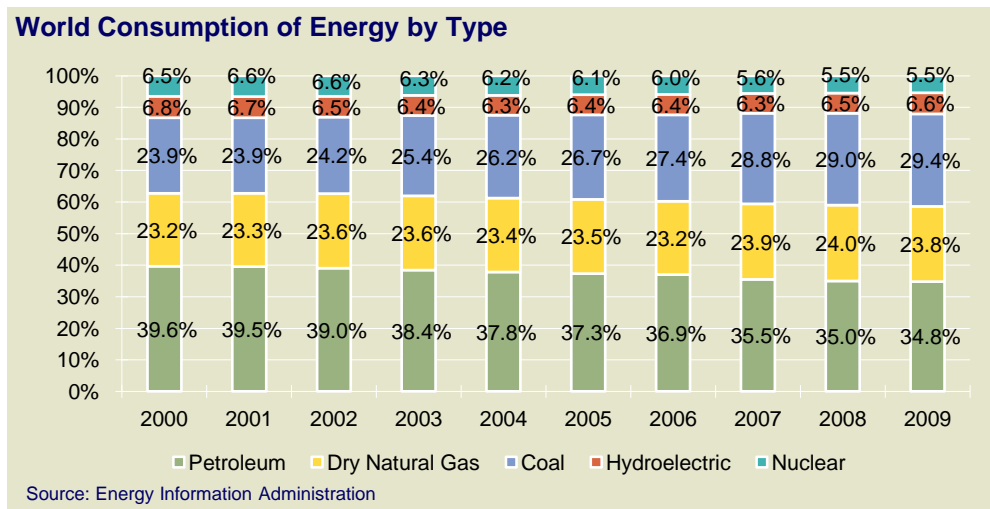
<sup>5</sup> EIA (Energy Information Administration)

<sup>6</sup> EIU (Economist Intelligence Unit)

<sup>7</sup> BP, Statistical Review of World Energy - June 2010



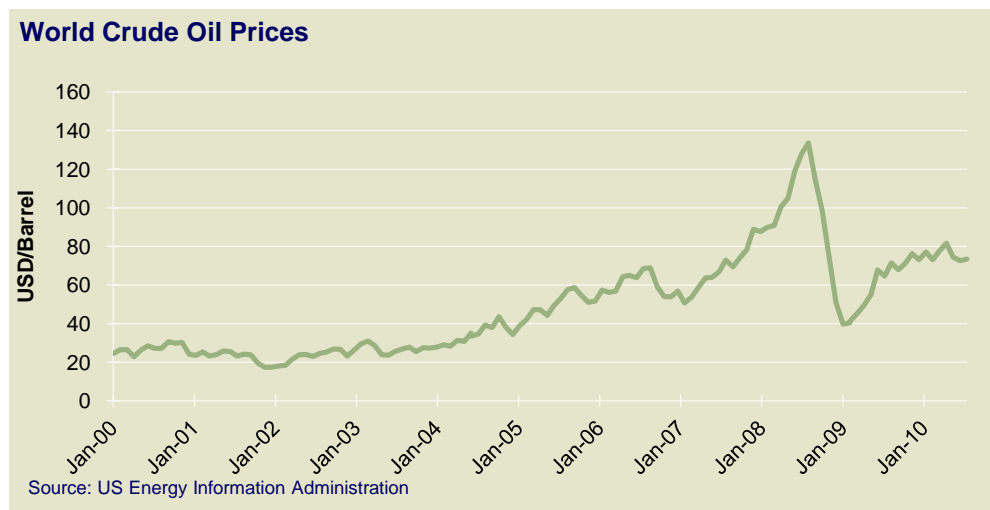
Figure 2 - World Consumption of Energy by Type



### 2.1.1 Oil

Strong growth in demand together with the reduction in spare capacity between 2003 and 2007 led to rapid growth in oil prices, which culminated in a peak of over USD 140/barrel in July 2008.<sup>8</sup> The peak was followed by even a more rapid decline as the impending global recession took shape. From early 2009 onwards, however, oil prices resumed their upward trend. As of July 2010, the crude oil price is approximately USD 73/barrel.<sup>9</sup>

Figure 3 - World Crude Oil Prices



### 2.1.2 Natural Gas

In 2008, the demand for natural gas started to decline with countries hit by recession reducing their energy usage. This trend continued in 2009. Although the consumption of natural gas was declining, at the same time, new gas resources such as liquefied natural gas (LNG) from the Middle East and Indonesia emerged. The global economic downturn showed its effects in 2009 and total natural gas production decreased by 2.4

<sup>8</sup> EIU (Economist Intelligence Unit)

<sup>9</sup> EIA (Energy Information Administration)



percent in 2009 compared to 2008, Russia and the US being the main producers, constituting 38 percent of the total production.<sup>10</sup>

Figure 4 - World Production of Natural Gas, By Region

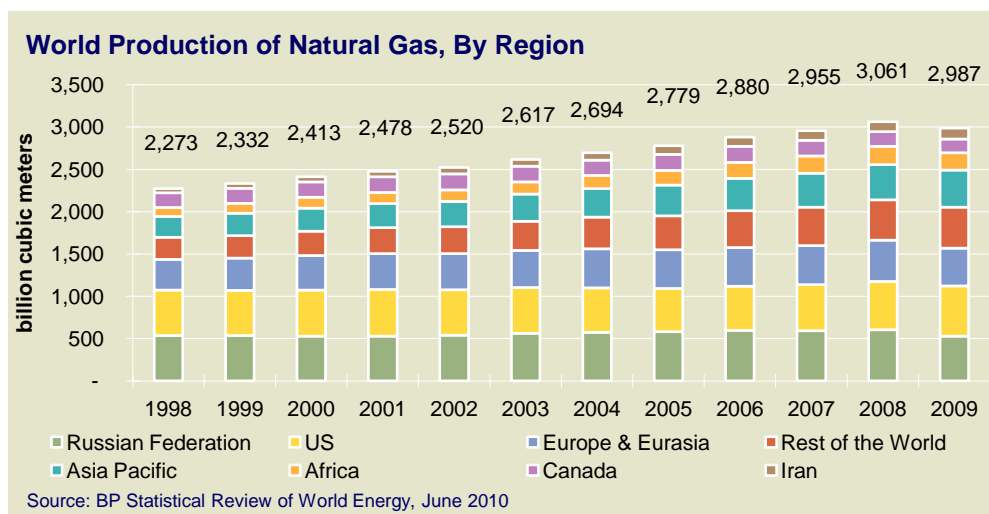
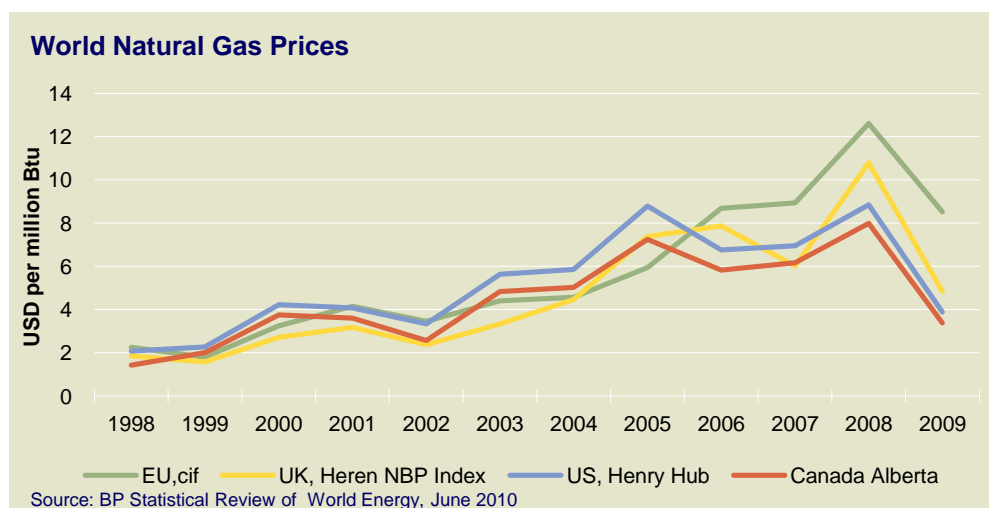


Figure 5 - World Natural Gas Prices



### 2.1.3 Coal

Coal production is expected to increase by around 60 percent between 2009 and 2030 with most of the growth expected in China and India.<sup>11</sup> The world's largest coal consumer is China, which is expected to dominate 38 percent of world capacity by 2011. India is another country in which coal is the primary source of energy, 62 percent of the country's electricity generation being obtained from coal-fired plants. The demand from these two big coal consumers has shaped the growth in the coal market with an annual increase in global demand of 5 percent from the beginning of the century.<sup>12</sup>

<sup>10</sup> BP, Statistical Review of World Energy - June 2010

<sup>11</sup> EIA (Energy Information Administration)

<sup>12</sup> EIU (Economist Intelligence Unit)



### 2.1.4 Nuclear

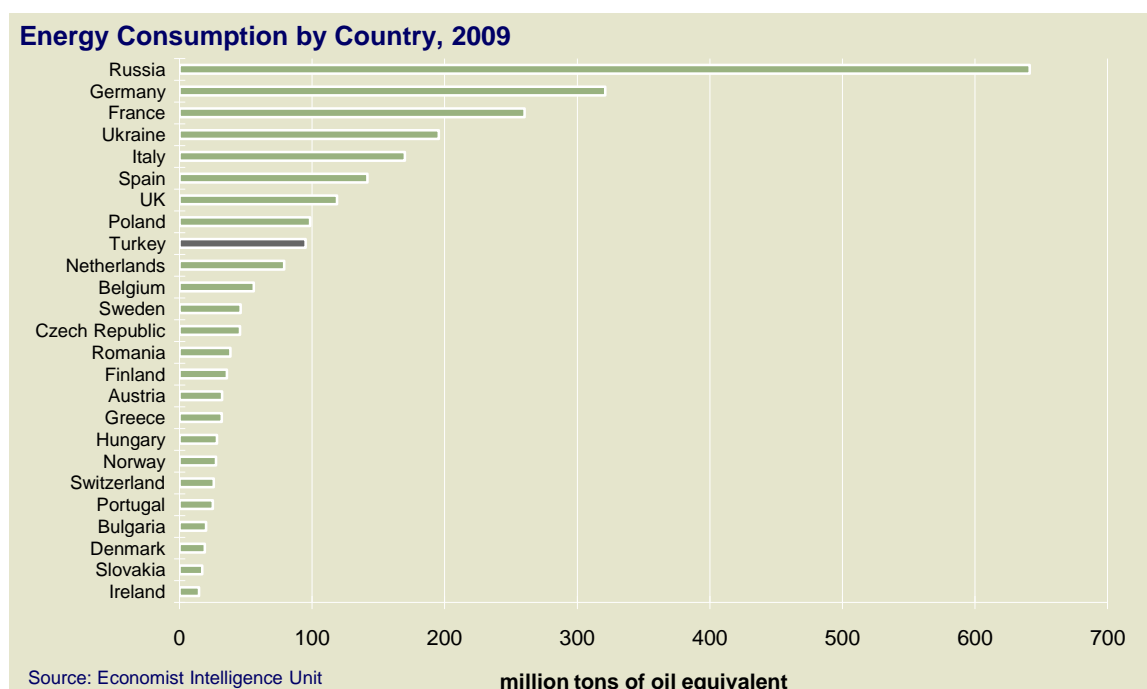
The nuclear energy industry has become attractive due to the demand from many countries to diversify their energy sources and the high level of alternative energy costs. Russia and France are major players in nuclear power in Europe, where nuclear energy comprises more than 44 percent of the total electricity generation. Concerns over the global warming effect of carbon-based electricity generation, together with concerns over the security of oil and gas supply, have reawakened interest in other countries such as the UK and Sweden. China is planning to construct a capacity of more than 20,000 MWs by 2015.<sup>13</sup>

## 2.2 The Domestic Sector

### 2.2.1 Sector Overview

Turkey is one of the fastest growing energy markets in the world, with significant further growth potential.

