

COUNTRY ANALYSIS BRIEFS

Turkey

Last Updated: February 2011

Background

Turkey is becoming a major regional energy transit hub, with supplies from Russia, the Caspian Sea region and the Middle East transported via Turkey westward towards Europe.

Turkey is playing an increasingly important role in the transit of oil and gas supplies from Russia, the Caspian region, and the Middle East routed westward to Europe. Turkey has been a major transit point for seaborne traded oil and is becoming more important for pipeline-traded oil and natural gas, with significant volumes transported to westward to Europe. Growing volumes of Russian and Caspian oil are being sent by tanker via the [Bosporus Straits](#) to Western markets while a terminal on Turkey's Mediterranean coast at Ceyhan allows the country to export oil from northern Iraq and Azerbaijan.



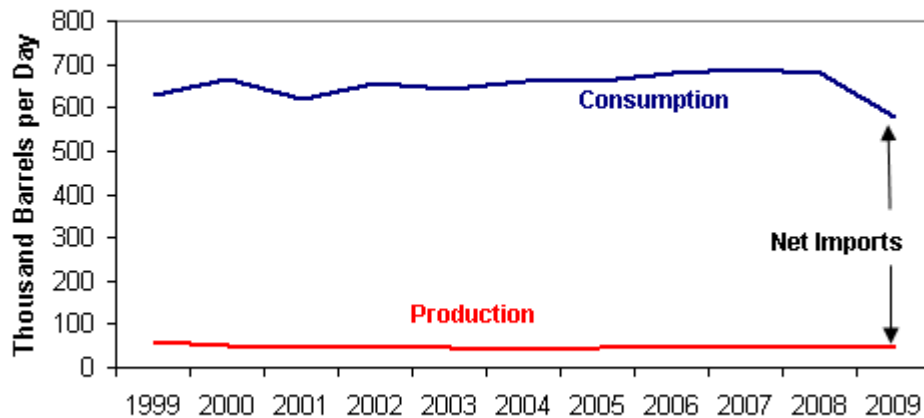
Oil

Although Turkey is not a major oil producer, its role as an increasingly important oil transit country makes it vital to world oil markets, particularly Europe.

As of January 1, 2011, the *Oil & Gas Journal* estimated Turkey's proved oil reserves at 270 million barrels, located mostly in the south-east region. Turkey's oil production peaked in 1991 at 85 thousand bbl/d, but then declined each year and bottoming out in 2006 at 44 thousand bbl/d. Turkey's oil production has seen a slight increase since then, reaching nearly 53 thousand bbl/d in 2009.

Turkey relies heavily on foreign sources of oil and imports nearly 90 percent of oil, with domestic supplies accounting for the remaining 10 percent.

Turkey's Oil Consumption and Production, 1999-2009



Source: U.S. Energy Information Administration

Exploration and Production

Most of Turkey's 270 million barrels of oil reserves are located in the Hakkari Basin (which is also where most of Turkey's oil production occurs), with additional deposits found in Thrace in the northwest. There also may be significant reserves under the Aegean Sea, however this has not been confirmed as a result of the ongoing territorial dispute with Greece. Turkish Petroleum Company (TPAO) has increased its exploration activities in the Black Sea, which according to the company could hold 10 billion barrels of oil. A number of foreign companies are involved in the exploration of the Black Sea in joint ventures with TPAO, including ExxonMobil and Chevron. ExxonMobil is planning to begin drilling its first exploration well in the Turkish sector of the Black Sea in the first half of 2011. Chevron, which has announced a substantial increase in its exploration budget for 2011, will serve as operator for any future wells that are drilled in Block 3921 (third from the right in the map below).

Exploration Efforts in the Black Sea



Source: TPAO

Consumption and Imports

Concurrent with its economic expansion, Turkey's oil consumption grew for most of the last decade, peaking at 690 thousand bbl/d in 2007, far exceeding the domestic supply. Since then Turkey's consumption has decreased somewhat as a result of the global (and Turkish) economic downturn. In 2009, Turkey's consumption totaled 580 thousand bbl/d, the lowest level since 1994.

