

ENERGY SECTOR

Energy Outlook

Turkey is one of the world's fastest growing energy markets. Annual electricity demand growth rate became 6.6% between 1995 and 2004 and is projected as 8.5% for the decade between 2005-2015 in line with the new supply and demand projection revised in February 2006. The electricity consumption, which peaked to 150 billion kWh in 2004, is envisaged to increase almost four-fold by 2020 reaching to 499 billion kWh. This requires installed capacity to increase about three fold – from about 38,500 MW in 2005 to 96,000 MW by 2020. These figures are well above the EU average and, combined with the low per capita consumption levels, are an indication of the vitality of the sector.

The Turkish energy sector, with its current size of \$30 billion and projected size of \$55 billion by 2015 as well as the fundamental restructuring process it has been going through since 2001, attracts both local and foreign investors. The sector needs an investment amount of approximately \$130 billion by 2020.

The Turkish government encourages foreign and Turkish private sector investors to implement the energy projects and is currently working on a new investment model for the construction of new generation plants to create the additional capacity needed.

Investment Needs of the Turkish Energy Sector 2005-2020	
Sector	Investment (\$ Million)
Coal Exploration & Extraction	5,109
Oil	16,000
Natural Resources	2,700
Water (DSI)	6,093
Generation (EUAS)	458
New Generation Facilities	91,276
Transmission	938
Distribution	6,000
Total	128,574

Source: Ministry of Energy and Natural Resources (MENR)

**TURKISH ENERGY MARKET:
GROWTH FOR INFRASTRUCTURE AND FINANCING**

Turkish Energy sector offers one of the top growth opportunities for an array of business segments within the next decade. The growth drivers are diverse.

- * The continuing steady growth of GDP, rapid growth of consumption per capita and demographic structure in Turkey will drive a double digit demand growth at a multiple of GDP.
- * The geographic disparity between the sources of primary energy and demand for oil and gas; is also driving growth for transportation of these commodities. Turkey's strategic location among multiple sources and consumers of primary energy, will continue to drive the pipeline investments, while presenting opportunities for shipping industry vertical and its adjacencies such as ports.
- * Continuing high input prices and dependency for imported gas have been creating a compelling case for increased renewable energy investments and entry into nuclear energy production.
- * Continuing deregulation including privatization of electric distribution will bring new investments in distribution and control technologies.

This represents an approximately \$100Bn business potential in the next decade for multiple industry verticals, and needless to say this would not happen without financing models.

Source: Kursat Ozkan , General Electric Turkey

Restructuring

Turkey has embarked on the liberalization of the energy sector in line with the EU directives. The turning point in energy markets occurred in 2001, when two laws were enacted to end the state's monopolies in power and natural gas. This was followed by a series of other laws on the electricity market licenses (2002), oil market (2003) and renewable energy (2005).

The massive restructuring through legal and institutional arrangements in the electricity, oil and natural gas sectors encourage new and competitive investments. Further, privatizations in electricity and natural gas distribution as well as power generation offers great potential for foreign companies due to lack of expertise and references on the part of Turkish companies. For instance, German EON Energie, Italian Enel and American AES are among companies which are closely following the tenders in electricity. The energy sector generates significant investment opportunities due to the following three factors:

1. The country's growing energy demand,
2. Its role as a transit country, and
3. Market liberalization.

1. Growing Energy Demand

Turkey's forward looking energy sector needs an investment amount of approximately \$130 billion by 2020. On the basis of demand series of 8.5%, which is in line with the State Planning Organisation's new long term development plan projections, a total of 51 thousand MW new capacity investments have to be added to the system. This is apart from the 7,385 MW projects under construction. SPO has recently stated that energy shortfall would emerge in 2008 and called on the responsible agencies to take measures immediately.

Driven by strong population growth, urbanization and economic expansion, the energy consumption more than tripled in the 1980s and 1990s, and recent surveys suggest that until 2020, the oil consumption is expected to increase two fold, and gas consumption four fold. A liberalization of the energy sector coupled with the energy demand foreseen to grow at an average over 8% annually through 2020 offer great opportunities for energy generation and equipment providers. In the planning work conducted, a total of 4,500 MW nuclear power plants need to be put into operation as of 2012.

ADDITIONAL CAPACITY REQUIREMENT IN ELECTRICITY, 2005-2020			
MW			
Source	2005-10	2011-15	2016-20
Lignite	0	4,520	5,520
Hard coal	0	0	1,200
Import coal	0	0	4,500
Natural gas	2,800	6,000	5,450
Hydro	542	6,811	7,782
Wind	500	625	625
Nuclear	0	4,500	0
<i>Total</i>	<i>3,842</i>	<i>22,456</i>	<i>25,077</i>

Source: The Ministry of Energy and Natural Resources, November 2004

2. Market liberalization and prospects

Opportunities in electricity and natural gas include:

- Bidding for electricity distribution assets
- Bidding for electricity generation assets
- Sales of electricity equipment,
- Development of the domestic natural gas network,
- International natural gas projects.