Figure 6 - Energy Consumption by Country



Turkey's energy demand was affected by a local economic downturn experienced in 2001, picked up in 2002 and continued to grow thereafter, reaching the pre-crisis consumption level in 2003.

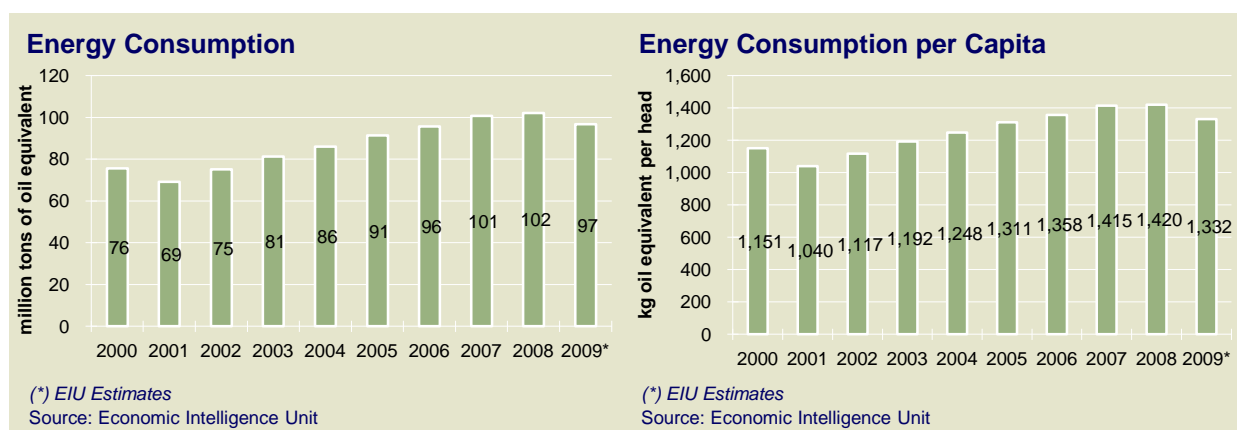
The increase in energy consumption continued between 2004 and 2008 equalling 102 million tons of oil equivalent, or 1,420 kg of oil equivalent per head in 2008, which was still below Western standards. Together with the global economic crisis, energy consumption slowed down since mid-2008 with an annual growth rate of 1.4 percent in 2008, compared to a rate of 5.3 percent in 2007. The decline continued in 2009 with an estimated fall of 5.3 percent; however an increase of 2.5 percent annually is expected thereafter between 2010 and 2013.<sup>14</sup>

<sup>13</sup> EIA (Energy Information Administration)

<sup>14</sup> EIU (Economist Intelligence Unit)



Figure 7 - Energy Consumption in Turkey

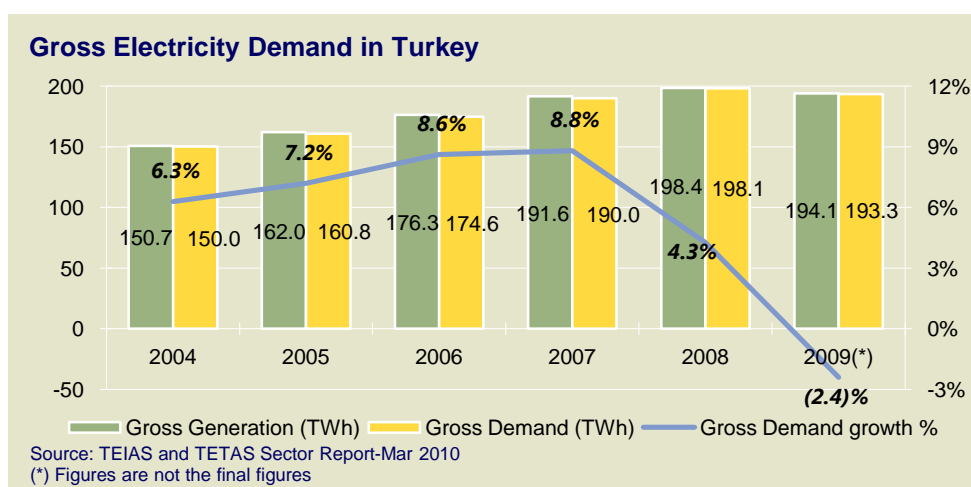


### 2.2.2 Electricity

The Turkish electricity market is currently going through a liberalization process and rapid growth. The market is experiencing a transition into a competitive electricity market in order to attract private sector investments and maximize efficiency.

Electricity demand in 2008 equaled 198 TWh, representing a 4.3 percent annual growth from 2007. The CAGR of electricity demand between 2004 and 2008 was 7.2 percent.<sup>15</sup> Electricity demand has been growing in parallel with the urbanization and industrialization level and economic development. Also supported by the increase in population, electricity demand in Turkey holds great potential for further growth.

Figure 8 - Gross Electricity Demand in Turkey



Electricity demand is affected by the global economic downturn: it is estimated that there was a 2.4 percent decrease in the demand in 2009 compared to 2008. Electricity demand in 2009 is estimated to be realized at 193 TWh.<sup>16</sup>

Installed capacity continued to rise in the last decade between 1998 and 2009 from 23,354 MW to 44,766 MW respectively with a CAGR of 6.1 percent.<sup>17</sup> In line with the increase in the number of natural gas fired

<sup>15</sup> TEIAS (Turkish Electricity Transmission Company)

<sup>16</sup> TETAS (Turkish Electricity Trading and Contracting Company) Sector Report – March 2010

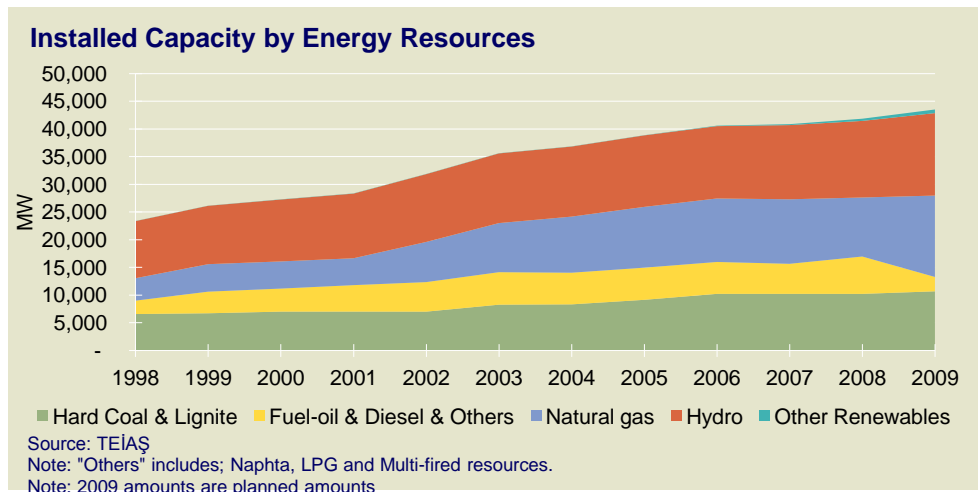
<sup>17</sup> TEIAS (Turkish Electricity Transmission Company) and TETAS (Turkish Electricity Trading and Contracting Company) Sector Report – March 2010





plants and hydro electric plants, both constitute the highest share in energy resources with 34 percent each, followed by hard coal and lignite forming 24 percent together.

Figure 9 - Installed Capacity by Primary Energy Sources



The current energy supply including the existing power plants, the licensed plants and those under construction was expected to be insufficient to cover the base energy demand starting from 2009.<sup>18</sup> On the other hand, the decline in economic activity, which has affected electricity demand has also delayed the electricity imbalance. After a recovery in electricity demand, there will be a requirement for further capacity to balance supply and demand. The estimated investment required for the period of 2010-2030 is between USD 193-225 billion, which comprises USD 180-210 billion for generation, USD 6-7 billion for transmission and USD 7-8 billion for distribution.<sup>19</sup>

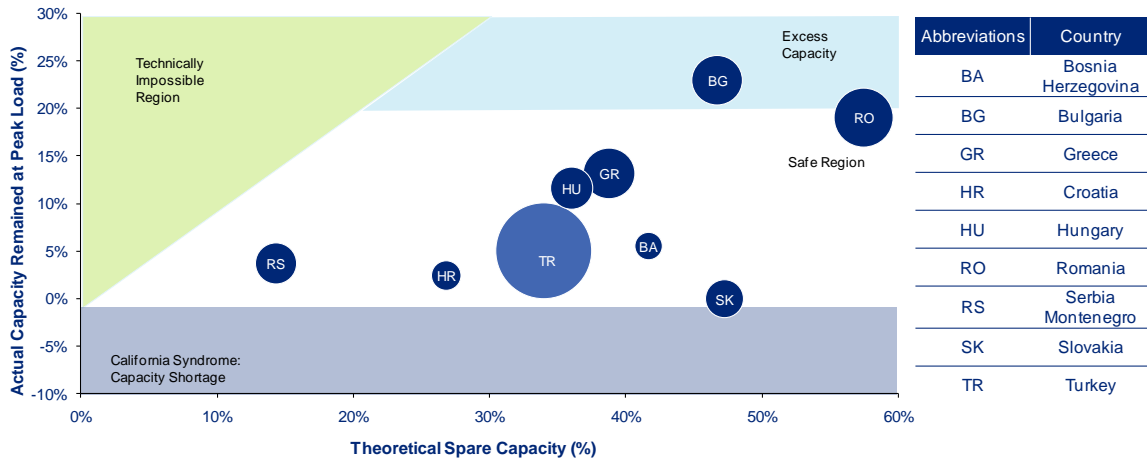
According to the report "System Adequacy Forecast 2010-2025" published by ENTSO-E, the convertibility of theoretical reserves to available reserves by electrical systems may be analyzed by comparing theoretical reserves expected and the capacity remaining at peak consumption. There are four main categories; Technically impossible, Californian syndrome: Scarcity in Resources, Safe Area, and Excess Capacity. Based on this analysis, Turkey is in Safe Area as it has 34 percent theoretical reserve capacity and ca. 5% available capacity at peak load.