In 2009, Turkey imported about 90 percent of its total consumption. The majority of Turkey's oil imports originate in Russia, which became the country's top supplier in 2007, surpassing Iran for the first time. Additional oil imports originated in Saudi Arabia, Libya, Iraq, and Syria.

Sector Organization

TPAO is the main exploration and production entity in Turkey, and directly competes with the

private sector in these activities. However, the state-owned firm has preferential rights and any foreign involvement in upstream activities is limited to joint ventures with TPAO. Overall, TPAO produced about 70 percent of the total oil output in Turkey in 2009.

Oil Transit

Turkey is playing an increasingly important role in the transit of oil supplies from Russia, the Caspian region, and the Middle East to Europe, with the Turkish government deriving significant revenues from the transit fees. Growing volumes of Russian and Caspian oil are being sent by tanker via the [Bosporus Straits](#) to Western markets. Approximately 2.9 million bbl/d flowed through Bosporus in 2009, 2.5 million bbl/d of which was crude oil. Oil shipments through the Turkish Straits decreased from over 3.4 million bbl/d at its peak in 2004 to 2.6 million bbl/d in 2006 as Russia shifted crude oil exports toward the Baltic ports. Traffic through the Straits has increased again as Azerbaijan and Kazakhstan crude production and exports rose.

Additionally, a terminal on Turkey's Mediterranean coast at Ceyhan allows the country to export oil from northern Iraq via a pipeline from Kirkuk and from Azerbaijan via the Baku-Tbilisi-Ceyhan pipeline. The Kirkuk-Ceyhan pipeline is Turkey's largest oil pipeline (by capacity), and serves as a transport pipeline of Iraqi oil. It is approximately 600 miles long and has a capacity of 1.65 million bbl/d. However, frequent attacks on the pipeline's Iraq section regularly result in operation disruptions.

The Baku-Tbilisi-Ceyhan Pipeline (BTC) is Turkey's longest pipeline, and runs approximately 1,100 miles is capable of carrying 1.2 million bbl/d of oil. The pipeline transports Azeri light crude via Georgia to Turkey's Mediterranean coast for further export. The pipeline initially came into service in June 2006.

Bypass Routes

To ease increasing oil traffic through the Bosporus Straits, a number of Bosporus bypass options are under consideration in Bulgaria, Romania, Ukraine, and Turkey itself. The Baku-Tbilisi-Ceyhan Pipeline, which bypasses the Bosporus Straits chokepoint, is the first of numerous planned or proposed Bosporus bypass pipelines to be constructed. In addition, Turkish government approved the construction plans for the proposed Samsun-Ceyhan pipeline that, according to some estimates would reduce the Bosporus Straits oil tanker traffic by up to 50 percent. The Samsun-Ceyhan bypass would transport oil from Turkey's Black Sea port of Samsun to Ceyhan on the Mediterranean coast. The project includes the construction of a 350-mile oil pipeline, a new terminal for receiving oil at Samsun and a terminal for exporting the oil and a storage plant at Ceyhan. The oil pipeline will have a maximum initial transportation capacity of 1 million bbl/d, which can eventually be increased to 1.5 million bbl/d.



Ports

The port of Ceyhan has become an important outlet for both Caspian oil exports as well as Iraqi oil shipments from Kirkuk. Turkey is seeking to build up Ceyhan as a regional energy hub, with private investors receiving approval to build several refineries at the oil terminal, adding revenue beyond transit fees.