The current and potential energy and natural gas projects enable foreign companies using advanced technology to invest in Turkey, and many Turkish companies are keenly seeking foreign partners.

- **Domestic gas transmission:** Natural gas consumption was 22.8 bcm in 2004, and is expected to increase to 60 bcm by 2015. Turkey has had one of the fastest growing gas markets in the world in the past decade. Botas, the Turkish national pipeline company, will hold several tenders for the construction of natural gas

transmission lines to expand the transmission network to cover the whole country. At present, EMRA (the Electricity Market Regulatory Authority) continues to issue license tenders for natural gas distribution in major cities. After the planned lines and lines under construction are completed, over 60 cities will be connected to Botas's natural gas pipeline system.

As of November 2005, a total of 104 licenses and 638 construction and service certificates were issued, of which 1 is transmission, 1 is export, 9 are imports, 3 are storage, 16 are wholesales, 10 are Liquefied Natural Gas (LNG) transmission, 32 are Compressed Natural Gas (CNG) and 32 are distribution. A total of 33 natural gas distribution tenders were realized over the last three years and 20 more tenders would be launched in 2006.

- **Gas release:** Turkey operates take-or-pay contracts with Algeria, Iran, Nigeria and Russia. It is shortly to receive gas from Azerbaijan, and to export gas to Greece. The authorities would like to see these long-term contracts transferred from BOTAS to private traders, and the first tender for contract transfers was held in November 2005.
- **Upgrading of electricity distribution and power plants:** Transmission lines of over 40,000 km are under continuous upgrading and in need of automatic control systems while state-owned thermal and hydro power plants (of 8,000 MW), which are slated for privatization, also require upgrading. The long-term maintenance and rehabilitation plan for the thermal plants only cost \$508 million. The equipment and services market in upgrade activities is a lucrative one for foreign companies considering cooperating with Turkish companies in order to become more competitive in the market.
- **Privatization of electricity distribution:** The electricity distribution facilities will be among the most important privatization activities of Turkey in 2006. EMRA Chairman has said: "Many strong and important foreign companies from Italy, Spain, Austria, and also the U.S. and French financing institutions and consulting companies are holding negotiations with us."

The Turkish Electricity Distribution Company TEDAS, that has monopoly in the electricity distribution market, was slated for privatization in April 2004. The World Bank supported Electricity Sector Strategy Paper dated February 2004 foresees privatization of production facilities to be completed during July 2006 and 2011, while privatization of the distribution grid during 2005 and 2006. The plan calls for a maximum of 21 distribution regions to be privatized. The process has proceeded slowly and now a transition period to 2009 or 2010 is envisaged during which a national pricing regime will apply. The deadlines having slipped, privatization of 20 of the 21 distribution regions is now due to start in the first half of 2006, with that state generating plants also to start in 2006.

- **Power generation privatizations:** Starting in 2006, the authorities plan to sell approximately 16,000 MW of state-owned thermal and hydro capacity.

According to the Electricity Sector Strategy Paper, privatization of production facilities will begin from July 2006 to be completed in 2011. Considered as major privatization tenders involving thermal and hydro power plants, these plants will be grouped together which are close to each other and which have similar power capacities and divided into six 'Portfolio Groups. These auctions

are likely to attract international bidder interest. Among these Yenikoy and Kemerkey are known as the largest power plants in Turkey.

In addition, the government has recently opened small HEPP projects, which have not yet been completed, to the private sector and has started to receive applications for these.

Further, the use of lignite mines has been opened to the private sector based on a royalty system, in which a license holder agrees to pay a royalty to the state calculated on a per ton basis.

- Renewable Energy Opportunities** Turkey's total electric energy demand in 2004 was about 150,000 GWh and is expected to increase to 240,000 GWh in 2010 and 350,000 GWh in 2015 and the country has a major demand for small hydro power plants, wind power, solar energy, geothermal power generation and waste to energy type of technologies. It is expected that €1.2 billion will be invested in wind energy only. Turkey is encouraging the use of renewable energy to reduce the energy imports and carbon dioxide and other emissions. The hydropower potential of Turkey is about 128 billion kWh per year. About 35% of the hydropower potential is utilized and generating electricity. Hydropower plants with an installed capacity of 11 billion kWh/year are under construction. Many private companies are developing small and midsize hydropower projects.

RENEWABLE ENERGY POTENTIAL	
	MW
Wind economic potential	10,000
Hydro economically usable	35,000
Geothermal	35,000
Solar	35 Mtoe year
<i>Source:</i> The Ministry of Energy and Natural Resources	

- Nuclear:** Turkey will undertake three nuclear power plants, each rated at 1,500 MW and making up a total nuclear capacity of 4,500 MW, by the year 2020. During Turkish Atomic Energy Agency's insite studies at North Anna nuclear power plant during February 2006, the US Department of Energy urged for technologic cooperation with Turkey, stating that they wanted to cooperate with the Turkish Government in the area of nuclear energy with the latest technology, which is known as Generation 3.5.