<sup>18</sup> TEİAŞ (Turkish Electricity Transmission Company)

<sup>19</sup> EPDK (Energy Market Regulatory Authority)



Figure 10 - Remaining Capacity and Theoretical Reserves at Peak Time Consumption

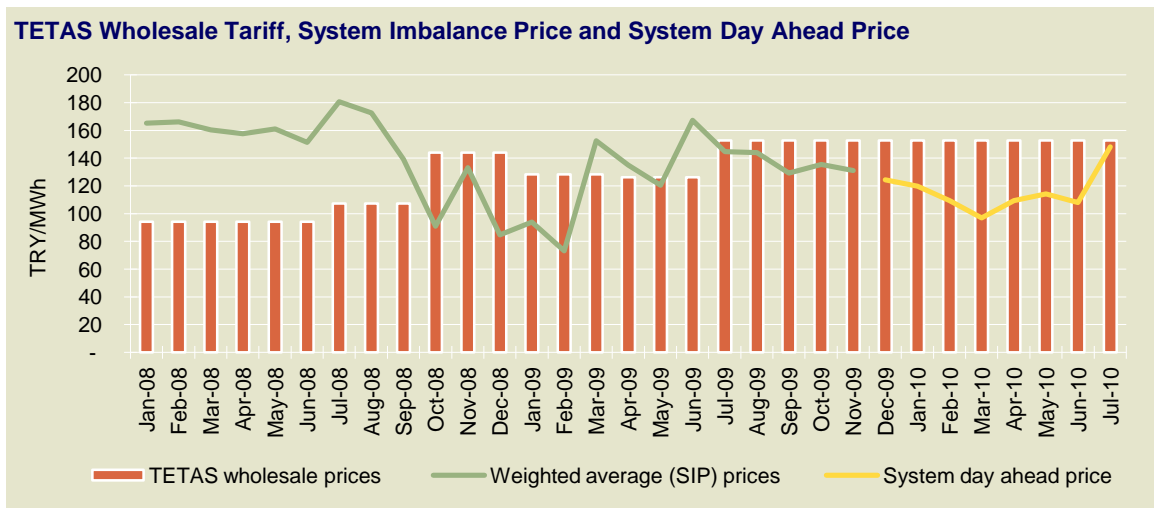


Note: The size of the circles represents the available capacity of the countries. The theoretical spare capacity of Turkey mentioned above represents the 2009 value while theoretical spare capacity expected for 2010 are indicated for other countries.

Source: ENTSO-E, Deloitte Analysis

There were basically two types of prices in Turkish electricity market defined as: market prices and regulated tariffs approved by EPDK (Energy Market Regulatory Authority). Starting from December 2009, the system imbalance pricing system has been replaced by a day ahead price. A comparison of the weighted average system imbalance prices (SIP), day ahead market price (presenting monthly average) and TETAS wholesale prices is presented in the chart below.

Figure 11 - Weighted Average Electricity Prices



The decline in prices in 2010 may be attributed to unusually high output from hydroelectric plants following good rainfall and although it is minor, as per the changed market rules.

System Day Ahead Prices are set in Day Ahead Planning (expected to be replaced with Day Ahead Market as of January 01, 2011) where demand and supply are met by taking individual bids of market participants into account. The market operator calculates hourly prices in accordance with the daily demand forecast and daily generation schedule defined on an hourly basis. Prior to July 2008, the gap between regulated tariffs and market prices was high.

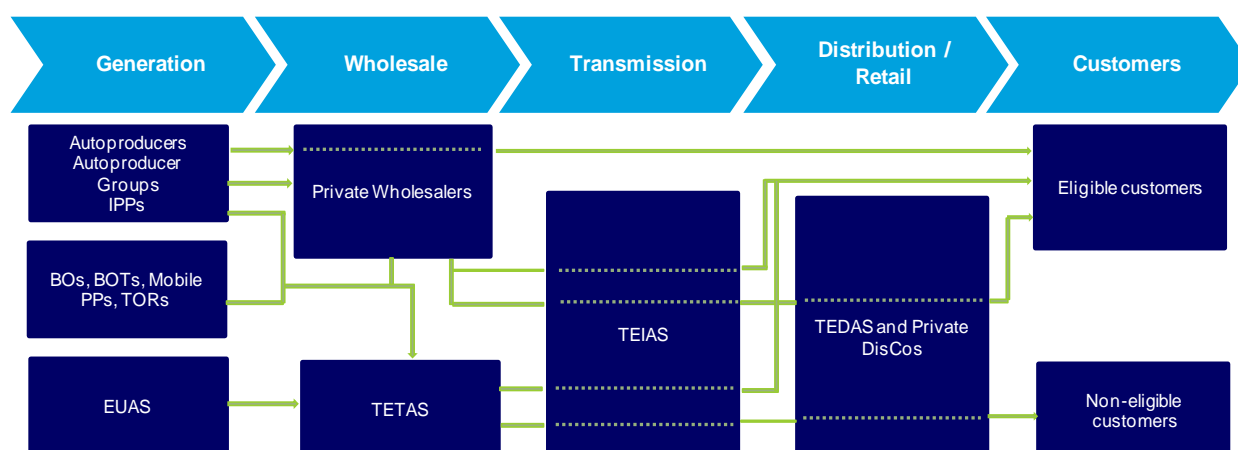


The Automatic Pricing Mechanism, based on reflecting cost fluctuations on the energy prices of state-owned enterprises, was introduced as of July 1, 2008 and had an immediate impact on the TETAS prices. The Automatic Pricing Mechanism affected the TETAS price and the gap started to close.

The Turkish electricity market’s regulatory structure is as follows: General principles are set by the Law. The Council of Ministers and/or the High Planning Council make decisions in line with the spirit of the law. Detailed rules are set by secondary regulations and finally detailed operational issues such as tariff approvals and the issuance of licenses are defined by EPDK Board Decisions. The Electricity Market Regulatory Authority, established under Law no. 4628, was later renamed the Energy Market Regulatory Authority. EPDK acts as a supervisory and regulatory body for the energy market. These laws aim to establish a stable and transparent energy market functioning in a competitive environment.

The market chain can be divided into four sections; generation, wholesale, distribution and the retail market (or consumers). There is a monopoly for transmission in between wholesale and generation. The general market value chain and structure is illustrated in the following figure on the next page.

Figure 12 - Turkish Electricity Market Structure

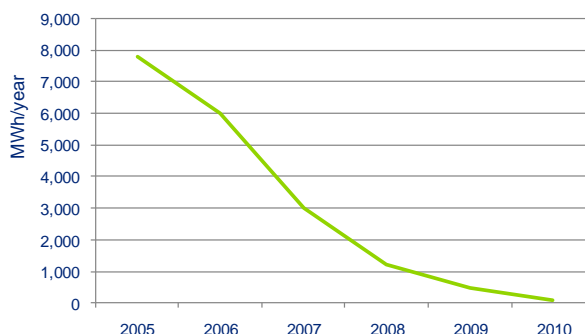


Source: MENR, EUAS, TETAS, EIE, EPDK  
 IPP: Independent Power Producer  
 BO: Built - Operate  
 BOT: Built - Operate - Transfer  
 TOR: Transfer of Operating Rights  
 Mobile PP: Mobile Power Plants  
 DisCo: Distribution Company

According to the Law No. 4628, any real person or legal entity that has the liberty to choose its supplier, due to its consumption of more electricity than the amount set by the Energy Market Regulatory Board and/or its direct connection to the transmission system is defined as “Eligible Consumer”. According to the law, Organized Industrial Zone legal entities are deemed as eligible consumers without taking into consideration their amounts of consumption. Starting from 2005, eligible consumer limits decreased rapidly. In 2009, consumption limit per eligible consumer was 480 MWh/year. This limit decreased to 100 MWh/year in 2010.



Figure 13 - Development in Eligible Consumer Limits



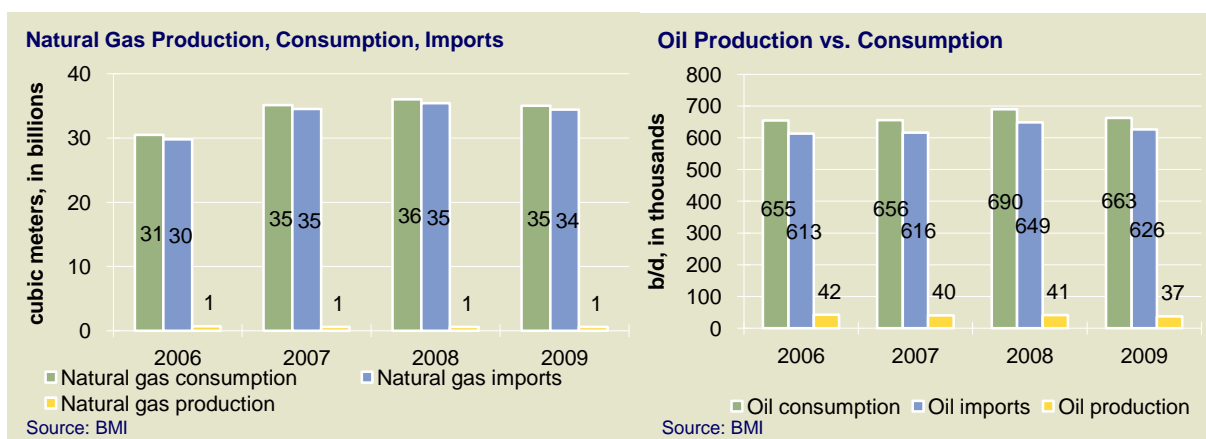
Source: EPDK

### 2.2.3 Oil and Gas

As of December 2009 Turkey's producible oil and gas reserves correspond to 299 million barrel (bbl) and 6.2 billion cubic meters (bcm), respectively.<sup>20</sup> Oil production is far lower than the estimated consumption of c.663,000 barrel per day (b/d) in 2009. It is estimated that in 2009, c.31 percent of the total primary energy consumption in Turkey was constituted from oil, showing a slight decrease compared to 2008 (31.5 percent), whereas natural gas comprised 31.1 percent of the total in 2009 percent. Natural gas prices have risen in line with global prices.<sup>21</sup>

Demand for natural gas is increasing rapidly as it is preferred as fuel for industrial use as well as for power generation. 53 percent of natural gas was used for power generation, 22 percent for residential use and the remaining 25 percent for industrial use in 2009. Although relatively low compared to others, industrial usage has nearly doubled since the beginning of the decade.<sup>22</sup> The network of the state-owned pipeline operator and gas supplier BOTAS covered 66 provinces by the end of 2009, up from 63 at the end of 2008.<sup>21</sup> The improvement in the distribution network is expected to increase natural gas availability.