Refinery Sector

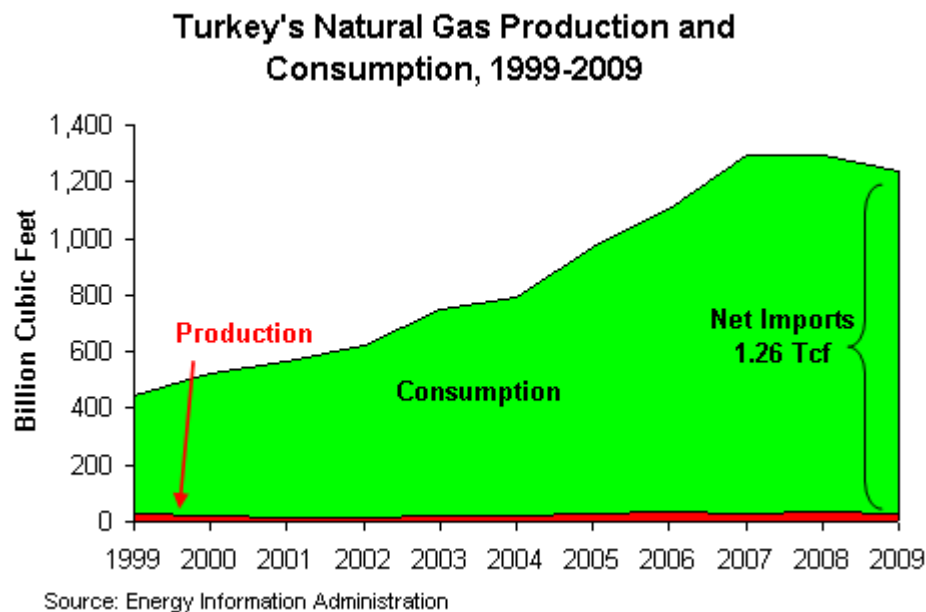
Turkey has six refineries with a combined processing capacity of 714,275 barrels per day. Turkish Petroleum Refineries Company (Tupras) is Turkey's dominant refining firm, operating about 85 percent of the total refining capacity. Turkey's refining sector is in the process of being privatized, with the formerly state-owned Tupras's majority of shares (51 percent) currently owned by a consortium of companies including Koc Holding, Avgaz, and Shell. The remaining 49 percent of shares are publicly traded.

Refineries in Turkey are also undergoing modernization, with the aim to improve Turkey's refined products that would meet EU environmental and fuel-quality standards. In addition, new refinery construction is planned for Ceyhan, which is the terminus of two existing pipelines (Kirkuk-Ceyhan and BTC), as well as the ongoing Samsun-Ceyhan project. There are at least three proposals for new refineries in Ceyhan. Additionally, the state-run Indian Oil Corporation recently expressed interest in participating in a project to build a new \$5-billion refinery near Ceyhan.

Natural Gas

Turkey holds a strategic role in natural gas—between the world's second largest natural gas market, continental Europe, and the substantial gas reserves of the Caspian Basin and the Middle East.

As of January 1, 2011, the *Oil & Gas Journal* estimates Turkish natural gas reserves at 218 billion cubic feet (Bcf). Turkey produced 25 Bcf of natural gas in 2009, relying almost exclusively on imports to meet domestic demand. Turkey's energy demand growth has been among the fastest in the world, although the recent economic downturn dampened some of the growth.



Exploration and Production

Turkey produces a very small amount of natural gas, with the total production amounting to 25 billion cubic feet (Bcf) in 2009. There are 14 gas fields in Turkey, the largest one of which is Marmara Kuzey, an offshore field in the Sea of Marmara in the Thrace-Gallipoli Basin. Gas production is mainly carried out by three companies: TPAO, BP, and Shell. Toreador, a U.S.-based producer commenced gas production in the Akcakoca gas field in the offshore Black Sea in 2007. The gas field, which was initially operated by Toreador in a consortium with TPAO, was brought onstream in April of that year, followed by the East Ayazli, Akkaya, and Ayazli fields. Additional phases of the Black Sea projects are expected to come online in the second half of 2011.

Consumption

Consumption has increased rapidly, hitting a peak of 1.3 trillion cubic feet (Tcf) in 2008 up from 442 Bcf in 1999. Natural gas is mainly used in power generation and space heating, and consumption growth is expected to remain strong as rising electricity consumption and new power plants will continue to spur demand.

