February 2014

HERDEM ATTORNEYS AT LAW

2013 TURKEY ENERGY REPORT

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Contents

Introduction

Turkish economic growth that had been going on for more than a decade have created a strong economy that is based on high demand for energy. However as a country that is heavily dependent on energy imports Turkey is investing on the means that will provide it with a more diversified energy base. This report is intended to provide an extensive analysis of such an effort on the part of Turkey by laying out the energy map of the country. It puts a specific emphasis on combining the sector specific dynamics with the legal knowledge of the Turkish energy market. The report should be read in conjunction with the recent developments in the region including new discoveries of energy resources in the Eastern Mediterranean and their resonances for the Turkish energy policy as well as the energy policies of the regional players.

General Macro Economic Overview and Political Analysis

Turkey's Economic Outlook 2013

Turkish economy has been growing in unprecedented rates during the course of the last decade. Its macro economic restructuring and reforms following the economic crisis of 2002 had paid off and led the country to an economy based on solid macro-economic foundations. Throughout the last ten years the country has been increasingly associated with the emerging economic power houses of BRIC and has been regarded as an economic hub in its region.

- GDP per capita increase from 3,492 USD in 2002 to 10,497 USD in 2013
- Economic growth by 3.6% in 2013
- Inflation rate 7.4% in 2013
- Annual Exports of 151.3 USD billion in 2013
- Annual Imports of 248.3 USD billion in 2013
- Budget deficit to GDP 1.2%

Political Analysis

Outstanding Turkish economic performance which has spread out to the last decade has a keen connection with the political situation in Turkey. Once a country of an unstable politics that is marked by ever changing coalition governments, Turkey has managed politically to transformed itself in to a stable and reliable country with a single party government capable of implementing much needed political and economic reforms. Throughout the last decade Turkey had experienced no major political crisis and the stable political situation had found an expression in the country's unprecedented economic growth almost reaching double digit numbers in its heyday.

The year 2014 is a year to watch for the Turkish politics to see if the country will continue to proceed in a stable course or two ballot boxes that will be brought before the Turkish electorate will change the political landscape in Turkey. Turks will go to the polls both in March 2014 local elections to determine who will run the Turkish cities and August 2014 to directly elect their President for the

first time in their history. What is crucial for these two elections are two events that have the potential to change the Turkish politics.

Turkish Energy Market in Perspective

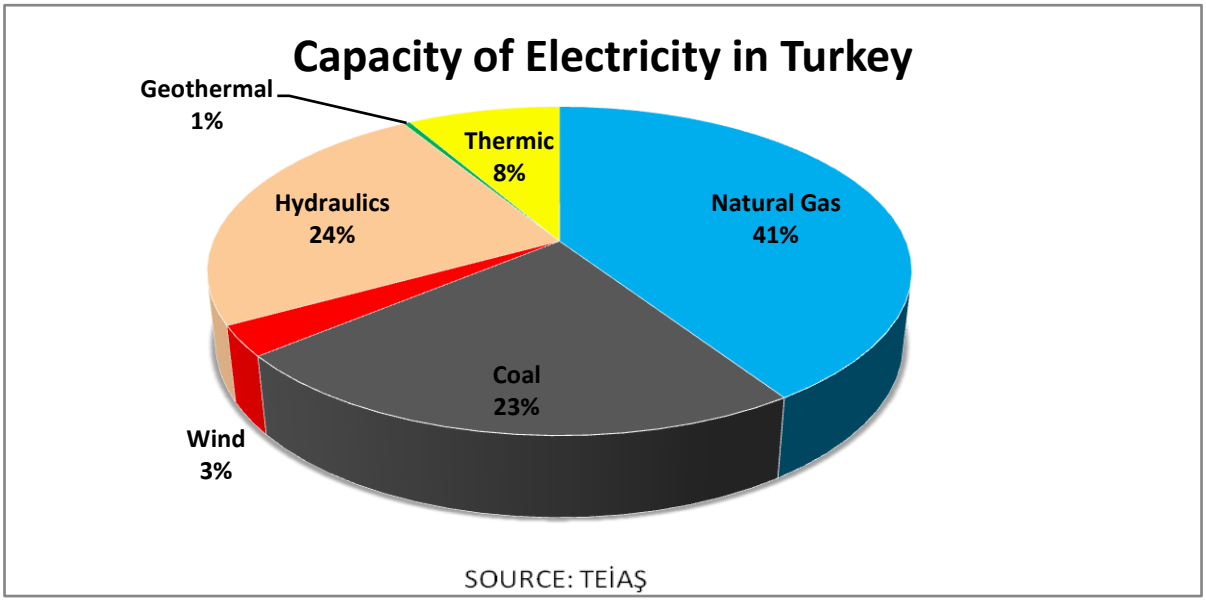
- Turkish energy market has been structured through the liberalization policies of Turkish government with intent to form a competitive energy market.
- Despite the latest monetary policies of Central Bank of Turkey on interest rates which were implemented against to currency risk, Turkish electricity consumption rate is estimated to mount up to 4.5 % annually in parallel with GDP.
- Turkish natural gas market is sharply expanding with substantial privatizations in recent years. In line with economic growth, Turkish natural gas consumption augmented circa 5% compared to 2012.
- Electricity consumption performed a sustainable growth throughout 2007 to 2013. Although it was very soft winter season last year, the electricity consumption increased 1.3% in 2013. This is a fundamental indicator that electricity demand is mostly related to industrial consumption.

Overall Distribution of Energy Resources

- Turkey has become one of the fastest growing energy markets in the world and has been experiencing rapid demand growth in all segments of the energy sector for decades.
- Turkey comes in possession of the most dynamic energy economies of the world in terms of increase in energy demand.
- Having a substantial potential for the renewable energy resources, Turkey ranks seventh in the world and first in Europe in terms of geothermal energy.
- Turkey aims at further increasing its use of hydro, wind and solar energy resources and Turkey has potential producing %30 of its electricity need from the renewable by 2023.
- Turkey is geographically located in close proximity to more than %70 of the world's oil and gas reserves.
- Annual electricity generation is approximately 179, 5 billion kWh in Turkey.

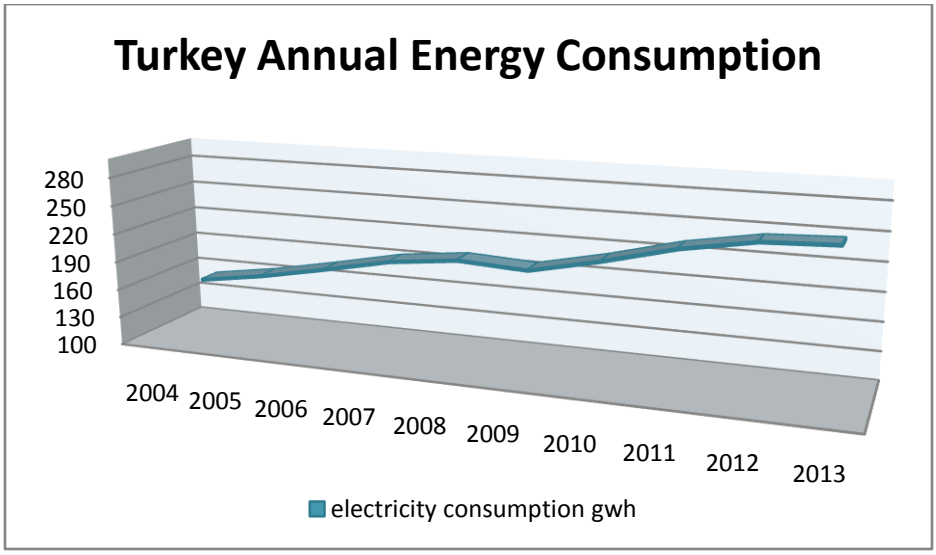
- Renewable energy and energy efficiency projects are assisting to reduce CO_2 emissions in Turkey by more than 3 million tons annually.

- Turkey has different kinds of energy sources which Turkish energy sector is becoming more active, competitive and attracting the attention of investors.



Annual energy consumption

In comparison with 2012, annual electricity consumption in Turkey has risen by 1.3 % and climbed to 245K GWh. The highest energy consumption revealed on July by 22K GWh due to the cooling off items usage.



Data Source: TEIAS

Total Energy Supply Sources

Energy Generation

- Electricity demand has been growing in line with economic developments which driven by industrialization and urbanization in Turkey.

- Growing demand is driven by population and industrial growth which in emerging markets calls for a rise in the supply capacity as well as diversity in the energy generation mix.

- Diversification of primary energy supplies decrease dependency on a single source and contributes to supply security.