Figure 14 - Natural Gas & Oil Production, Consumption & Imports



<sup>20</sup> TPAO (Turkish Petroleum Corporation) – 2009 Oil and Natural Gas Sector Report

<sup>21</sup> EIU (Economist Intelligence Unit) – March 2010 Turkey Energy Report

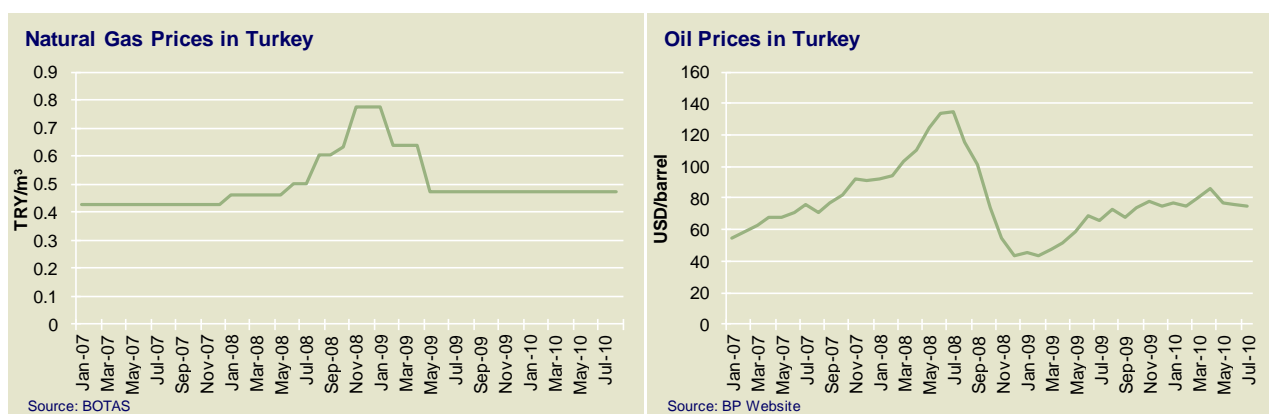
<sup>22</sup> EPDK (Energy Market Regulatory Authority) - 2009 Natural Gas Report



Turkey's domestic extraction of oil and gas meets less than 3 percent of the country's energy requirement, making the country a major importer of oil and gas. 90 percent of Turkey's crude oil is imported, mainly from Saudi Arabia, Iran, Iraq and Russia.

70 percent of domestically produced oil is obtained from the state-run Turkish Petroleum Corporation (TPAO), whereas the remainder is produced mainly by Royal Dutch/Shell. As regards natural gas, Turkey is dependent on imports from Russia corresponding to 63 percent of the total in 2007. Other suppliers include Iran accounting for 17 percent and Azerbaijan for 4 percent of the total.<sup>23</sup> Turkey imported c.USD 16.4 billion of crude oil and natural gas in total in 2009, which accounts for 11.6 percent of the country's total imports.<sup>23</sup>

Figure 15 - Oil and Natural Gas Prices in Turkey



Turkey has a strategic location between European markets and major oil and gas-producing countries in the Middle East and around the Caspian Sea. Although the Bosphorus is a major oil shipping route between the Black Sea and the Mediterranean, heavy oil tanker traffic through the Bosphorus is restricted due to environmental concerns. The legal framework for the EU-backed Nabucco pipeline project was signed by Turkey and four EU transit countries in mid-July 2009. Accordingly, the 3,300-km pipeline will carry gas from the Caspian region and the Middle East through Turkey, Bulgaria, Romania and Hungary to Austria, with the gas further distributed to other EU countries through existing pipelines. The project is expected to reduce the dependence of EU countries on Russian gas.<sup>24</sup>

### 2.2.4 Coal

30 percent of the total primary energy consumption in Turkey is derived from coal. Coal consumption of 28,204 kiloton of oil equivalent (ktoe) in 2009 declined by c.3.4 percent compared to the previous year<sup>25</sup>, whereas the total coal production in 2009 amounted to 15,069 ktoe, up from 15,044 in 2008.<sup>24</sup> Hard coal is mainly mined by the Turkish Hard Coal Enterprises (TTK) in Zonguldak in the western Black Sea region. Lignite is mined mostly by the state-owned Turkish Coal Works (TKI) in various parts of the country. TKI controls mining in Afsin-Elbistan located in Southeast Anatolia, where most lignite coal is produced.

Only one-half of the coal used is produced domestically in Turkey. This makes Turkey's coal market dependent on imports. The domestic coal market is largely considered to be a monopoly operated by TTK with minor parts of production, processing and distribution activities contracted to the private sector.

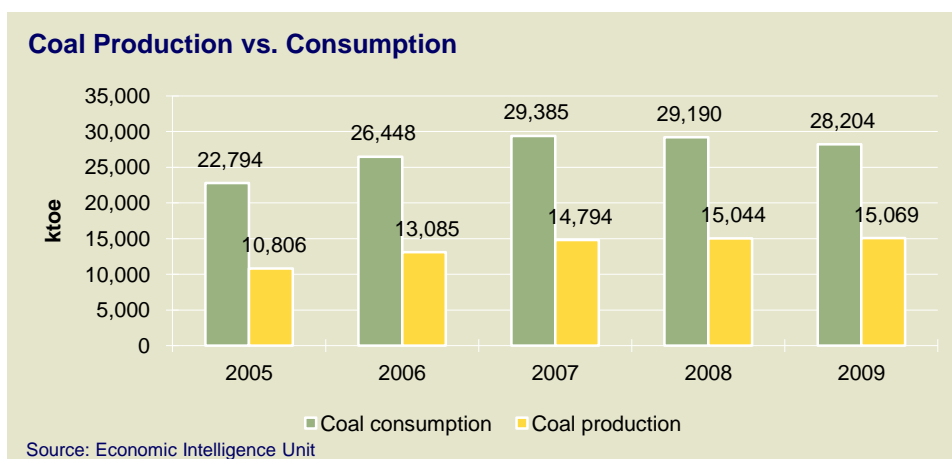
<sup>23</sup> EIU (Economist Intelligence Unit) – Turkey Energy Report, March 2010

<sup>24</sup> EIU (Economist Intelligence Unit)

<sup>25</sup> EIU (Economist Intelligence Unit)



Figure 16 - Coal Production vs. Consumption



### 2.2.5 Nuclear

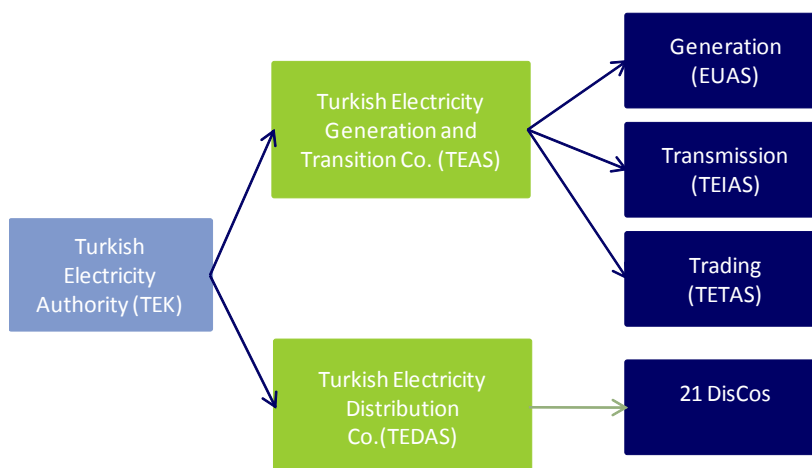
Turkey does not generate electricity from nuclear sources. A tender for building a 1,000-MW nuclear-power plant by 2005 was cancelled in 2000. In subsequent years, a tender was developed for the first nuclear plant with a combined capacity of 5 GW and was announced on September 24, 2008. However, with only one consortium submitting a bid, namely Russia's state-owned nuclear export company Atomstroyexport and Turkey's Park Teknik Group, the tender was cancelled by TETAS in November 2009. As energy demand grows in Turkey, nuclear energy could provide an important supply source and will remain on the agenda in the coming years. Lastly, an agreement regarding the construction of the nuclear plant is reached with Russia. On the other hand, negotiations with South Korea regarding the same subject are still in process.

### 2.2.6 Main Players

#### 2.2.6.1 Electricity

Before the 1990s, the Turkish Electricity Authority (TEK), a state-owned company, dominated the Turkish electricity industry. TEK was established in 1970, and in order to move towards market liberalization and privatization it was separated in 1993 into TEAS for generation, transmission and wholesale power supply and TEDAS for distribution. In 2001, TEAS was further separated into EUAS for generation, TETAS for wholesale and TEIAS for transmission; each being established as a separate legal entity with the introduction of Electricity Market Law.

Figure 17 - Historical Development of Electricity Market Entities

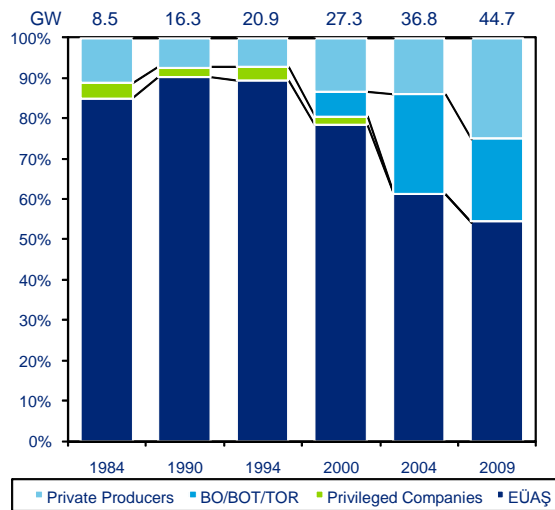


Source: TETAS



The figure below presents the changes in Turkey's installed capacity based on ownership. The share of state owned EUAS decreased significantly between 1984 and 2009. The public share was about 85 percent in 1984, and decreased to 53 percent in 2009.