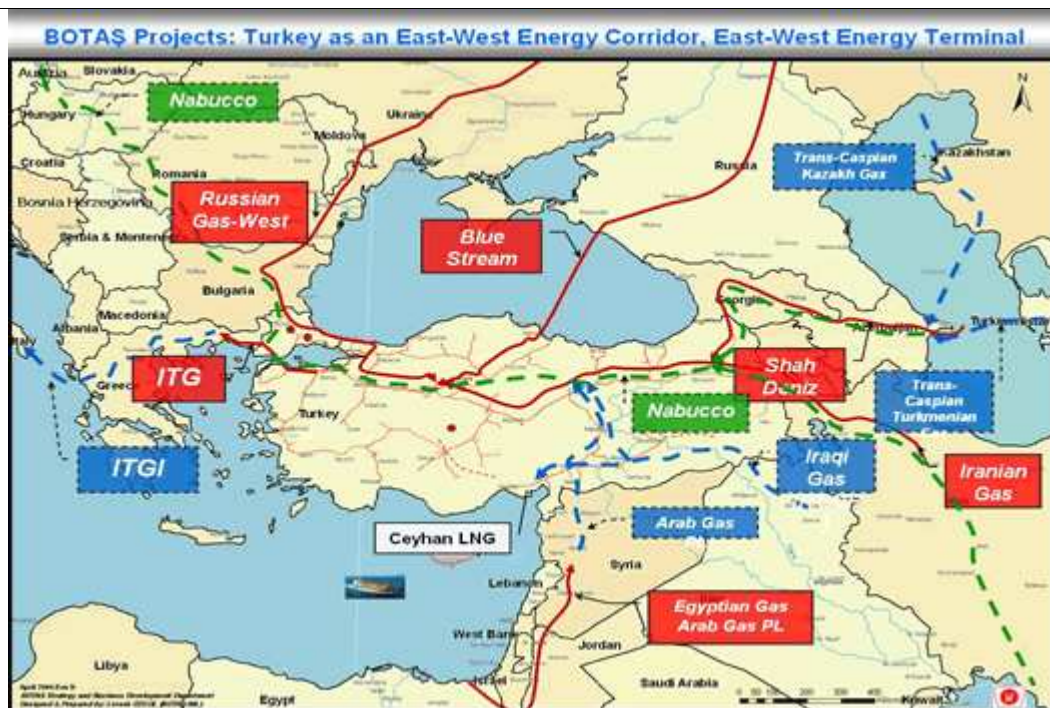
Most of Turkey's gas imports come from Russia, with Gazprom sending gas to north-west Turkey via the Balkans as well as to central Turkey via the Blue Stream pipeline that links Russia to Turkey across the Black Sea. Turkey also imports gas via pipeline from Iran and Azerbaijan, as well as liquefied natural gas (LNG) supplies under contract with Algeria and Nigeria. Turkey began receiving gas from Azerbaijan's Shah Deniz field in 2007 to help offset rising consumption. Rising demand combined with often erratic deliveries of gas from Iran in early 2007 and 2008 have periodically forced Turkey to request additional deliveries of gas from Russia to meet domestic demand requirements.

Sector Organization

The Turkish gas sector is regulated by the Energy Markets Regulatory Authority (EMRA). The sector is dominated by state-owned Petroleum Pipeline Corporation (BOTAS), although majority of the market is open to competition. BOTAS also builds and operates gas pipelines in Turkey. BOTAS had a monopoly over Turkey's natural gas market, however that effectively ended in 2007 with Shell becoming the distributor of some volume imported from Russia.

Natural Gas Pipelines and Imports

With the 2007 launch of Azerbaijani gas exports to Europe through the Turkey-Greece gas pipeline interconnector, Turkey has begun to realize its goal of becoming an energy bridge for gas supplies from the Caspian region to Europe.



For Turkey to function as a gas transit state, it must be able to import enough gas to satisfy both domestic demand and any re-export commitments as well as provide enough pipeline capacity to transport Caspian and Middle Eastern gas across Turkey to Europe. Turkey currently enjoys considerable excess import capacity. However, as Turkish demand increases, surplus capacity is expected to decline; it could disappear altogether within the next decade without additional investment.