3. The transit function of Turkey and international gas and oil projects

Turkey is supporting the realization of pipeline projects to transport the hydrocarbons to be produced in Caspian region in a cost-effective and environmentally conscious way to the world markets. In this regard, Turkey has been very active in international oil and gas pipeline projects, which are underway or almost completed. This will improve the security of supply in Turkey and maintain its role as an important "energy corridor" between East and West. Synchronization of Turkey's electricity networks with the European UCTE grid is planned for 2006.

The transit of foreign gas and oil across Turkey from suppliers in the Caspian / Central Asia and Middle East to the Southern and Central Europe is a major opportunity for the Turkish energy sector. The current and potential energy and natural gas projects enable foreign companies using advanced technology to invest in Turkey, and many Turkish companies are keenly seeking foreign partners.

Meanwhile the EU has been encouraging Turkey to provide a safe transit center for the EU's future energy requirements, and is strongly interested in establishing new supply networks over Turkey. The EU's gas import dependency, presently 41%, is envisaged to account for approximately two-thirds of its total gas demand by 2020. According to a EU study 70% of the incremental gas demand of Europe can be supplied via Turkey and the U.S. is interested in reducing dependence on Persian Gulf oil supplies and preventing supply disruptions. Turkey has the opportunity to become Europe's fourth-largest source of energy supply after Norway, Russia, and Afghanistan. Projects underway include:

Projects to construct gas and oil pipelines are at various stages.

- ✓ **The Caspian -Turkey -Europe (Shah Deniz)** natural gas pipeline project- This project is being developed as the first step in the South Caucasian Gas Pipeline Project. The Shah Deniz Project is aimed at transporting natural gas produced in Azerbaijan via Georgia to Turkey and further to other European markets by a pipeline system has vital importance. The missing link of this project between Baku in Azerbaijan and Erzurum in Eastern Turkey – 225 km long line- is under construction. The first phase of the Shah Deniz project, under which 6.6 bcm of gas will be supplied to Turkey, could be followed by a second phase involving a similar or larger additional quantity to be supplied from early in the next decade.
- ✓ **Baku-Tbilisi-Ceyhan (BTC)** crude oil pipeline, the backbone of the East-West Energy Corridor, aims at the transportation of crude oil produced in the Caspian Basin, mainly in Azerbaijan and Kazakhstan, by a pipeline to a marine terminal at the Mediterranean coast, Ceyhan and then to the world markets by tankers. The pipeline, which is expected to become operational by May 2006, will have an approximate length of 1760 km and will carry 1 million barrels of crude oil per day.
- ✓ **The Nabucco natural gas pipeline project from Turkey to the natural gas hub Baumgarten in Austria** – The MOU regarding the “Nabucco” natural gas pipeline project between Turkey, Bulgaria, Romania, Hungary and Austria to bring natural gas from Egypt, Syria and eventually from Iraq to the EU (October 2002); related grant agreement concluded in December 2003 and technical feasibility contract concluded in February 2004. The technical design of the pipeline and an environmental impact study are the next steps to be finalized in 2006. The total investment for the 3400 km pipeline will cost 4.4 billion Euro.
- ✓ **The Iraq-Turkey natural gas pipeline** project developed for the purpose of transporting 10 billion m³ natural gas per year from the gas fields to be developed in Iraq. ENI-Agip has been designated as coordinator for upstream activities and Gaz de France as coordinator for midstream activities. The project is delayed by the lack of security in Iraq

As a more recent development, Turkey has the opportunity to serve as a transit country for the oil exports of Iraq, which plans to raise its production capacity to 6 million bpd by 2010 (\$30-40 billion) and needs repair work on existing oil export installations (\$5 billion).

- ✓ **Samsun Ceyhan crude oil pipeline project** - Gazprom is interested in the transport of Russian gas to Lebanon and Israel via Turkey, offering Turkey the opportunity to become a partner in building a gas pipeline from the Black Sea port of Samsun to Ceyhan on the Mediterranean coast. ENI has offered a throughput guarantee. ENI and Çalik companies have announced a joint project to transport 50-70 million tons of oil annually through a pipeline of approximately 1,000 km long. Çalik Enerji Executive Board Chairman Erdal Çelik. Gazprom has also expressed interest in shipping gas through Turkey to an **LNG export terminal** on the Mediterranean or to markets in the Middle East, including Israel.
- ✓ Turkey has also signed a protocol for co-operation with **Egypt**. This foresees the transportation of 4 bcm/year of gas from Egypt to Turkey by a pipeline crossing the Mediterranean Sea.
- ✓ **Turkey-Greece Interconnector** - The delivery of natural gas from Turkey to Greece will start in 2006 with a volume of 0.25 bcm/year and increase gradually to 0.75 bcm/year. According to an agreement signed in October 2002, Botas, Depa of Greece and Edison Gas of Italy are cooperating to develop the **Greece-Italy natural gas interconnector**. The project contains a total 504 km on-shore and off-shore pipeline.