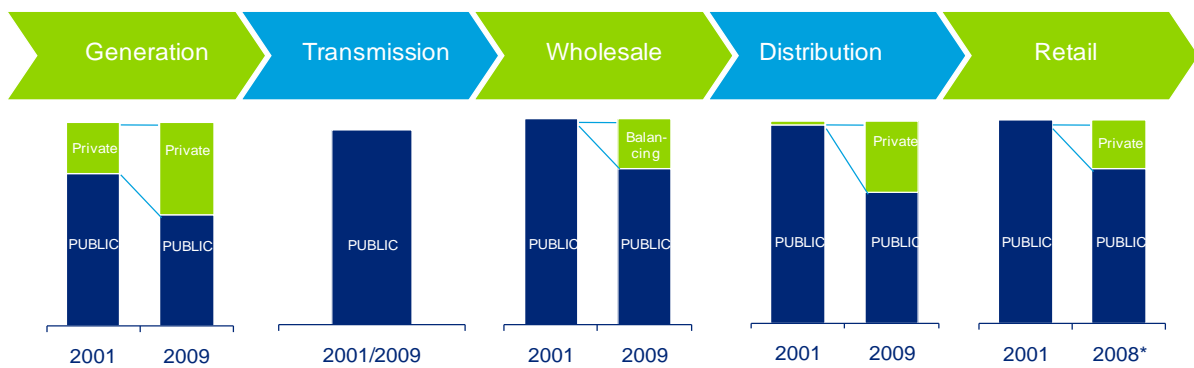
**Figure 18 - Changes in Turkey's Installed Capacity based on Ownership**



Source: TEİAŞ

In electricity generation, public share has decreased from 78 percent in 2001 to 46 percent in 2009. 100 percent of transmission is done by TEİAŞ. In 2001, wholesale was made entirely by public sector. In 2009, 20 percent of wholesale was realized in balancing market in which prices were determined according to price bids of generators. In distribution and retail of electricity energy, major share of public in 2001 was replaced by private sector.

**Figure 19 - Reducing The Public Share: Stronger Competitive Environment**  
**Private Sector in Turkey's Electricity Energy Sector: Development of Public Shares**



\*In 2008, 24% of the the total amount of energy retailed in Turkey is conducted by private companies while 76% is done by public sector.

Source: TEDAŞ, TEİAŞ, Deloitte Analysis



The top 15 generators by installed capacity ranking as of December 2009 are shown in the following table.

Figure 20 - Top 15 Power Generators by Installed Capacity, December 2009

Top 15 Power Generators by Installed Capacity, Dec-2009				
(MW)	Hydro	Thermal	Wind	Total Installed Capacity
EUAS	11,678	12,524	-	24,202
ENKA	-	3,984	-	3,984
Aksa	29	1,356	132	1,517
Isken	-	1,320	-	1,320
Cengiz Ins.	545	334	-	879
Ciner	-	755	46	801
Baymina	-	798	-	798
Zorlu Enerji	144	421	130	695
GAMA Enerji	672	-	-	672
Colakoğlu	-	571	-	571
UNIT	-	504	-	504
Trakya Elektrik	-	498	-	498
Akenerji	88	358	15	461
EnerjiSA	85	370	-	455
BIS Enerji	-	410	-	410
<b>Total</b>	<b>13,241</b>	<b>24,203</b>	<b>323</b>	<b>37,767</b>

Source: Deloitte Analysis

The state-owned generation company EUAS currently owns c.a. 54 percent of the total installed capacity. EUAS operated 91 percent of Turkey's power supply before the electricity reform in 2001.<sup>26</sup> Due to the ongoing liberalization process in the Turkish electricity market, the state-owned generation assets are expected to be privatized.

Apart from state owned EUAS, the other top players include ENKA, a leading construction company in Turkey owning the Adapazari, Gebze and Izmir combined cycle gas turbine (CCGT) plants; Aksa Energy, a Kazanci Holding company with operations mainly in thermal energy field; Isken owning an imported coal power plant; and Cengiz Insaat the fifth largest player with 879 MW.

### 2.2.6.2 Oil and Gas

BOTAS, the state-owned gas supplier and pipeline operator, handled all gas and oil imports and distribution infrastructure until recently. However, its dominant position has started to weaken in the past two years.

The competitive gas market in Turkey is shaped by Natural Gas Market Law, which was enacted in 2001. According to the Law, a gas release program was started and a tender was completed for the transfer of the gas import rights under 4.75 bcm<sup>27</sup> of BOTAS's contracts (14 percent of actual natural gas imports). Following the program, the four private sector companies, which won the tenders, started to import gas and sell it wholesale to major customers in Turkey. In the coming years, more tenders are expected which should reduce BOTAS' market share in imports to the limit of 20 percent set by Natural Gas Market Law as the maximum for any single market player. The private sector's market share should thus increase correspondingly.

<sup>26</sup> BMI (Business Monitor International), Power Industry View-Turkey Report, July 2009

<sup>27</sup> Deloitte Turkish Gas Market: Current Situation and Outlook





The companies which successfully tendered to take over the agreements and their corresponding volumes were Enerco with 2.5 bcm, Bosphorus Gas with 750 million Sm<sup>3</sup>, Avrasya Gas with 500 million Sm<sup>3</sup> and Shell with 250 million Sm<sup>3</sup>. Bosphorus and Shell completed the take-over process earlier and started importing in 2008, whereas Enerco and Avrasya Gas started their operations in April 2009.

There are 60 licensed natural gas distribution companies in the Turkish gas market of which 4 are owned by municipalities and the remaining 56 are private companies. The privatization tenders for Izgaz and Baskentgaz were completed; and IGDAS will be privatized. Tenders for the remaining provinces are planned to be completed by the end of 2011.

78 percent of the Turkish fuels and lubricants supply market is controlled by TUPRAS and the largest fuels retailer in Turkey is POAS, a former state-owned company which is now owned by the Dogan Group and OMV. BP, Shell and ConocoPhillips are the other active companies<sup>28</sup>.

In the petroleum refining market, TUPRAS has a strong monopoly position with 4 sites located in Izmit, Izmir, Kirikkale and Batman. The total combined capacity of TUPRAS is over 600,000 b/d. In September 2005, a 51 percent stake in TUPRAS was acquired by a consortium led by Koc Holding and Shell Co at a cost of USD 4.4 billion.<sup>29</sup>

Turkey has one non-TUPRAS refinery which is the Atas plant in Mersin which has been operated as a terminal since September 1, 2004. The plant is owned by BP (68 percent), Shell (27 percent) and domestic fuels supplier Turkp petrol (5 percent).<sup>29</sup>

## 2.3 Sector Outlook

Driven by high industrialization and urbanization, electricity demand has exceeded electricity generation and largely resisted the global financial crisis. The increase in demand is expected to continue with the population growth and economic development in future and Turkey is expected to outpace its European peers.

TEIAS projections for 2009-2018 include 4 different scenarios. The high demand scenario accompanied by high capacity has been considered and presented below. There are also three other scenarios with lower demand and capacity estimates.

Electricity demand is expected to exceed electricity generation with a CAGR of 7 percent between 2009 and 2018. The reliable electricity generation is expected to increase by a 3.2 percent CAGR, while installed capacity is expected to increase with a 3 percent CAGR in the coming decade. While thermal capacity formed 64 percent and HEPP 34 percent of the total installed capacity in 2009, the share of thermal capacity is expected to slightly decrease to 60 percent whereas HEPP capacity increases to 38 percent by 2018<sup>30</sup>.

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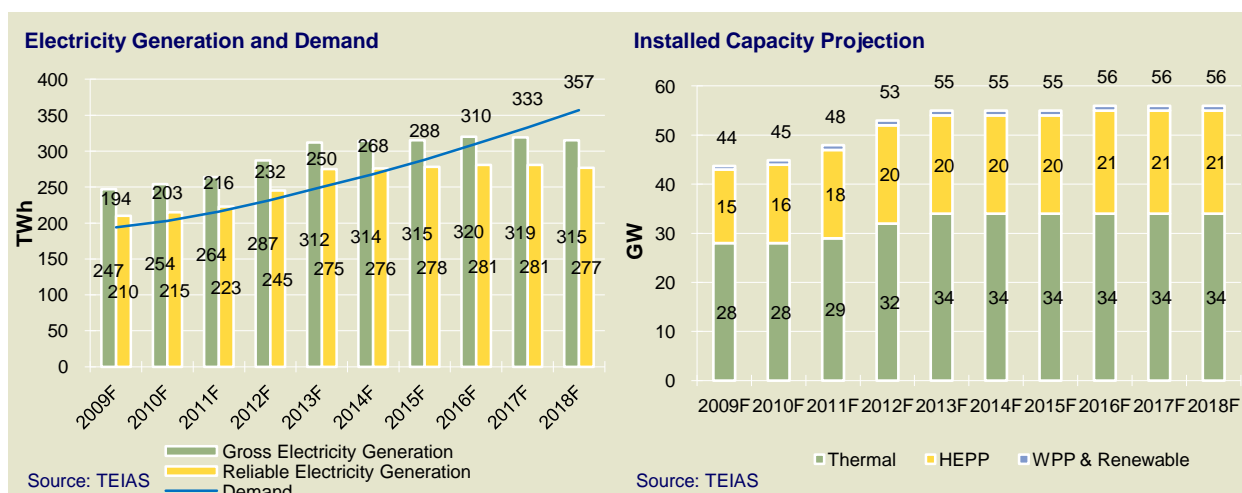
<sup>28</sup> EIU (Economist Intelligence Unit)

<sup>29</sup> BMI (Business Monitor International), Oil & Gas View – Turkey Report, July 2009

<sup>30</sup> TEIAS (Turkish Electricity Transmission Company)



Figure 21 - Electricity Projections



The oil import level is expected to rise in line with demand and increasing prices assuming an average of USD 80/barrel in Turkey by 2013<sup>31</sup>. On the other hand, growth in natural gas is expected to exceed oil and coal consumption. The natural gas consumption is expected to increase with a CAGR of 6 percent between 2010 and 2014.