Major Turkish Gas Pipelines			
Name	Capacity	Route	Notes
Baku-Tbilisi-Erzurum Pipeline (BTE)	1.05 Tcf	Azerbaijan-Georgia-Turkey	Connects Azerbaijan's offshore Shah Deniz gas field to Turkey via Georgia. Construction of the pipeline was completed in 2006 and began operating in 2007.
Blue Stream Pipeline	1.1 Tcf	Russia-Turkey via the Black Sea	Became operational in 2003. Volumes via the pipeline have been well below capacity because of a price dispute between Turkey and Russia, although supplies have been increasing. Russia and Turkey have discussed a potential "Blue Stream-2" pipeline that would extend the pipeline to Israel via the Mediterranean Sea.
Iran-Turkey Pipeline	49 Bcf	Iran-Turkey	The pipeline runs from the Iranian city of Tabriz to the Turkish capital of Ankara. Turkey took its first Iranian gas delivery in December 2001. Iranian supplies have been periodically disrupted either because of disputes between the two countries or without any explanation from Iran, particularly in winter when Iran's own demand increases. Several explosions on the line near the Turkey-Iran border have also disrupted supplies temporarily in the past.
Romania-Bulgaria-Turkey Pipeline	630 Bcf	Romania-Bulgaria-Turkey	Pipeline carries Russian gas into Istanbul and north-western Turkey. Pipeline length includes the common transit pipeline from the Bulgaria-Romania border to Greece and Macedonia and the loop transit pipeline to Turkey.
Bursa-Komotini	420 Bcf	Turkey-Greece	Pipeline launched in late 2007, allowing Turkey become an energy bridge to Europe. The Turkey-Greece interconnector is expected to be a vital part of the South Europe Gas Ring Project, which also envisions a subsea pipeline connecting Greece to Italy.

Source: IHS Global Insight

Turkey is positioned to play an even bigger role linking gas producers in the Caspian and Middle East to consumers in south-eastern and central Europe with the proposed Nabucco gas pipeline project. The Nabucco project is geopolitically significant to European security by diversifying supplies as it will secure access to new gas supplies from new sources in the Caspian region as well as the Middle East. For this reason it has been regarded as vital for the EU's long-term strategy to boost supply security. Nabucco pipeline is expected to run about 2,000 miles from Erzurum in Turkey to Baumgarten in Austria and carry more than 1 Tcf of natural gas. However, most recent trade press reports indicate that the start-up date of the pipeline has been delayed to 2017.

Additional pipeline projects have been proposed, including the Trans-Caspian Gas Pipeline (TCP). If completed, the TCP is expected to be nearly 1,500 miles long with a capacity of up to 1.05 Tcf. Repeated setbacks have effectively resulted in shelving of the project however the EU continues to advocate for the completion of the pipeline, which would connect to Nabucco.

Liquefied Natural Gas

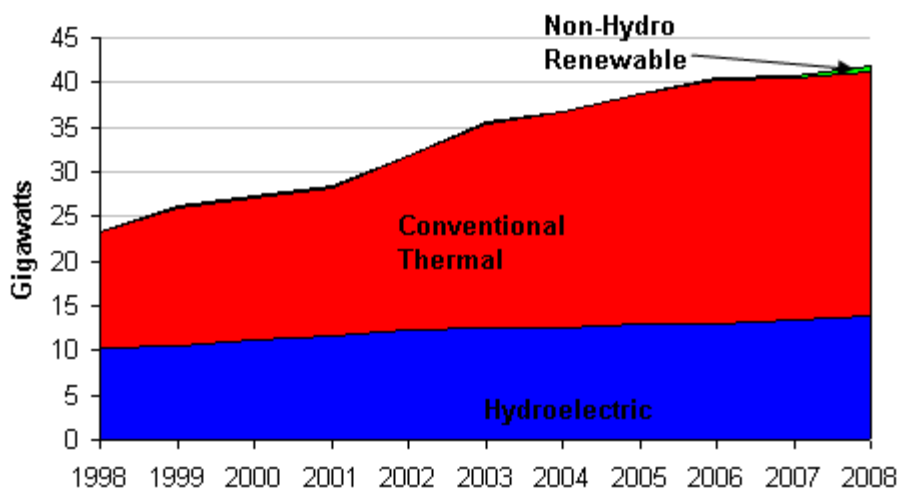
Turkey imports liquefied natural gas (LNG) from Algeria and Nigeria to its only import terminal at Marmara Ereğlisi, which is owned by BOTAS. LNG imports have continued to rise as Turkey seeks to diversify its sources of gas imports. The facility has been in operation since 1988 and can import 175 Bcf of LNG per year. BOTAS proposed three additional LNG projects, however no additional details have been provided.