- Developing countries which is Turkey to constitute 93% of the growth in demand.

- According to the International Energy Agency (IEA), shale gas caused a decline in gas prices which increase the demand on natural gas and LNG.

- Turkish electricity market has been increasing in size with its economic developments which industrialization and urbanization make room for the importance of electricity in Turkish market.

- The Turkish electricity market is one of the fastest growing in the world with an average of approximately 9% annual growth in 2010 and 2011.

- Turkish electricity market play a crucial role in terms of natural gas demand since it is expected to grow by 2.9% annually until 2020 according to the Ministry of Energy and Natural Resources.

- Turkey has the second highest energy consumption growth after China and is highly dependent on external energy resources.

Energy Imports

- There is a competitive global market place in which energy cost is a significant competitive factor. Turkish economy is an aim of becoming more competitive in the global market place.

- The geographic position of Turkey and its proximity to the energy sources is its biggest asset.

- The energy intensity of Turkish industry is higher than any modern standard. Energy intensity of Turkish industry is two times higher than the OECD average and four times higher than Japan's average. Turkish industry has to increase energy efficiency in production and increase the share of the renewable energy in its energy mix in line with the EU regulations and standards.

- Turkey is located in a region that holds 72% of the world's proven gas reserves and 78% of proven oil reserves. Countries to the west of Turkey consume 50% of world's oil and natural gas while countries to the east produce 70% of world's oil and natural gas.

- Turkey is located at the crossroads of energy in the middle of five seas. In regard to this, this position makes Turkey an indispensable energy corridor between the two regions of energy production and consumption.

- The limits of Turkey's domestic energy sources in light of its growing energy demand have resulted in dependency on energy imports, primarily of oil and gas.

- Turkey aims at fully utilizing its indigenous hard coal and lignite reserves, hydro and other renewable resources such as wind and solar energy in order to meet the demand growth in a sustainable manner.

- Integration of nuclear energy into the Turkish energy mix is also one of the main tools in responding to the growing electricity demand while avoiding increasing dependence on imported fuels.

- Turkey imports about 90% of the hard coal mainly from Russia, Australia and the United States. The volumes of imported coal will rise in the future as coal's importance for electricity generation increases.

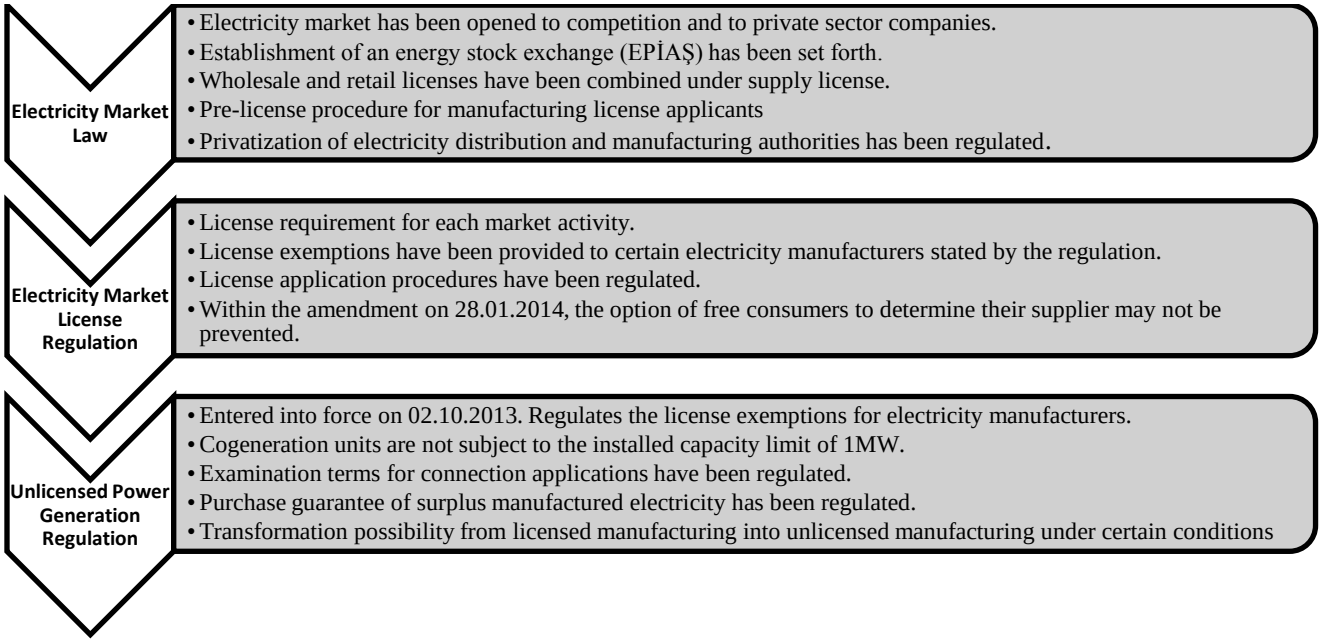
- Turkey's lignite reserves make a significant contribution to Turkey's energy sector and power mix. The government has begun a policy to encourage exploitation of Turkey's domestic lignite reserves instead of natural gas for electricity generation.

- Progress in the liberalization process allowed Turkey to be a part of European markets in which political integration exists. After Norway, Russia, and Algeria, Turkey aims to become the fourth artery in energy imports.

Legislative Framework Summary

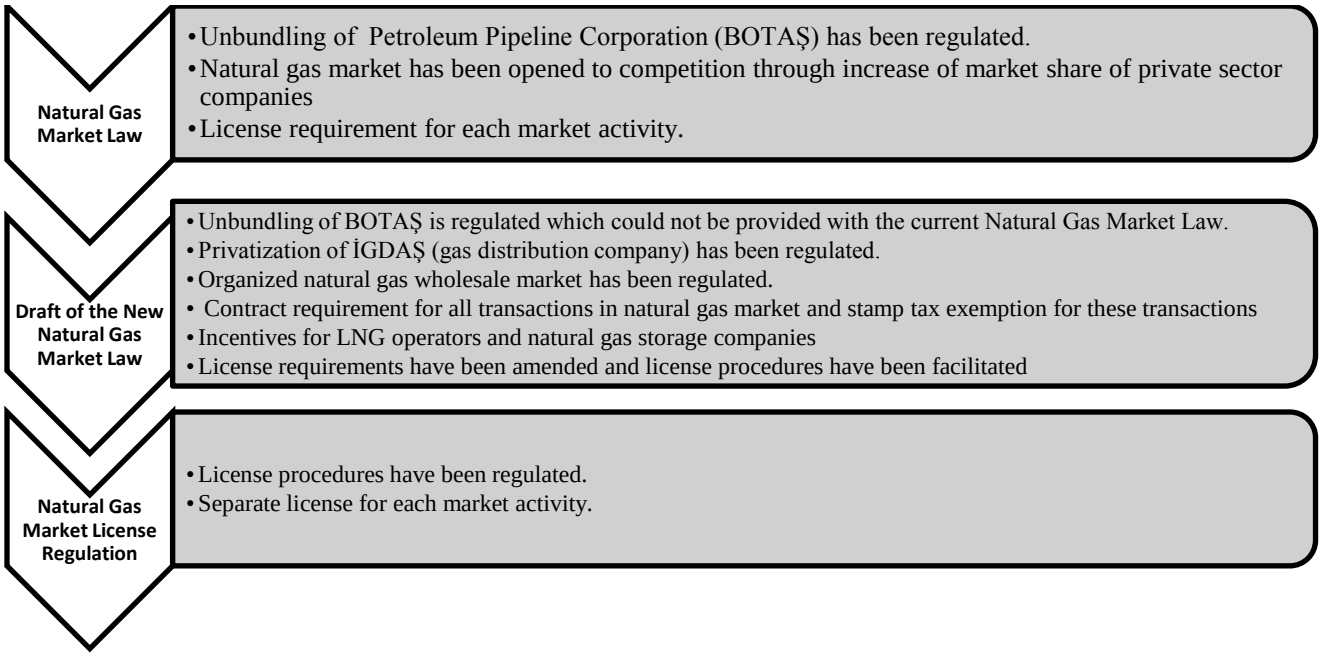
Legislation in Turkish energy market has been amended within the scope of the adaptation of Turkish Law with the European Union's Directives and Regulations and within the frame of the energy market liberalization policies. The energy market legislation supports the access of private sector companies into energy market and accordingly, the energy market has been opened to competition to a large extent. The most essential is that the legislation has been amended in accordance with the changes and requirements in each market. The last legal reforms have been made in Natural Gas Market.