Figure 22 - Oil and Gas Consumption

	2009	2010F	2011F	2012F	2013F	2014F
Oil consumption ('000 b/d)	663	676	693	707	728	740
Natural gas consumption (bcm)	35	37	40	44	46	46
Oil prices (US\$/bbl)	59	83	85	90	90	90

F: Forecasts; Source: BMI

In 2009, coal consumption in Turkey was 28,204 ktoe which was mainly used for power generation. Coal consumption in Turkey is expected to increase by c. 1 percent in 2010<sup>32</sup>.

Figure 23 - Coal Consumption

	2009E	2010F	2011F	2012F	2013F	2014F
Coal consumption (ktoe)	28,204	28,496	28,963	29,351	29,675	29,573

E: Estimated; F: Forecast, Source: Economist Intelligence Unit

<sup>31</sup> Business Monitor International, Turkey Oil & Gas Report 2009

<sup>32</sup> Economist Intelligence Unit (EIU)



## 2.4 SWOT Analysis

### **S**trengths

- Well-organized and structured legal framework in the energy sector
- EPDK operating as an independent market regulator
- High growth potential of the Turkish energy sector compared with other European countries.
- Advantage of Turkey operating as an energy hub between Europe and the Middle East.

#### Electricity

- Increase in the share of the private sector through the privatization of state-owned generation assets
- Probable horizontal and vertical mergers of electricity, natural gas and water distribution, to allow synergy between regional utility companies

#### Natural Gas

- High gas demand drives growth potential
- Favorable gas supply geography and infrastructure
- Potential role as a transit corridor and potential for development of trading hubs

### **W**eaknesses

#### Electricity

- Coal is the only energy source with significant domestic availability, leaving the country increasingly import-dependent

#### Natural Gas

- Requirement for gas storage for system security reasons
- Dependence on imported natural gas

### **O**pportunities

#### Electricity

- Privatization of regional distribution companies (to be finalized by 2010) will allow for an independent merchants' market
- Synergy expected to be created between electricity, natural gas and water distribution businesses

#### Natural Gas

- Tenders for the remaining cities, gas requirements to be met by end of 2011
- Privatization of municipality owned natural gas distribution companies.
- Restructuring of BOTAS and transition to a competitive market structure
- Increasing interest by foreign investors in the natural gas distribution market.

### **T**hreats

#### Natural Gas

- No new contract releases are announced/expected in the short term
- Shortage of electricity supply against electricity demand.



## 2.5 Investment Opportunities

Turkey is a major energy importer with energy consumption exceeding its production. For Turkey to meet its energy demand, significant investments are necessary in the energy sector. The transition of the Turkish electricity market to a liberalized market has already attracted private investments from both domestic and foreign investors and more opportunities will occur. Among these, the privatization of state-owned generation and distribution assets, together with the new power plant establishments, can be pointed out.

Turkey has experienced a lively investment environment in the last five years in which many foreign investors have made greenfield investments, formed partnerships with local players and acquired state-owned and private companies.

The Turkish government is in the course of privatization of the distribution companies as a step towards full liberalization of the energy market. Privatization of electricity generation companies has accelerated during 2010. 52 hydro-electric power plants' tenders were established under 19 groups with a total deal amount of USD 439.9 million. However, high investment costs have arisen at these plants which may cause some difficulties for investors and may end up in transfers of these plants to other investors within a few years.<sup>33</sup>

In addition, privatization of 13 thermal plants (12,474 MW) and 28 hydroelectric plants (3,687 MW) have been divided into 9 portfolios within the privatization process.<sup>32</sup>

A list of M&A transactions by foreign investors in the Turkish energy industry between 2004 and 2010 is given on the next page.

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<sup>33</sup> Deloitte Report, Turkish Electricity Market Developments and Expectations 2010-2011



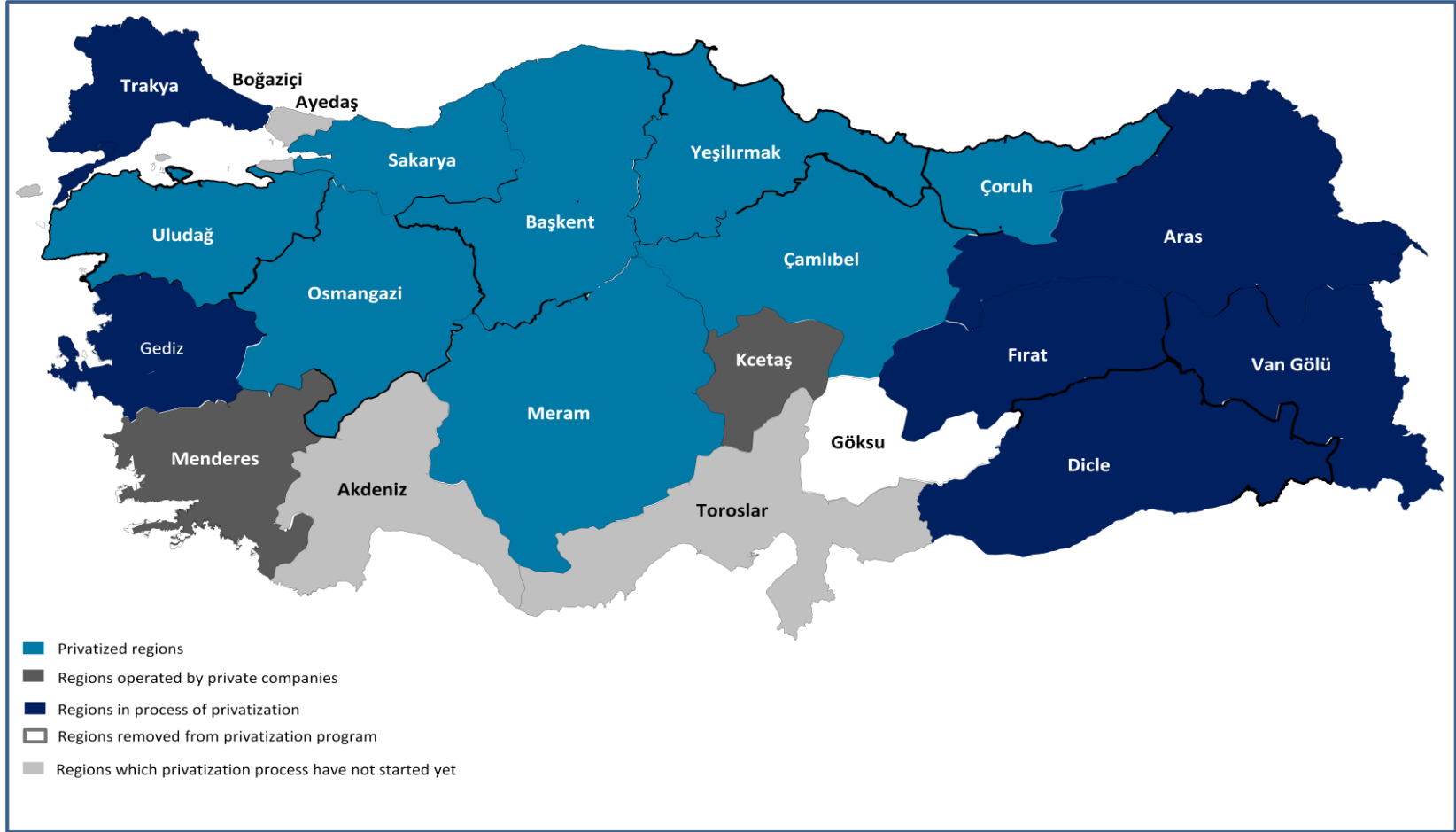
Figure 24 - M&A Transactions by Foreign Investors in the Turkish Energy Sector (2004 – 2010)