Electricity

The majority of Turkey's electricity comes from conventional thermal sources.

In 2008, Turkey had total installed electricity generating capacity of 41.8 Gigawatts (GW), a 78 percent increase since 1998. The country produced 189 billion kilowatthours (Bkwh) of electricity in 2008, while consuming 161 Bkwh. Conventional thermal sources comprise the largest share of Turkey's electricity supply, contributing 81 percent in 2008. Hydroelectricity generation makes up almost all of the remainder. Although Turkey does not currently produce any nuclear energy, the government has been advocating construction of nuclear power plants in an effort to diversify Turkey's electricity supply portfolio.

Turkey's Electricity Installed Capacity by Source, 1998-2008



Source: Energy Information Administration

Sector Organization

In March 2001, the Turkish government enacted a new Electricity Market Law, which set the stage for liberalization of power generation and distribution activities. Under the law, the state-owned Turkish Electricity Generation and Transmission Corporation (TEAS) was split into separate generation, transmission, distribution, and trade companies, with a goal of eventual privatization of the generation and trade companies. Recent news indicate that the full privatization of Turkey's electricity generation sector is expected to be completed in 2014, with four large thermal power plants operated by the state-owned EUAS to be the first assets sold. This announcement followed a December 2010 finalization of the sale of the last remaining state-owned power distribution networks, in which Turkey raised more than \$5 billion. These privatization efforts would boost private investment in the sector, making it possible to increase generation capacity and meet the rising electricity demand.

Conventional Thermal

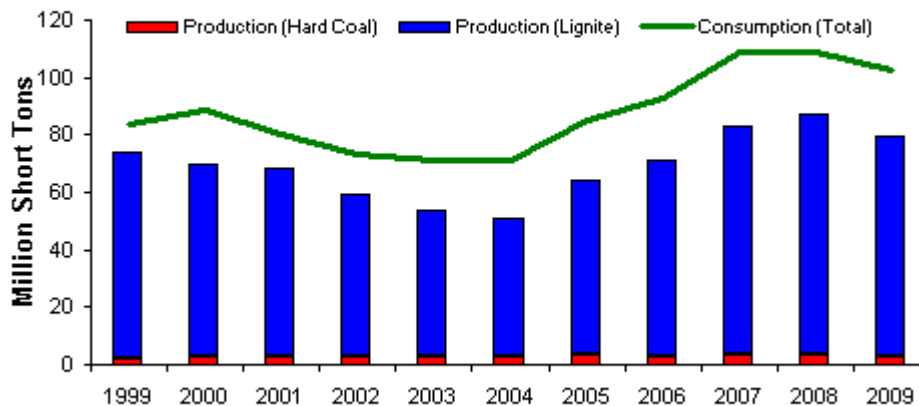
Conventional thermal sources have historically been Turkey's largest power source. Natural gas-fired power plants have increased substantially in the last decade and now comprise more than half of the country's conventional thermal generation. There are plans to build additional gas-fired generators, with three of them in various stages of construction.

Coal

Coal-fired power stations also remain an important energy source for Turkey, and there is renewed interest in exploiting Turkey's domestic coal resources.

In 2008, Turkey had total recoverable coal reserves of 2.6 billion short tons, of which only 583 million short tons (MMst), or about 23 percent, was "hard coal" (anthracite and bituminous). The remainder, around 2,000 MMst, consists of lignite coal reserves. In 2009, Turkey produced 79.8 MMst of total coal and consumed about 102.5 MMst of total primary coal in 2009, showing net imports of approximately 22 MMst.