Electricity Market



Oil & Gas

Gas



Oil

Legislation	What does it regulate?
Petroleum Market Law	• Adaptation of the Turkish Petroleum Market Law to the EU Directives has been provided. • Regulates the market activities such as distribution, import, export, refining, storage. • Petroleum market has been opened to competition due to increase of the market share of private sector companies. • License requirement for each market activity.
Turkish Petroleum Law - 2013	• Regulates the petroleum activities such as oil exploration, production. • Petroleum areas have been divided into sea and land. • Oil exploration activities may be done by private sector companies. • Exploration license terms have been extended. • Tax exemptions and reductions for oil investments.
Petroleum Market License Regulation	• Requirement of a minimum capital amount for distribution, refining, storage and transmission licenses. • Requirement of a minimum sale target for distribution license. • License applications are finalized within 60 days. • Oil import allowed to right holders depending on their licenses.

Renewable Energy

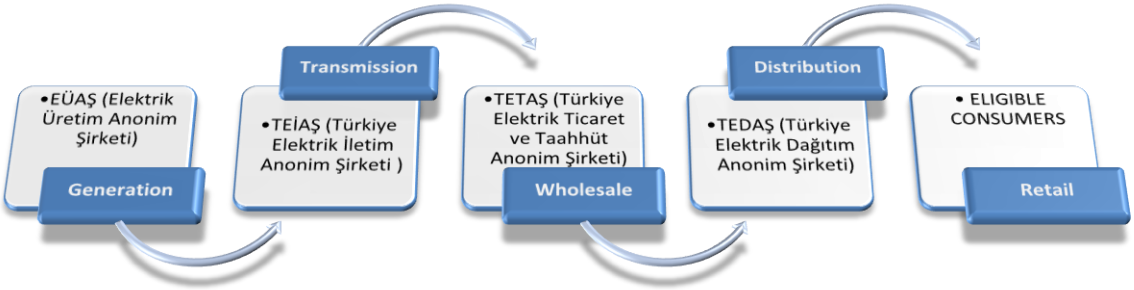
Legislation	What does it regulate?
Electricity Market Law	• Renewable resources have been included to unlicensed power manufacturing under certain conditions. • Council of Ministers may increase the unlicensed power generation limits from renewable resources fivefold. • Purchase guarantee for surplus generated power in tariffs determined by laws.
Renewable Resources Law No. 5346	• The feed-in tariffs have been regulated for power manufacturing license owners. • Incentives for use of local equipment in power manufacturing have been set forth. • Purchase guarantee of surplus generated power for 10 years. • Incentives for investments which have been stated by the Law.
Unlicensed Power Generation Regulation	• Unlicensed power generation limit has been increased from 500 kW to 1 MW in 2013. • Purchase guarantee for surplus generated power for 10 years.

Due to the Resolution of the Council of Ministers from 05.12.2013, the support mechanism for power manufacturing from renewable resources, feed-in tariffs and local equipment incentives have been extended to 2020.

Nuclear Energy

Legislation	What does it regulate?
Nuclear Power Plants Law No. 5654	• Infrastructure incentives for investors (right of use and servitude free of charge on the property where power plants are established. • It is possible to benefit from other investment incentives. • Private sector companies may establish nuclear power plants. • License requirements for the power manufcturer from nuclear power plant
Nuclear Power Plants Regulation	• Tender processes have been regulated for determination of the company which establishes the power plant • Infrastructural incentives for investors have been regulated in accordance with the Nuclear Power Plants Law.

TURKEY ELECTRICITY MARKET OUTLOOK



Operational Structure of Turkish Electricity Market

Generation	Transmission	Wholesale	Distribution	Retail
❖ **66% Private Sector, 34% State Owned (EÜAŞ)**	❖ State owned monopoly (TEİAŞ)	❖ Net Electricity Foreign Trade Deficit 2.9 TWh	❖ The privatization of energy distribution was completed	❖ 5000 kwh is minimum limit per year for consumers who are free to choose their suppliers
❖ **20% market share limitation for a private company**	❖ Market financial settlement is generated by TEİAŞ	❖ 10% wholesale limit for private sector.	❖ Enerjisa acquired Toroslar Elektrik Dağıtım by US$ 1.7 billion is largest pivatization deal in 2013	❖ This limit is targeted to be zero by 2015
❖ **243 TWh energy generation in 2013**	❖ System operator is part oF TEİAŞ	❖ TETAŞ is the governmental part for billateral contracts		

Recent Developments and Opportunities

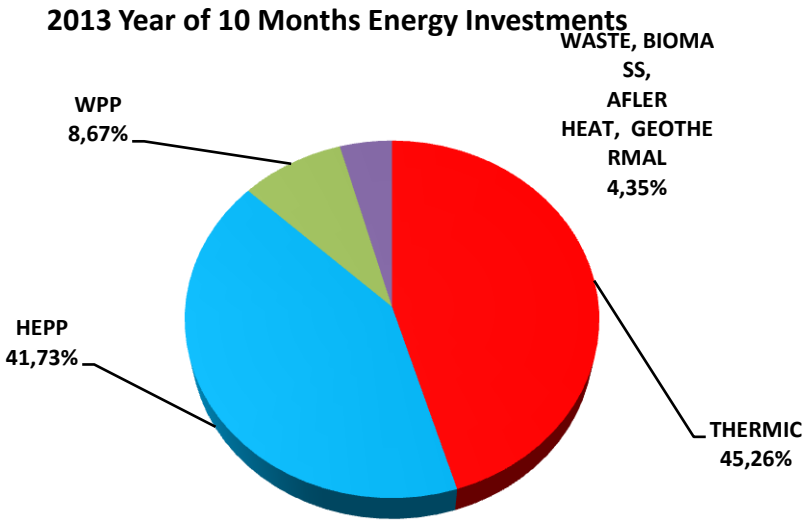
Recent developments

- Demand for electricity is impacted by economic growth, increase in population and urbanization as well as energy efficiency applications and factors related to climate change.
- According to the latest Turkish Electrical Energy 10 Year Generation Capacity Projection (2009-2018) Report published by TEIAS, total electricity demand is expected to reach 336 TWh with 6.3% compound annual growth rate in base scenario in 2018 and 357 TWh with 7% compound annual growth rate in high scenario.
- Turkish electricity sector has three distinguished eras:
    - TEK (Turkish Electricity Administration)
    - Period of unbundling of generation, transmission, wholesale and distribution/retail sales operations
    - Period of market structuring
- In regard to Electricity Energy Market, there are targets which have been set such as;
    - Decreasing the share of electricity generation based on natural gas down to 30% as of 2020, so as to reduce the risks arising from dependency on gas imports,
    - Increasing the share of renewable resources up to 30% as of 2023,
    - Utilizing all known domestic lignite and hard coal resources and hydroelectric potential by 2023,
    - Continuing to benefit from imported coal by considering security of supply,
    - Ensuring that 5% of generation portfolio is based on nuclear power,

Opportunities in Electricity Market

- Turkey's electricity sector plays a crucial role in investors because this sector is attractive many investors and indicates enormous potential, triggered by the economic and population growth of country.
- Thanks to developing legal infrastructure, Turkey's electricity market has altered significantly.

- The privatization of the electricity generation segment provides substantial opportunities for local investors who desire to diversify their generation portfolio and for international investors who desire to enter Turkey's fast growing electricity market.
- Investors are very eager to enter the market as confirmed by the developments in the installed capacity.
- Market structure is deepening with new mechanisms and utilization of domestic sources, particularly renewable, is a strategic goal for energy supply in many aspects.
- New Electricity Market Law takes an advantageous for investors who important alter in the market mechanism.
- There is huge potential of Turkey in renewable energy sources which affect vast investment potential for local and global investors.



SOURCE:TEİAŞ

- Improving regulatory conditions, liberalizing the market, opening the sector to competition in Turkish electricity market.

- Investors should note that the Turkish government has the strategic goal of enhanced the share of renewable resources in the country.

- Through the involvement of the private sector, there is well coordinated energy diplomacy to strengthen its position in global energy negotiations.

- Turkey has dynamic private sector which is a source of stability in the regions on which the global economy is dependent for the energy sources.

- Turkey has suitable places in which the investors make an investment in the energy market. Since there are four important items for investors so as to assist:

    - Establishment of a well designed, well functioning and competitive market
    - Measures taken for security of supply to ensure the availability of predictable sales opportunities or incentives that would provide return of investments
    - Providing predictability, transparency and a confident environment as per the economic, political and regulatory framework
    - Access to resources such as machinery, equipment, infrastructure, qualified work force
    - Access to effective financial resources

- Expertise in the energy sector is dramatically increasing with the continuous expansion and liberalization of the energy sector.