#	Acquirer	Origin	Target	Date	Stake	Deal Value (USD million)
1	TransAtlantic Petroleum Corporation	Canada	Amity Oil International Pty Limited	July-10	100.0%	97.0
2	Milan Petrol	Turkey	M Oil	June-10	70.0%	N/D
3	Statkraft	Norway	Yeşil Enerji	June-10	5.0%	6.7
4	Kent Solar Elektrik	Turkey	EUAŞ Portfolio 1	May-10	100.0%	6.6
5	Nema Kimya-Espe Consortium	Turkey	EUAŞ Portfolio 3	May-10	100.0%	17.4
6	İvme Elektromekanik	Turkey	EUAŞ Portfolio 9	May-10	100.0%	7.6
7	Boydak Enerji	Turkey	EUAŞ Portfolio 14	May-10	100.0%	29.1
8	Demistaş Doğu Elektrik	Turkey	EUAŞ Portfolio 15	May-10	100.0%	6.6
9	Kisan İnşaat	Turkey	EUAŞ Portfolio 19	May-10	100.0%	14.7
10	Aksu Enerji	Turkey	EUAŞ Portfolio 4	May-10	100.0%	56.1
11	Er-Bu İnşaat	Turkey	EUAŞ Portfolio 17	May-10	100.0%	6.4
12	Sarar Giyim	Turkey	EUAŞ Portfolio 2	May-10	100.0%	5.8
13	Fides Reklam Enerji	Turkey	EUAŞ Portfolio 5	May-10	100.0%	2.8
14	Kayseri ve Cıvırı Elektrik	Turkey	EUAŞ Portfolio 10	May-10	100.0%	69.7
15	Firat Enerji Üretim	Turkey	EUAŞ Portfolio 7	May-10	100.0%	86.4
16	Seba Consortium	Turkey	EUAŞ Portfolio 7	May-10	100.0%	13.5
17	Nas Enerji	Turkey	EUAŞ Portfolio 7	May-10	100.0%	40.8
18	Nema Kimya-Espe Consortium	Turkey	EUAŞ Portfolio 18	May-10	100.0%	50.1
19	Kayseri ve Cıvırı Elektrik	Turkey	EUAŞ Portfolio 13	May-10	100.0%	13.8
20	Seba Consortium	Turkey	EUAŞ Portfolio 8	May-10	100.0%	5.7
21	Ka-Fnih Enerji Üretim A.Ş.	Turkey	EUAŞ Portfolio 11	June-10	100.0%	7.0
22	İpragaz	Turkey	Yıldırım Petrol (ExEnGaz)	April-10	100.0%	67.0
23	Yığıtler Enerji	Turkey	Aydın-Pamukören Jeotermal Sahası	April-10	N/A	48.8
24	Çelikler İnşaat	Turkey	Aydın-Sultanhisar Jeotermal Sahası	April-10	N/A	25.6
25	Erdem Consortium (Kıpaş Mensucat)	Turkey	Aydın-Nazilli Jeotermal Sahası	April-10	N/A	20.5
26	Energo - PRO as	Czech Republic	Aralık HPP; Hamzalı HPP; Resadiye Cascade	April-10	100.0%	407.0
27	Akenerji	Turkey	İçkale Enerji	March-10	100.0%	N/D
28	Cogentrix Energy LLC	USA	Taşyapı Enerji Grubu	February-10	50.0%	80.0
29	Aksa Elektrik	Turkey	Firat Elektrik Dağıtım	February-10	100.0%	230.3
30	Aksa Elektrik	Turkey	Vangözü Elektrik Dağıtım	February-10	100.0%	100.1
31	Limak Holding	Turkey	Uludağ Elektrik Dağıtım	February-10	100.0%	940.0
32	SGM Enerji Sanayi Ve Ticaret AS	Turkey	Bis Enerji Elektrik Üretim AS	January-10	50.0%	250.0
33	Enerco Group	Turkey	Essentium Grubu	January-10	100.0%	N/D
34	Tiway Oil	Norway	Toreador Turkey	October-09	100.0%	10.6
35	Gazprom	Russia	Bosphorus Gaz	August-09	11.0%	N/D
36	Statkraft	Norway	Yeşil Enerji	June-09	95.0%	118.9
37	RWE	Germany	E.On Turcas Kuzey Elektrik and E.On Turcas Güney Elektrik	March-09	70.0%	N/D
38	Manitoba Hydro International	Canada	Palmet-Manitoba Hyro International	March-09	12.5%	N/D
39	EnBW	Germany	Borusan Enerji	March-09	50.0%	N/D
40	OMV	Austria	Enerco Enerji	February-09	Majority	N/D
41	EDF Energies Nouvelles	France	Polat Enerji	December-08	50.0%	N/D
42	EWE	Germany	Bursa Şehirçi Doğalgaz Dağıtım (BURSAGAZ)	October-08	40.0%	N/D
43	CEZ	Czech Republic	Akenerji	October-08	37.4%	302.6
44	OMV	Austria	Borasco	August-08	60.0%	N/D
45	GDF Suez	France	İzgaz	August-08	90.0%	232.0
46	Cogentrix Energy (Goldman Sachs)	USA	Taşyapı Enerji	July-08	50.0%	N/D
47	Lukoil	Russia	Akpet Akaryakıt Dağıtım	July-08	100.0%	555.0
48	Italgas	Italy	Bares Elektrik	July-08	100.0%	50.2
49	EnerjiSA -Sabancı Holding-Verbund	Austria	Başkent Elektrik Dağıtım	July-08	100.0%	1,225.0
50	AkCez Consortium	Czech Republic	Sakarya Elektrik Dağıtım	July-08	100.0%	600.0
51	EWE	Germany	Kayseri Doğal Gaz Dağıtım Pazarlama	April-08	80.0%	N/D
52	Linde Group	Germany	Birleşik Oksijen Sanayi	July-07	100.0%	123.5
53	EWE	Germany	Bursagaz	May-07	39.9%	N/D
54	Verbund	Austria	Enerjisa	March-07	50.0%	326.6
55	Indian Oil Corporation	India	TAPCO	December-06	12.5%	N/D
56	Berggruen Holding	USA	BND Elektrik	December-06	66.7%	0.7
57	Lukoil	Russia	Marmara Petrol ve Rafineri İşleri (Kocaeli Facility)	November-06	N/A	21.5
58	Lukoil	Russia	M-Oil Distribution Network	September-06	N/A	N/D
59	Eni S.p.A.	Italy	TAPCO	September-06	50.0%	N/D
60	OMV	Austria	Petrol Ofisi	May-06	34.0%	1,054.0
61	Linde Gas	Germany	Karbobaz Karbondioksit ve Kurubuz	May-06	100.0%	N/D
62	RAO UES	Russia	TGR Enerji	September-05	70.0%	N/D
63	Kansai Power	Japan	MEC Esenyurt	August-05	62.5%	N/D
64	Sumitomo Corporation	Japan	Birecik Dam ve HEPP	May-05	31.0%	40.7
65	Enron	USA	Trakya Elektrik Üretim	November-04	9.0%	N/D
66	International Power plc	UK	Trakya Elektrik Üretim	March-04	31.0%	N/D

Source: Deloitte Analysis



Figure 25 - Distribution Regions Map





There are 21 distribution regions under Turkish privatization portfolio. Kayseri region was the only private region and currently, the privatization tenders for 9 DisCo's have been finalized, although one has been cancelled by the Council of State. Electricity distribution to the provinces of Aydin, Denizli and Mugla was removed from the privatization portfolio and the electricity distribution is made to this region by Aydem.<sup>34</sup> The competitive environment as a result of the privatizations is expected to accelerate the electricity generation investments<sup>34</sup>.

Figure 26 - Privatization Process of DisCos

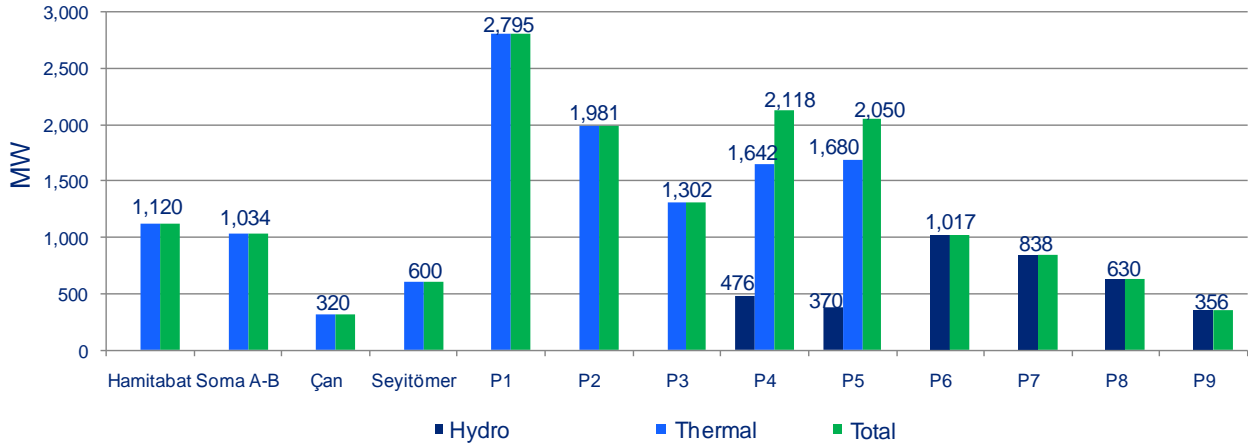
#	Region	Privatization Status	Tender Date	Acquirer	Purchase Price (USD m)
1	Sakarya Elektrik Dağıtım A.Ş.	Completed	11.01.2009	Ak-CEZ	600
2	Başkent Elektrik Dağıtım A.Ş.	Completed	28.01.2009	Sabancı-Verbund	1,225
3	Meram Elektrik Dağıtım A.Ş.	Completed	30.10.2009	Alarko Holding	440
4	Aras Elektrik Dağıtım A.Ş.	Completed, but cancelled	n/a	Kiler Holding	129
5	Çoruh Elektrik Dağıtım A.Ş.	Completed	07.06.2010	Aksa Elektrik Perakende Satış A.Ş.	227
6	Osmangazi Elektrik Dağıtım A.Ş.	Completed	22..04.2010	Eli Gümüş A.Ş.	485
7	Yeşilirmak Elektrik Dağıtım A.Ş.	Completed	07.06.2010	Çalık Enerji Sanayi ve Ticaret A.Ş.	442
8	Uludağ Elektrik Dağıtım A.Ş.	Completed	24.06.2010	Limak İnşaat Sanayi ve Ticaret A.Ş.	940
9	Çamlıbel Elektrik Dağıtım A.Ş.	Completed	26.07.2010	Kolin İnşaat Turizm Sanayi ve Ticaret A.Ş.	258
10	Firat Elektrik Dağıtım A.Ş.	In process	18.02.2010	Aksa Elektrik Perakende Satış A.Ş.	230
11	Vangölü Elektrik Dağıtım A.Ş.	In process	18.02.2010	Aksa Elektrik Perakende Satış A.Ş.	100
12	Aydem Elektrik Dağıtım A.Ş.	n/a	n/a	n/a	n/a
13	Toroslar Elektrik Dağıtım A.Ş.	Not started	n/a	n/a	n/a
14	Akdeniz Elektrik Dağıtım A.Ş.	Not started	n/a	n/a	n/a
15	Gediz Elektrik Dağıtım A.Ş.	In process	09.08.2010	İş Kaya İnş - MMEKA Makine İth.	1,920
16	İstanbul Anadolu Yakası Elektrik Dağıtım A.Ş.	Not started	n/a	n/a	n/a
17	Göksu Elektrik Dağıtım A.Ş.	Removed	n/a	n/a	n/a
18	Trakya Elektrik Dağıtım A.Ş.	In process	09.08.2010	Aksa Elektrik Perakende Satış A.Ş.	622
19	Bedaş Boğaziçi Elektrik Dağıtım A.Ş.	In process	09.08.2010	İş Kaya İnş - MMEKA Makine İth.	2,990
20	Dicle Elektrik Dağıtım A.Ş.	In process	09.08.2010	Karavil - Ceylan İnş.	228
21	Kayseri ve Cıvırı Elektrik T.A.Ş.	n/a	n/a	n/a	n/a

Source: Privatization Administration web site & Deloitte Report  
Note: n/a: not applicable

The privatization process regarding EUAS power plants has gained speed in 2010. The aim of privatizations is to prevent market dominance from emerging and to give rise to production capacity by strengthening competition. In this aspect, ADUAS has been privatized in 2008 and 13 thermal power plants and 28 hydroelectric power plants with a total capacity of 16.2 GW have been divided to 9 portfolios to be privatized. The power plants in these portfolios will be privatized after the privatization of Hamitabat, Soma, Can and Seyitomer power plants. Further information related to the portfolios groups and associated installed capacities are summarized in the chart on the following page.