Turkey's Coal Consumption and Production, 1999-2009



Source: Energy Information Administration

Lignite is Turkey's most important domestic energy resource, with reserves estimated at 2,583 million short tons. Around 40 percent of Turkey's lignite is located in the Afsin-Elbistan basin of southeastern Anatolia, while hard coal is mined only in one location, the Zonguldak basin of northwestern Turkey.



Source: EUROCOAL, European Association for Coal and Lignite

Hydroelectric

Turkey has significant hydroelectric power resources, with more than 100 total plants and total installed hydroelectric generating capacity of nearly 14 GW. Turkey is also developing additional hydropower plants as part of the \$32-billion Southeastern Anatolia Project (GAP) along the basin of the Tigris and Euphrates Rivers. Current plans include the construction of 28 hydropower units with a combined generating capacity of 6.2 GW.

Nuclear

In February 2011, Turkey's Energy Ministry announced a new target for construction and expansion of nuclear power, looking to facilitate construction of at least 20 nuclear reactors across the country by 2030 in an effort to reduce Turkey's heavy dependence on oil and natural gas imports. Turkey currently does not have any nuclear power plants but is in planning phases of three plans that are expected to be completed over the next 10 years. The Black Sea port of Sinop will be the site of the country's first nuclear power plant. The plant is expected to have a generating capacity of up to 4,000 MW.

Profile

Energy Overview

Proven Oil Reserves (January 1, 2011)	270.3 million barrels
Oil Production (2009)	52,980 barrels per day.
Oil Consumption (2009)	579,480 barrels per day
Proven Natural Gas Reserves (January 1, 2011)	218 billion cubic feet
Natural Gas Production (2009)	25 billion cubic feet
Natural Gas Consumption (2009)	1.2 trillion cubic feet
Recoverable Coal Reserves (2008)	2,583 million short tons
Coal Production (2009)	79.8 million short tons
Coal Consumption (2009)	102.5 million short tons
Electricity Installed Capacity (2008)	41.8 gigawatts
Electricity Production (2008)	188.8 billion kilowatthours
Electricity Consumption (2008)	161.0 billion kilowatthours
Total Energy Consumption (2008)	4.3 Quadrillion Btus*, of which Oil (32%), Natural Gas (31%), Coal (29%), Hydroelectricity (8%), Nuclear (0%), Other Renewables (0.6%)
Total Per Capita Energy Consumption (2008)	56.8 million Btus
Energy Intensity (2008)	6,301 Btu per \$2000-PPP**

Oil and Gas Industry

Organization	Turkey's oil sector is mostly open to foreign company involvement, although both upstream and downstream activities are mostly dominated by state-owned companies.
Major Oil/Gas Ports	Ceyhan, Iskenderum, Istanbul, Izmir, Mersin
Foreign Company Involvement	BP, Chevron, ConocoPhillips, Eni, ExxonMobil, OMV, Royal Dutch Shell, Total
Major Oil Fields	Bati Raman, Karakas, K. Karakas, Raman
Major Natural Gas Fields	Marmara Kuzey
Major Refineries (capacity, bbl/d)	Izmit (251,600), Izmir-Aliaga- (226,440), Kirikkale (113,220), ATAS (Mersin) (95,000), Batman (22,000)

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power.

**GDP figures from Global Insight estimates based on purchasing power parity (PPP) exchange rates.

Links

EIA Links

[EIA – Turkey Country Energy Profile](#)

U.S. Government

[CIA World Factbook - Turkey](#)

[U.S. State Department's Consular Information Sheet - Turkey](#)

[U.S. Embassy in Turkey](#)

[Central Asia-Caucasus Institute: "The Baku-Tbilisi-Ceyhan Pipeline: Oil Window to the West"](#)

[Turkey and the IMF](#)

[World Bank: Turkey](#)

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[Turkish Petroleum Refineries Corporation \(Tupras\)](#)

Sources

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