- The liberalization process constantly enhances the competitiveness of the market, while privatizations proffer a variety of investment opportunities which serves the purpose of increasing competitively.

- According to the Engineering News Record, Turkish contractors are second to Chinese contractors on a global scale, and have been gaining credibility Western construction standards and project management expertise.

- It is expected that the market for supply companies will grow more competitive in the upcoming years. Suppliers will have to develop strategies for various segments with different consumption profiles.

Current Regulatory Updates

The most essential legal reform in Turkish electricity market is the entry of the New Electricity Market Law into force in 2013. Due to this law, the establishment of a competitive and liberalized electricity market has been enabled. Accordingly, the license types have been changed, the pre-licensing process has been set out and privatizations in the electricity market and establishment of an energy exchange have been regulated. The amendments in the secondary legislation that have been made in 2013 are as follows:

- ✓ The Regulation on Unlicensed Electricity Production has been amended and the New Regulation has entered into force on 02.10.2013.
- ✓ The amended Electricity Energy License Regulation has been put into force on 02.11.2013. The electricity market operation, export and import have been regarded as market activities within this regulation and license obtaining has been made obligatory for each market activity. Moreover, the unlicensed electricity production has also been regulated in this Regulation. Within this Electricity Energy License Regulation, the stamp tax incentives for energy production companies have been extended until 2015.

Oil and Gas Market

Natural gas has been the most used energy resource in Turkey like the electricity market and its demand is expected to increase by 2.9 % annually until 2020 according to the statistics. In parallel with the energy demand of Turkey, the oil distribution and import also has been increased in the year of 2012. The rapid increase of energy demand has led up to the research of the Liquefied Natural Gas (LNG) and shale gas. Recently, several countries have been working on development of the shale gas and the LNG trade. Incentives and opportunities for LNG come to the fore in Turkish natural gas market.

Turkey has a limited natural gas and oil production capacity. Even if it is an import dependent country with regard to the primary energy resources like natural gas and petroleum, Turkey has been in a geostrategic location and due to this, Turkey provides opportunities to investments in pipeline projects. TANAP, natural gas pipeline project between Azerbaijan and Turkey.

Operational Structure

Natural Gas

The natural gas market structure has been in a change since 2001. Within the new legislation, the market liberalization has been intended and changes within this purpose have been realized to a large extent. Due to privatizations and restructuring in Turkish energy sector, the market share of private sector has been increasing also in natural gas market activities and natural gas market has been more open to competition. One of the most essential developments is the unbundling transactions of BOTAŞ, State-owned Natural Gas and Petroleum Pipeline Corporation. Evenif its unbundling has not been finalized completely yet, financial unbundling regarding the production, export, import, transmission and LNG storage activities has been completed. According to the recent Natural Gas Market Law No. 4646, a related license obtaining is required for each market activity. The market activities stated in the Law are as follows:

Production and Import: Production has not been regarded as a market activity in the Law. However, under certain conditions, natural gas manufacturers may sell the produced natural gas to distributors, importers, exporters or to free consumers.

Natural Gas Production in Turkey between 2007 and 2012 (bcm)

Year	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Production Amount	874	969	684	682	759	632

Source: Natural Gas Market Report of EMRA, 2012

According to the statistic, the natural gas production in Turkey has decreased 16,7 % in 2012. Moreover, 98,64 % of natural gas in Turkey has been imported as from 2012.

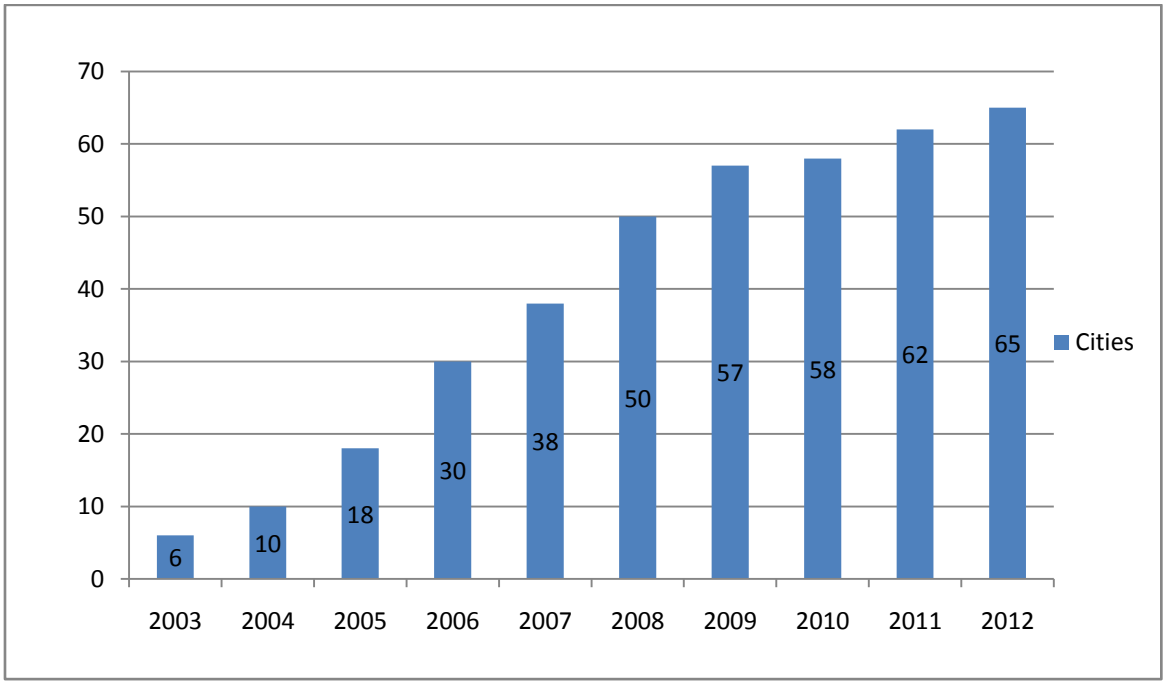
Transmission activity is operated by BOTAŞ and LNG transmission is operated by several private transmission companies. As from December 2012 total 59,7 bcm of LNG has been transmitted in Turkey.

Storage plays an essential role for natural gas supply security. As from 2012, there are 3 natural gas storage companies in Turkey. The underground storage has been developing year by year. Recently, the Tuz Gölü Natural Gas Storage Project is ongoing which is expected to be finalized in 2015. After the completion of this project, 750 bcm of natural gas will be stored and daily 40 bcm of natural gas will be distributed in Turkey. It is expected that this capacity will increase until 2018.

Wholesale is operated by licensed legal entities. As from the end of 2012, there are 42 licensed pipeline or liquefied natural gas wholesale companies in Turkey and 8 of them are natural gas producers according to the statistics of EMRA.

Distribution and Retail: Distribution activities are operated by private companies due to the legal reforms regarding natural gas market liberalization. These companies are controlled by the EMRA. According to the statistics, natural gas distribution has been provided to 65 cities of Turkey as from 2012. Distribution in natural gas market may provide partnership or acquisition opportunities to investors due to privatizations.

Number of cities in which natural gas supply has been provided



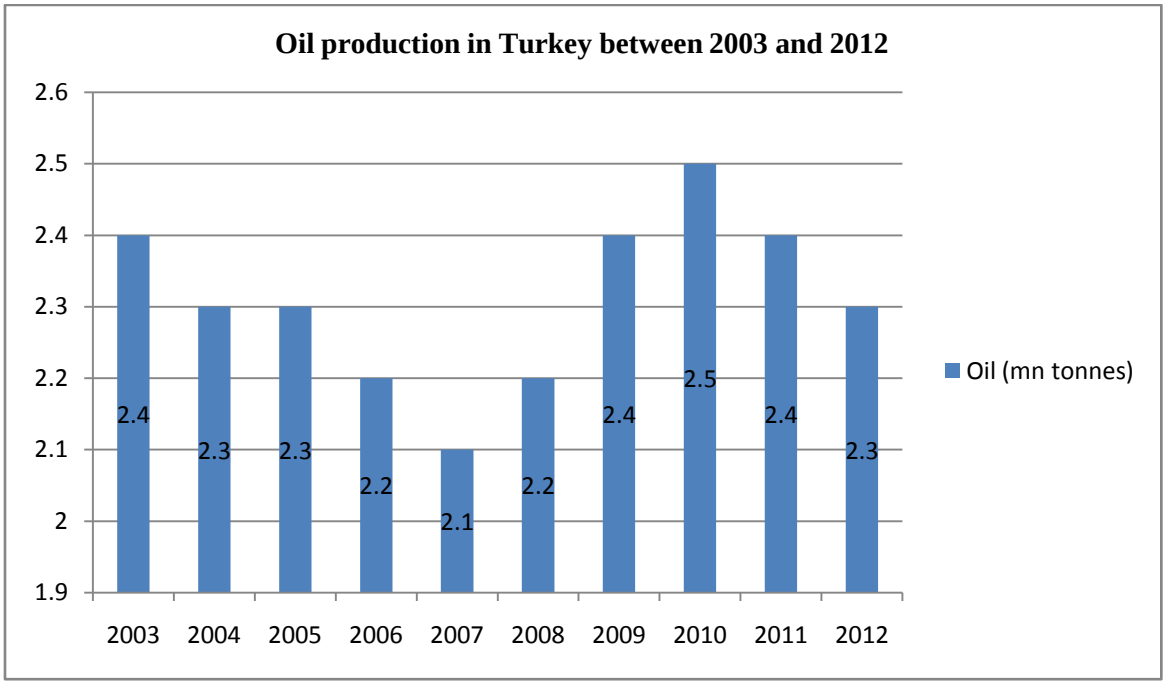
Source: Natural Gas Market Report of EMRA, 2012