<sup>34</sup> OIB (Privatization Administration)

Figure 27 - Portfolio Groups and Installed Capacities



Source: EÜAŞ, ÖİB, Deloitte Analysis

Privatized Alone	Portfolio 1 (P1)	Portfolio 2 (P2)	Portfolio 3 (P3)	Portfolio 4 (P4)
<ul style="list-style-type: none"> <li>• Hamitabat (1,120 MW)</li> <li>• Soma A-B (1,034 MW)</li> <li>• Çan (320 MW)</li> <li>• Seyitömer (600 MW)</li> </ul>	<ul style="list-style-type: none"> <li>• Elbistan A (1,355 MW)</li> <li>• Elbistan B (1,440 MW)</li> </ul>	<ul style="list-style-type: none"> <li>• Ambarlı DG (1,351 MW)</li> <li>• Ambarlı Fuel-oil (630 MW)</li> </ul>	<ul style="list-style-type: none"> <li>• Aliğa (180 MW)</li> <li>• Kangal (457 MW)</li> <li>• Tunçbilek (365 MW)</li> <li>• Çatalağzı (300 MW)</li> </ul>	<ul style="list-style-type: none"> <li>• Bursa DG (1,432 MW)</li> <li>• Orhaneli (210 MW)</li> <li>• Gökçekaya (278 MW)</li> <li>• Sarıyar (160 MW)</li> <li>• Yenice (38 MW)</li> </ul>
Portfolio 5 (P5)	Portfolio 6 (P6)	Portfolio 7 (P7)	Portfolio 8 (P8)	Portfolio 9 (P9)
<ul style="list-style-type: none"> <li>• Kemerköy (630 MW)</li> <li>• Yatağan (630 MW)</li> <li>• Yeniköy (420 MW)</li> <li>• Demirköprü (69 MW)</li> <li>• Adıgüzel (62 MW)</li> <li>• Kemer (48 MW)</li> <li>• Karacaören-1 (32 MW)</li> <li>• Gezende (159 MW)</li> </ul>	<ul style="list-style-type: none"> <li>• Altınkaya (703 MW)</li> <li>• Derbent (56 MW)</li> <li>• Hirfanlı (128 MW)</li> <li>• Kesikköprü (76 MW)</li> <li>• Kapulukaya (54 MW)</li> </ul>	<ul style="list-style-type: none"> <li>• Hasan Uğurlu (500 MW)</li> <li>• Suat Uğurlu (69 MW)</li> <li>• Almus (27 MW)</li> <li>• Köklüce (90 MW)</li> <li>• Kılıçkaya (120 MW)</li> <li>• Çamlığöze (32 MW)</li> </ul>	<ul style="list-style-type: none"> <li>• Çatalan (169 MW)</li> <li>• Aslantaş (138 MW)</li> <li>• Menzelet (124 MW)</li> <li>• Kısık (10 MW)</li> <li>• Karkamış (189 MW)</li> </ul>	<ul style="list-style-type: none"> <li>• Doğan kent (75 MW)</li> <li>• Kürtün (85 MW)</li> <li>• Tortum (26 MW)</li> <li>• Özlüce (170 MW)</li> </ul>

Source: EÜAŞ, Deloitte Analysis



## 2.6 Sector Establishments and Institutions

Establishments and Institutions	Code	Description	Web site
Energy Market Regulatory Authority	EPDK	EPDK is responsible for licensing new energy projects, including renewables.	<a href="http://www.epdk.gov.tr">http://www.epdk.gov.tr</a>
Turkey Atomic Energy Authority	TAEK	Main goals and authority of Turkey Atomic Energy Establishment is to determine the plan, program and national policies about using atomic energy to the advantage of conciliatory and encourage all atomic works to develop technology.	<a href="http://www.taek.gov.tr">http://www.taek.gov.tr</a>
Privatization Administration	ÖB	The major targets of the privatization program are primarily : to minimize state involvement in the industrial and commercial activities in the economy, to provide legal and structural environment for free enterprise to operate, to decrease the financial burden of State Economic Enterprises on the national budget, to transfer privatization revenues to the major infrastructure projects, to expand and deepen the existing capital market by promoting wider share ownership, to provide efficient allocation of resources.	<a href="http://www.oib.gov.tr">http://www.oib.gov.tr</a>
Turkish Electricity Transmission Company	TEİAŞ	TEİAŞ, being a state owned enterprise under the Decree Law No:233 and within the framework of the existing legislation and Articles of Association, has been acting in compliance with the new market structure depending upon the the transmission licence obtained from Electricity Market Regulatory Authority (EMRA) on 13.03.2003.	<a href="http://www.teias.gov.tr">http://www.teias.gov.tr</a>
Turkish Electricity Distribution A.Ş.	TEDAŞ	TEDAŞ distributes and sells electricity to users in Turkey.	<a href="http://www.tedas.gov.tr">http://www.tedas.gov.tr</a>
Türkiye Elektrik Ticaret ve Taahhüt A.Ş.	TETAŞ	According to deregulation works in energy sector in 2001, Turkish Electricity Generation & Transmission (Teaş) has been divided into three separate entities as Turkish Electricity-Transmission Company (TEİAŞ), Electricity Generation Company (EÜAŞ) and Turkish Electricity Trading and Contracting Company (TETAŞ) on 01.10.2001. TETAŞ is founded to operate as the only wholesale of electricity which is the first electricity wholesaler public company.	<a href="http://www.tetas.gov.tr">http://www.tetas.gov.tr</a>
Electricity Generation Co.Inc.	EÜAŞ	The state-owned company EÜAŞ has taken up the responsibility of power plants which are not transferred to private companies. Additionally, it carries on as being sole owner of power plants whose operating rights have been transferred to private companies. In terms of supply security and other reasons, provided that approved by authorized entities, this company is going to build new power plants and operate them. This company (EÜAŞ) has also taken up the responsibility of the operation of the hydraulic power plants constructed by Directorate-General of State Hydraulic Works (DSİ).	<a href="http://www.euas.gov.tr">http://www.euas.gov.tr</a>
Ministry of Energy and Natural Resources	MbENR	According to Law No. 3154, the purpose of the Ministry of Energy and Natural Resources is to help define targets and policies related to energy and natural resources in a way that serves and guarantees the defense of our country, security, welfare, and strengthening of our national economy; and to ensure that energy and natural resources are researched, developed, generated and consumed in a way that is compatible with said targets and policies.	<a href="http://www.enerji.gov.tr">http://www.enerji.gov.tr</a>
BOTAŞ Petroleum Pipeline Co.	BOTAŞ	BOTAŞ's monopoly rights on natural gas import, distribution, sales and pricing that was granted by the Decree of Natural Gas Utilization No. 397 dated February 9, 1990, were abolished by the Natural Gas Market Law. The Law covers import, transmission distribution, storage, marketing, trade and export of natural gas and the rights and obligations of all real and legal persons related to these activities.	<a href="http://www.botas.gov.tr">http://www.botas.gov.tr</a>
Turkish Petroleum Co.	TPAO	TPAO was founded in 1954 by Law No. 6327 with the responsibility of being involved in hydrocarbon exploration, drilling, production, refinery and marketing business as Turkey's sole national company. Since its foundation, TPAO has spent pioneering efforts on all the branches of petroleum industry and realized significant and strategic investments successfully within the frame of rights granted by the related law. Until 1983, as an integrated oil company, it was engaged in all the activity fields of oil industry from exploration to production, from production to refinery, from refinery to marketing and transportation. Today, TPAO is national oil company involved in merely upstream (exploration, drilling & production) sector.	<a href="http://www.tpao.gov.tr">http://www.tpao.gov.tr</a>
General Directorate of State Hydraulic Works	DSİ	DSİ is a primary executive agency responsible for elimination of adverse effects of Turkey's surface and ground water and putting them in public utilization in various ways such as hydropower, irrigation, domestic and industrial use.	<a href="http://www.dsi.gov.tr">http://www.dsi.gov.tr</a>
General Directorate of Mineral Research & Exploration	MTA	The institute, according to the establishment law ; was made responsible of carrying out the necessary studies, chemical and technological analysis, in order to search and to find our country's mining and stone beds, and then to determine whether they are appropriate for operation or not, and at the same time to educate engineers, assisting personnel and qualified employers for the sector.	<a href="http://www.mta.gov.tr">http://www.mta.gov.tr</a>
General Directorate of Mining Affairs	MİGEM	Mines under the Government Administration are audited, investigated and issued a licence by MİGEM under the right of Ministry of Energy and Natural Resources.	<a href="http://www.migem.gov.tr">http://www.migem.gov.tr</a>
World Energy Council Turkish National Committee	DEKTMK	DEKTMK works technical and scientific issues about potential, efficient production, distribution and using of energy. DEKTMK shares scientific results with members and public.	<a href="http://www.dektrnk.org.tr">http://www.dektrnk.org.tr</a>
General Directorate of Turkish Coal	TKİ	TKİ evaluates natural resources like lignite, turp bituminous schist, asphaltite; meets Turkey needs; contribute Turkey economy; planning and programming; following; immobilize application strategies.	<a href="http://www.tki.gov.tr">http://www.tki.gov.tr</a>
General Directorate of Electrical Power Resources Survey and Development Administration	EİE	Electrical Power Resources Survey and Development Administration (EİE) founded on June 24, 1935 under law No. 2819 EİE, being governed by the provisions of private law and administrated in accordance with commercial methods, having the status of a juridical person and being bound to the Ministry of Energy and Natural Resources, carrying out engineering service with opportunity of production of electrical energy is an investor public organisation.	<a href="http://www.eie.gov.tr">http://www.eie.gov.tr</a>



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**Abbreviations**

b/d	Barrels per day
Bbl	Barrel
Bcm	Billion cubic meters
BMI	Business Monitor International
CAGR	Compound Annual Growth Rate
CCGT	Combined cycle gas turbine
DisCo	Distribution Company
EIU	Economist Intelligence Unit
EMEA	Europe, Middle-East and Africa
EUAS	Electricity Generation Co.Inc.
EUR	Euro
GDP	Gross Domestic Product
HEPP	Hydro Electricity Power Plant
IEA	International Energy Agency
ISE	Istanbul Stock Exchange
ISPAT	Republic of Turkey Prime Ministry Investment Support and Promotion Agency
KCETAS	Kayseri Region Electricity Company (Kayseri ve Civari Elektrik T.A.S)
Ktoe	Thousand tons of oil equivalent
LNG	Liquefied natural gas
OPEC	Organization of the Petroleum Exporting Countries
PED	Primary energy demand
RMB	Chinese yuan
US	United States
USD	US Dollars
TEAS	Turkish Electricity Generation and Transition Co.
TEIAS	Turkish Electricity Transmission Company
TEK	Turkish Electricity Authority
TETAS	Turkish Electricity Trading Company
TPAO	Turkish Petroleum Corporation
TRY	Turkish Lira

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