Oil

As is known, petroleum plays an essential role in transport and industry sectors even if the use of renewable energy resources instead of primary energy resources have been supported since last years. The market activities in oil market have been stated in the Turkish Petroleum Market Law with Law No. 5015. Obtaining of the related license is a requirement for each market activity.

Oil exploration and manufacturing activities have also been operated in Turkey even if these amounts are not sufficient to meet the oil demand. According to the statistics of Turkish Petroleum Corporate (TPAO), 2,3 mn tonnes oil has been manufactured in Turkey. Accordingly, 9 % of oil

demand of Turkey has been met from local production. Oil exploration principles have been regulated by the Turkish Petroleum Law. TPAO is the major player in oil exploration.



Source: Oil and Gas Market Report of TPAO, 2012

Refining activity may be conducted with a refining license. The market activities of refining license owners are supply of oil products from abroad, sale and export of refined oil products. As from end of 2012, there are 6 refining license owners in Turkey according to the Oil Market Report of EMRA in 2012. The refining market has been opened to competition within the private sector investments since 2007. The refining activity is operated by TÜPRAŞ.

Processing: As from 2012, there are 2 license applications for petro-chemistry. According to the statistics in the Oil Market Report 2012 of EMRA, a license owner has produced 17.729 tonnes of biodiesel in 2012 and there were no biodiesel import and export activities in Turkey in that year.

Oil distribution, transport and franchise activities: Oil distributors may supply oil products in order to export or sell into the domestic market. According to the statistics of EMRA, 10.848.129 tonnes of oil has been supplied from refining companies in order to sell into the domestic market. *[Source: Petroleum Market Report of EMRA, 2012]*. As from 2012, there are 58 oil distribution license owners in Turkey. Distribution and franchise activities are operated by private sector companies. The number of distribution companies has increased year by year due to liberalization policies.

Storage, Transmission, Free user and bunker fuel activities are also market activities stated in the Petroleum Market Law which may be operated under with the correspondent license.

Key Market Players

The Turkish Petroleum Company (TPAO) has the highest market share in oil exploration.

Refining activities are operated by TÜPRAŞ to a large extent. SOCAR and Doğu Akdeniz Petrochemicals and Refinery are the both major players in oil refining after TÜPRAŞ.

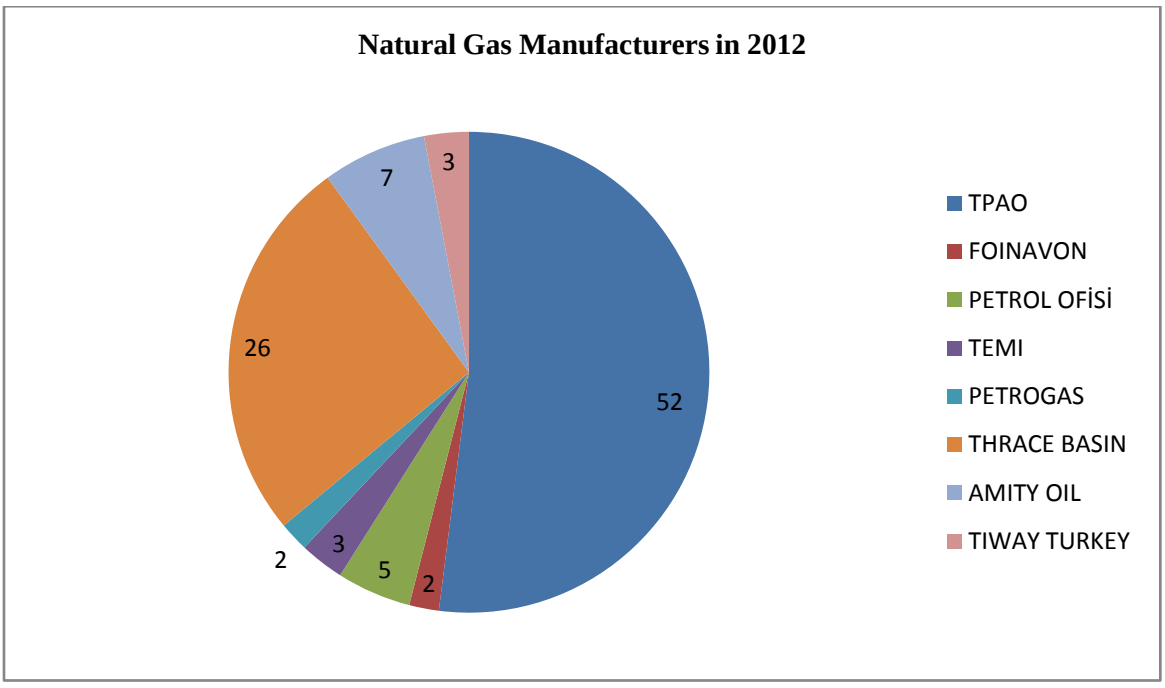
Oil distribution activities are operated by private companies and the key market players in oil distribution are Shell, BP, OPET, Total and OMW-POAŞ.

Natural Gas

Since the beginning of liberalizations in Turkish natural gas market, the number of market players in private sector has been increasing year for year. The key market players may vary depending on each market activity.

Natural gas production, exploration and import: Due to liberalization processes in natural gas market, the contracts of BOTAŞ have been transferred in order to decrease its market share to 20%. In this context, the contracts have been transferred to SOCAR, Ege Gaz, Bosphorus Gaz, Akfel Gaz, Shell, Enerco Enerji and Kibar Enerji.

Natural gas production is operated in accordance with the Petroleum Law. Pursuant to the statistics of EMRA, most market share belongs to the TPAO in natural gas production.



Source: EMRA, Natural Gas Market Report, 2012

Natural gas transmission is under state's monopoly and it is operated by BOTAŞ.

Distribution is operated by private sector companies to a large extent. Key market players in distribution are İGDAŞ and BAŞKENTGAZ.

Key market players in storage activities are BOTAŞ, TPAO and EGEGAZ.

Major players in wholesale and retail are EnerjiSa, EWE, Zorlu, OMV and Aksa.

Oil

Major market player in oil exploration is the Turkish Petroleum Company (TPAO). However, the oil exploration activities have been supported and opened to private sector companies within the New Petroleum Law.

Raw refinery materials are imported from Iran and Russia to a large extent. TÜPRAŞ is the key market player in refinery sector and SOCAR Star Refinery and Star Turcas Refinery A.Ş.

Key market players in petroleum market are Shell & Turcas A.Ş., POAŞ, OPET, BP and TOTAL in distribution and retail activities.

Recent Developments and Opportunities

Turkey is well situated at the crossroads of Asia and Europe to serve as an important energy hub. It is located in between the hydrocarbon consumers and the producers. In line with its geo-strategic location Turkey has embarked on a transformation that will redefine itself as an intersection of energy transportation routes and an energy transit country. The most significant development that offers opportunities to all the parties in the Eastern Mediterranean region is the discovery of oil and natural gas in the shores of Israel. From the Leviathan well Israel is expected to extract 25 trillion cubic feet of natural gas as well as 600 million barrels of oil. Such an amount of hydrocarbon is a game changer in the region especially for a country like Turkey which has been trying to transform itself in to an energy hub. The possible effects of such a discovery have already manifested itself in the Turkish Israeli relations. The former allies whose relations had hit the rock bottom by continuous bilateral crisis seem to bent on mending their ties lately. On December 2013 Israeli Minister of Environment Amir Peretz visited Turkey to join the meeting of the Barcelona Convention for the Protection of the Mediterranean Sea. Even though this was a multilateral platform, it is still important

for an Israeli minister to visit Turkey especially after the Mavi Marmara flotilla incident. Moreover the Israeli airlines EL-AL which had stopped its operations in 2007 have recently announced that it will re-start its flights from Istanbul. An Israeli Turkish rapprochement based on energy cooperation will not be a surprise.

Current Regulatory Updates

The recent Petroleum Market Law and Turkish Petroleum Law intend to establish a competitive petroleum market and these laws have been regulated in accordance with this target. The market activities have been determined as mentioned above and license requirements for each market activity have been regulated. The New Petroleum Law which has been in force since 11.06.2013, provides incentives to the investors for oil exploration. License terms have been determined as 9 and 14 years depending on its location on land or on sea. Moreover, petroleum regions have been separated into land and sea. Within these legal amendments, it is expected to increase the number of investments in petroleum market.

RENEWABLE ENERGY

Solar

- Solar energy is the most important alternation clean energy resource in Turkey.

- There is solar potential of Turkey and the yearly average solar radiation is 1311 kWh/m2 and 3.6 kWh/m2. The total yearly insulation period is approximately 2460 hours per year and 7.2 hours per day.

- There is no space for manipulative small scale project developers in Turkish Solar Energy market. The market is convenient for financially strong investors or mi and large scale project developers which co-operate with end investors.

- The investors who are interested in Turkish market see the growing energy demand, regular increase in price of energy and willing customers who have been already paying this cost.

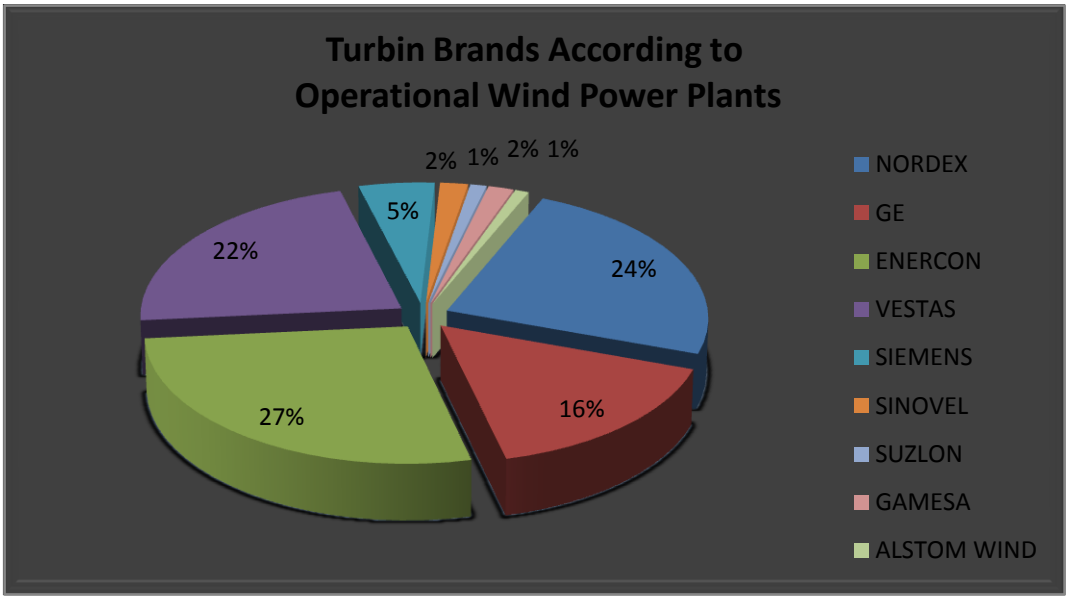
- Turkish government encourages investors to implement energy projects in Turkey with new incentives on renewable energies. This ensures that the government's feed-in tariff accelerate investment projects.

- Turkey is one of the top countries in the world to invest in solar power generation since there are five factors;

    - Stable and high energy demand increase
    - Feed-in tariff
    - Land availability
    - High solar energy potential
    - Public acceptance

Wind

- Wind power in Turkey is gradually expanding in capacity, mainly in the Aegean and Marmara regions.
- Turkey has 3 GW of installed capacity.
- The Turkish government has a target of a 20 times increase in wind capacity by 2020.
- Turkey to become a leader in wind energy since the country begins to involve itself in wind energy investments and it has also decided to produce inland wind turbines.



Data Source: TUREB

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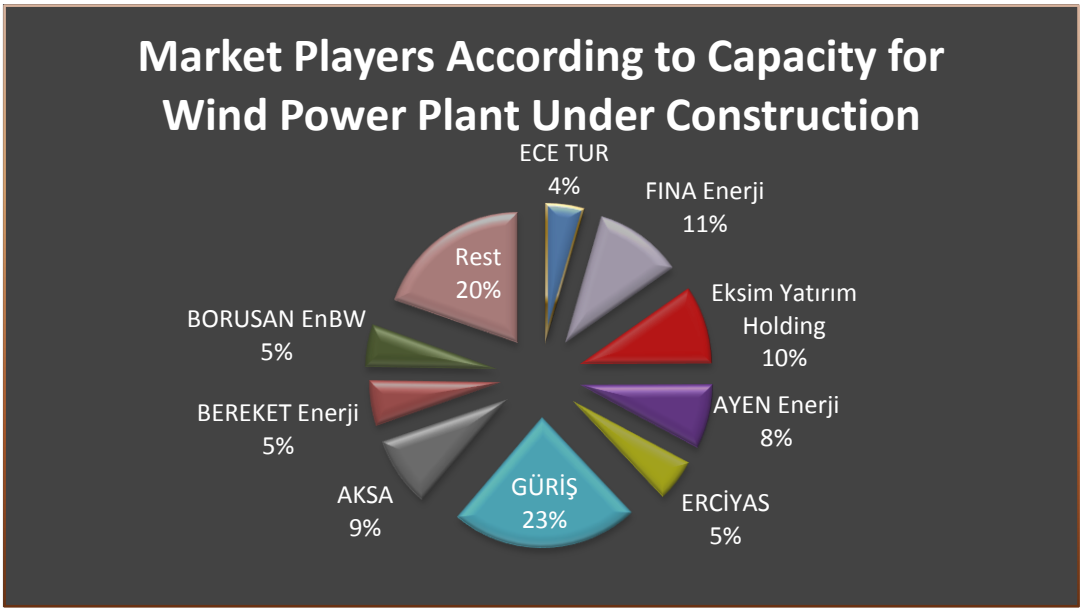

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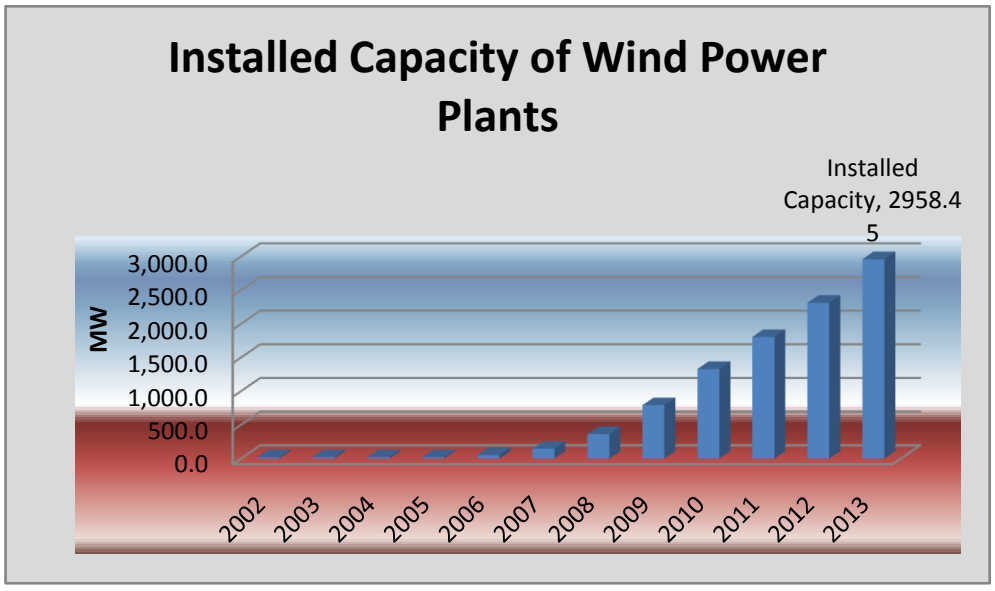

Data Source: TUREB

Hydro

- Turkey has energy demand and develops hydropower potential of the country.
- The most important rivers for hydropower development are Euphrates and Tigris, both of which are trans-boundary rivers originating in Turkey.
- Hydropower plants in Turkey are capital intensive, yet have lower operational costs than thermal options.
- Hydropower is the only renewable source that is capable of providing huge amounts of power in Turkey.
- Hydropower is competitive in terms of capital cost and perfectly superior to them in terms of fuel cost, which is zero in hydro plants.
- Investment and operating cost in Turkey are very low in comparison with many developed countries because of low construction and labor cost.

Biomass

- Biomass is the major source of energy in rural Turkey.
- Among the biomass energy sources, fuel wood seems to be the most interesting because its share of the total energy production of Turkey is high at 21%. The total biomass energy potential of Turkey is about 32 Mtoe. The amount of usable biomass potential of Turkey is approximately 17 Mtoe.
- Plants grown to be utilized in biomass field such as rapidly growing tree are called biomass raw material and biomass utilization also increases the profit margin obtained from agricultural fields.
- Biomass energy is one of the most significant renewable energy resources regarding its potential. Since geographical structure of our country along with its land suitable to biomass generation, our society living very close to abundant agricultural activities and the increased demand towards biomass energy mainly in rural regions carry energy to a prominent position.
- Biomass in Turkey is flourishing and has amazing opportunities for the development and commercial implementation of energy crops.
- Energy imports in Turkey are 75% of its energy needs and energy demand in the country is forecast to double by 2017.
- Biomass is expected to play a crucial role in Turkey because of biomass for heat and

- electricity as well as transport biofuels.
- Biomass is significant in term of its share of total energy consumption is high in Turkey.

Biofuel

- Biofuel is a fuel which involve in energy from geologically recent carbon fixation and these fuels are produced from living organisms such as carbon fixation.
- Turkey has huge capacity for biofuels industry which is expected to see rapid expansion over the next years.
- There are biofuels production and assist to alternative fuels in Turkey.
- Agricultural potential of Turkey for biofuels production and governmental policies about environmental friendly alternative fuels in Turkey.
- Turkey's biofuels industry is expected to see rapid expansion in production.
- Production and consumption of Biofuel will further grow once a new minimum biodiesel blending mandate is introduced in 2014 following last year's announcement by Turkey's Energy Market Regulatory Authority (EPDK) that at least 1% fatty acid methyl ester must be added to all diesel types from2014, rising to 2% in 2015 and then 3% in 2016

Geothermal

- Turkish geothermal market is set to grow rapidly as license holders develop projects.
- With up to 2 GW of power potential, Turkey is one of the hottest markets for geothermal and now is the time to take advantage of the huge opportunities.
- Turkey has incredible geothermal growth over the past decade and there is utilization for geothermal both for heating and power generation yet still has a large untapped potential.
- Turkey has geothermal resources and according to Turkey's Mineral Research and Exploration Agency (MTA) data, with its theoretical geothermal potential (31,500 MWt), Turkey ranks 7th in the world and 1st in the Europe.
- The development of Turkey's high-enthalpy geothermal resources suitable for power generation and its low enthalpy resources which could be developed for district heating and other direct uses, could assist the country to:
- Diversify its energy sources
- Ameliorate pollution

- Offset its need to import gas
- Improve its balance of payments
- Turkey has potential for 1,000-2,000 MW, but only 160 MW are currently installed needs a total investment of $6 billion to reach full utilization of potential resources and government plans to have 600 MW installed by end of 2023.

Current Regulatory Updates

The Regulations on Unlicensed Electricity Production and Renewable Energy which have been entered into force provide several amendments regarding renewable energy. The most essential amendment is that the unlicensed electricity production limit from renewable energy resources has been increased from 500 kW to 1 MW. Moreover, the feed-in tariffs and incentives for local equipment provided by the Regulation on Renewable Energy Resources Support Mechanism have been extended until 2020.

Nuclear Energy

The nuclear energy is not used yet as power generation resource in Turkey. However, the intergovernmental negotiations have been started in the seventies and these negotiations have not been finalized due to diverse reasons. The use of nuclear energy is again topical since 2007 within the new legislation and Turkey intends to produce a certain part of its electricity from nuclear energy until 2023. Diverse nuclear power plant projects have been planned and negotiated for that purpose.

Recent Developments and Opportunities

In the years of 2007 and 2008, the Nuclear Power Plant Law and the related Regulation have entered into force which set out the processes and principles of the nuclear power plants to be established and provide incentives to the investors. The main incentives are as follows:

Private sector companies are able to establish and operate nuclear power plants.

In the event that a nuclear power plant will be constructed on the land of the State or Treasury, the State may provide the right of use to this company free of charge.

Differently from the other energy sub-sectors, the regulatory authority in nuclear energy is the Turkish Atomic Energy Authority.

Nuclear Power Plant Projects

At present, establishment of two nuclear power plants in Akkuyu and Sinop is topical and the tender processes of the Akkuyu Nuclear Power Plant have been completed. The negotiations for the establishment of a nuclear power plant in Akkuyu have been started on 13.01.2010 and an international agreement with Russian Federation has entered into force on 21.07.2010. It is planned to be put into operation in 2023.

The negotiations with Japan for the Sinop Nuclear Power Plant Project continue.

Moreover, there are several incentives provided through the Agreement between Turkey and Russian Federation concerning the Akkuyu Nuclear Power Plant Project.

Energy Pricing in Turkey

Electricity Trading Mechanism in Turkey

- ***Day Ahead Market:*** This type of market enables to plan consumption and generation of the electricity from the day before.
- An authorized body called "Piyasa Mali Uzlaştırma Merkezi" organize the pricing of electricity for the purpose of market financial settlement.
- ***Balancing Market:*** Mainstream of balancing market is particularly settling electricity prices against to unpredictable technical issues on generation.
- There is no elasticity on electricity market.

New Stock Exchange: EPİAŞ

- EPİAŞ will be a new stock exchange for electricity market including intra-day and day ahead transactions.
- Shareholding structure of the EPİAŞ will be substantiated as 30% TEİAŞ, 30% of Borsa İstanbul and 40% of private sector investors.
- Determination of the reference prices will be key strategic issue for energy sector in Turkey.

- Currency risk is a pitfall for Turkish electricity market. For dealing with currency handicap in an emerging market further steps shall be taken below;

  - Transparency is one of the most crucial requisite in an energy market. Energy market players will be capable of reaching reliable information through EPİAŞ.
  - Intra-day transactions will boost the liquidity in electricity market with new stock exchange establishment.
  - Electricity market competition is forecasted to enhance by energy stock exchange in recent years as a consequence of foreign investors' appetite to Turkish energy market.

Investment Analysis of Energy Projects

Fundraising Opportunities in Energy Projects

- After energy policy revolution in 2010, remarkable deals have been substantiated in last four years.
- It is highly expected to increase in PE investments in energy industry for the purpose of benefiting from upward electricity demand.
- Mounting currency may trigger foreign investments in renewable energy market due to the feed-in tariff implementations of Turkish governments that USD $ is taken as a basis.
- Non-licensing electricity generation up to 1MW is attractive for on-shore wind farm investors. Policymakers is forecasted to amend upper limit from 1MW to 2.5 MW in recent future.
- " Turkey Sustainable Energy Financial Facility" (TurSEFF) is a loan provider up to EUR 5 million renewable energy projects that is resourced by EBRD.

Private Equity Deals in Energy in Turkey

Year	Acquirer Company	Country	Target Company	% Share	Deal Amount USD $
2013	Crescent Capital	Turkey	CB Elektrik	100%	Not Announced
2013	Crescent Capital	Turkey	Doğa Çevre Teknolojileri	80%	Not Announced
2013	Crescent Capital	Turkey	Kadirli HES	100%	Not Announced
2013	Crescent Capital	Turkey	Kuzeykaya HES	50%	Not Announced
2013	Crescent Capital	Turkey	Varto HES	100%	Not Announced
2013	Egeli&Co Girişim Sermayesi	Turkey	Enda Enerji	1,13%	0,9
2012	Goldman Sachs	Turkey	Aksa Enerji	13,30%	240
2012	Gözde Girişim Sermayesi	Turkey	Alartes Enerji	51,00%	0
2012	Aquila Capital	Turkey	Karasular Enerji	40,00%	53
2012	Kapital Yatırım Holding	Turkey	Ortadoğu Enerji	19,20%	26
2011	Verusa Girişim Sermayesi	Turkey	Ata Elektrik	68,00%	Not Announced
2010	Rhea	Turkey	Envitec	33,70%	1,7

Hydropower Plant Feasibility Study: A Black Sea Hydro Project In Turkey

PRROJECT HIGHLIGHTS	
Parameters	**Values**
Consruction time	3 years
Discount Rate (r)	9,50%
Energy Price $US/KWh	7,30
Installed Capacity	60 MW
Annual Energy Generation GWh	207,5
Annual Revenue (USD $)	15.147.500
Currency Rate (USD/TL)	2,19
Economic life of the project	50 years
Annual Inflation Rate	7,75%
Annual Growth Rate	3,50%

Hydopower Plant Classification Table	
Classification	**Power Output**
Large	>100 MW
Medium	10-100 MW(60MW)
Small	1-10MW
Mini	100KW-1MW
Micro	5-10KW
Pico	<5 KW

Cost Analysis for HEPP Project

Cost Accounts	Initial Project Cost (USD $ million)
Labor Works	28,1
Electrical&Mechanical Equipment	19,1
Land Expropriation	0,2
Power Transmission Line	0,4
Contingency	3,8
Supervision& Engineering	2,6
Total Estimated Project Cost (mn$)	54,2
Annual Operational & Maintainance Cost	1,45
Annual Renewal Cost	0,33
TOTAL COST (50 years duration)	**143,2**

Risk Analysis

- This project have already obtained necessary licenses for energy generation by Turkish government.
- EIA reports are granted through Ministry of Environment and Urban Planning
- Political stability is forecasted to remain until 2023. Turkish government constituted all energy policies in the scope of ten years period.

Risk Analysis of the Project				
Risk Factor	**Score 4**	**Score 3**	**Score 2**	**Score 1**
Environmental Issues	Project has detailed EIA report	Project has EIA report	Project has not an EIA report	Project site is located in ecological area
Grid Connection to Power System	Close	Near	Far	Limitations
Social Acceptance	Social Impact Report&Questionaire Completed	Survey has completed	No Survey or Social Impact Report	Local Community is benefiting from the riverside
Financial	Economic growth of the country is above 5%	Economic growth is between 2%-5%	Stable economy without growth	Low economic performance
Natural Hazards	Low Risk	Medium Risk	High Risk	Very High Risk
Regulatory Framework	Very High Politicial Stability	Stable Government	Political Risk with multi party regime	Government Reshuffle Risk
Land Use	Property of Treasury	Forest	Agricultural Land	Residential Area
Feed-in Tariffs	Between 15-10 dollar cent per kWh	Between 10-5 dollar per kWh	<5 dollar per kWh	No

A Brief Summary of Financial Results

- **IRR (Internal Rate of Return)** for this hydopower plant project calculated as **22,71%.**
- Annual revenue of this project is estimated in the light of government's feed-in tariffs and annual generated electricity amount. Approximately 15 million USD$ revenue is forecasted.
- Pay back period for this hydropower project is estimated as **7** years.

DCF Modelling for Hydropower Plant Project

TURKISH HYDROPOWER PROJECT STUDY

BLACK SEA REGION INVESTMENT ANALYSIS

INITIAL INVESTMENT	$54.200.000,00
DISCOUNT RATE	10%

	REVENUE	COST				DISCOUNTED CASH FLOW			
Year	Cash Inflow	Operational&Maintainance Cost	Renewal Cost	Cash Outflow	Net Cash Inflow/Outflow	Present Value of Cash flow	Cumulative Present Value of Cash Inflow	Present Value	Net Present Value
1	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$12.198.310,50	$12.198.310,50	-$42.001.689,50	-$39.324.192,15
2	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$11.140.009,59	$23.338.320,09	-$30.861.679,91	-$30.033.301,98
3	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$10.173.524,74	$33.511.844,83	-$20.688.155,17	-$21.548.470,77
4	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$9.290.890,17	$42.802.735,01	-$11.397.264,99	-$13.799.766,47
5	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$8.484.831,21	$51.287.566,22	-$2.912.433,78	-$6.723.324,19
6	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$7.748.704,30	$59.036.270,52	$4.836.270,52	-$260.819,82
7	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$7.076.442,28	$66.112.712,80	$11.912.712,80	$5.641.010,66
8	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$6.462.504,37	$72.575.217,17	$18.375.217,17	$11.030.810,18
9	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$5.901.830,47	$78.477.047,64	$24.277.047,64	$15.953.001,52
10	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$5.389.799,52	$83.866.847,16	$29.666.847,16	$20.448.153,43
11	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$4.922.191,34	$88.789.038,51	$34.589.038,51	$24.553.314,99
12	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$4.495.151,91	$93.284.190,42	$39.084.190,42	$28.302.320,98
13	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$4.105.161,56	$97.389.351,98	$43.189.351,98	$31.726.070,75
14	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$3.749.005,99	$101.138.357,97	$46.938.357,97	$34.852.782,86
15	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$3.423.749,77	$104.562.107,74	$50.362.107,74	$37.708.227,72
16	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$3.126.712,11	$107.688.819,85	$53.488.819,85	$40.315.939,91
17	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$2.855.444,85	$110.544.264,70	$56.344.264,70	$42.697.412,23
18	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$2.607.712,19	$113.151.976,90	$58.951.976,90	$44.872.272,80
19	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$2.381.472,32	$115.533.449,22	$61.333.449,22	$46.858.446,84
20	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$2.174.860,57	$117.708.309,79	$63.508.309,79	$48.672.304,41
21	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$1.986.174,04	$119.694.483,83	$65.494.483,83	$50.328.795,34
22	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$1.813.857,57	$121.508.341,40	$67.308.341,40	$51.841.572,44
23	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$1.656.490,93	$123.164.832,32	$68.964.832,32	$53.223.104,04
24	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$1.512.777,10	$124.677.609,43	$70.477.609,43	$54.484.776,74
25	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$1.381.531,60	$126.059.141,03	$71.859.141,03	$55.636.989,25
26	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$1.261.672,70	$127.320.813,73	$73.120.813,73	$56.689.238,11
27	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$1.152.212,51	$128.473.026,23	$74.273.026,23	$57.650.195,98
28	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$1.052.248,87	$129.525.275,10	$75.325.275,10	$58.527.783,07
29	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$960.957,87	$130.486.232,97	$76.286.232,97	$59.329.232,47
30	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$877.587,09	$131.363.820,06	$77.163.820,06	$60.061.149,74
31	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$801.449,40	$132.165.269,46	$77.965.269,46	$60.729.567,33
32	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$731.917,26	$132.897.186,72	$78.697.186,72	$61.339.994,35
33	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$668.417,59	$133.565.604,31	$79.365.604,31	$61.897.461,95
34	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$610.427,02	$134.176.031,34	$79.976.031,34	$62.406.564,78
35	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$557.467,60	$134.733.498,94	$80.533.498,94	$62.871.498,87
36	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$509.102,83	$135.242.601,77	$81.042.601,77	$63.296.096,22
37	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$464.934,09	$135.707.535,86	$81.507.535,86	$63.683.856,35
38	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$424.597,35	$136.132.133,21	$81.932.133,21	$64.037.975,20
39	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$387.760,13	$136.519.893,34	$82.319.893,34	$64.361.371,40
40	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$354.118,84	$136.874.012,18	$82.674.012,18	$64.656.710,40
41	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$323.396,20	$137.197.408,39	$82.997.408,39	$64.926.426,38
42	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$295.339,00	$137.492.747,39	$83.292.747,39	$65.172.742,34
43	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$269.715,98	$137.762.463,37	$83.562.463,37	$65.397.688,43
44	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$246.315,96	$138.008.779,33	$83.808.779,33	$65.603.118,64
45	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$224.946,09	$138.233.725,41	$84.033.725,41	$65.790.726,14
46	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$205.430,22	$138.439.155,63	$84.239.155,63	$65.962.057,20
47	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$187.607,50	$138.626.763,13	$84.426.763,13	$66.118.523,91
48	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$171.331,05	$138.798.094,18	$84.598.094,18	$66.261.415,89
49	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$156.466,71	$138.954.560,90	$84.754.560,90	$66.391.910,84
50	$15.147.500,00	$1.456.350,00	$334.000,00	$1.790.350,00	$13.357.150,00	$142.891,98	$139.097.452,88	$84.897.452,88	$66.511.084,32

Annual Electricity Generation GWh	208
Average Wholesale Price per KWh	$0,07
Annual Revenue	$15.147.500,00
Project IRR	22,71%

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