

33 Turkey



33.1 Summary of Coal Industry

33.1.1 ROLE OF COAL IN TURKEY

Coal accounts for just over half of Turkey's total primary energy production from domestic resources, but it is not clear what role coal will play in Turkey's future energy makeup. Coal production and consumption has risen dramatically over the past few years, but so has the country's natural gas use as Turkey is emerging as a major energy transport hub connecting central Asia and Europe (EIA, 2009). The amount of natural gas in Turkey's total energy consumption increased to 32 percent from 6 percent between 1990 and 2010. This consumption is reflected in the share of electricity generated from gas between 1990 and 2010, which rose to 49 percent from 18 percent over the time period (MEU, 2013).

In 2010, coal represented about 53 percent of Turkey's primary energy production from domestic resources, with low-quality lignite comprising 48 percent and hard coal 5 percent. The role of domestic coal is projected to increase in Turkey's primary energy supply, but due to increasing total energy consumption, dependency on foreign energy imports has increased to 70 percent in 2010 from 52 percent in 1990 (MEU, 2013). As of 2012, Turkey produced 69.51 million tonnes (Mmt) of coal and imported 31.77 Mmt of mostly hard coal for thermal power plants, steel production, and domestic heating, mainly from Russia, Colombia, the United States, and South Africa (EURACOAL, 2014; EIA, 2014).

Table 33-1 summarizes Turkey's proved coal reserves and production.

Table 33-1. Turkey's Coal Reserves and Production

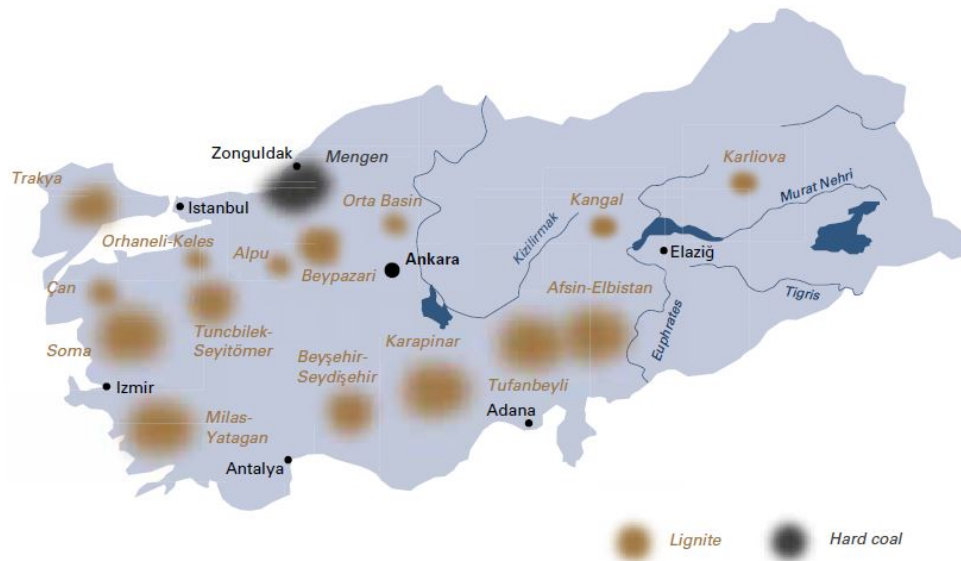
Indicator	Anthracite & Bituminous (million tonnes)	Sub-bituminous & Lignite (million tonnes)	Total (million tonnes)	Global Rank (# and %)
Estimated Proved Coal Reserves (2011)	322	8,380	8,702	(13, 0.98%)
Annual Coal Production (2012)	3.56	65.95	69.51	(12, 0.88%)

Source: EIA (2013)

Figure 33-1 shows locations of coalfields in Turkey. Lignite deposits are widespread throughout the country. BP's Statistical review of World Energy (2013) provides a somewhat lower estimate coal reserves with estimated lignite, hard coal and total coal resources of 1,645, 479.9, and 2,125.53 Mmt, respectively. In-country estimates completed by the Turkish Ministry of Energy and Natural Resources (MENR) increased total lignite reserves from 8.3 to 14.1 billion tonnes based on exploratory work completed by the Mineral Research and Exploration (MTA) in 2014.

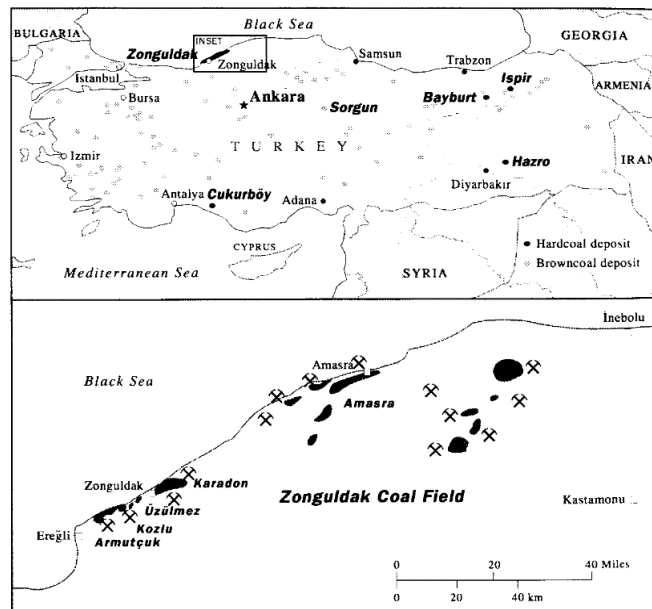
Most of Turkey’s reserves are considered by MENR as economically mineable, though about half of the reserves have a low heating value that ranges between 1,000 and 1,500 kcal/kg. Approximately 46 percent of Turkey’s lignite is in the Afsin-Elbistan Basin (MENR, 2014). Turkey’s hard coal deposits are mostly located in the western part of the country, in the Zonguldak Basin (see Figure 33-2). MENR estimated hard coal resources in the basin at 1,316 billion tonnes; of which, 514 Mmt are considered reserves.

Figure 33-1. Turkey’s Coal Fields



Source: EURACOAL (2014)

Figure 33-2. Turkey’s Zonguldak Coal Basin



Source: Schwochow (1997)

33.1.2 STAKEHOLDERS

The government-run companies, Turkish Coal Enterprise and Turkish Hard Coal Enterprise, are the main coal companies. Table 33-2 lists all potential stakeholders in Turkey's coal mine methane (CMM) industry.

Table 33-2. Key Stakeholders in Turkey's CMM Industry

Stakeholder Category	Stakeholder	Role
Mining Companies	<ul style="list-style-type: none"> ▪ Turkish Hard Coal Enterprise, TTK (Türk Taşkömürü işletmeleri) ▪ Turkish Coal Enterprise (TKI) ▪ HEMA Enerji 	Project host
Government Groups	<ul style="list-style-type: none"> ▪ Ministry of Energy and Natural Resources ▪ Organization of Aegean Lignite ▪ Turkey Hard Coal Authority ▪ Representation of Turkish Coal Enterprises 	Preparation and implementation of mining and energy policies, plans and programs
Developers, Engineering, Consultancy, and Related Services	<ul style="list-style-type: none"> ▪ See http://www.epa.gov/coalbed/networkcontacts.html 	Technical assistance, project opportunity identification and planning

33.1.3 STATUS OF COAL AND THE COAL MINING INDUSTRY

The Turkish government has complete ownership over the country's coal resources and these rights are administered by two government-owned corporations, Turkish Coal Enterprises (TKI) and Turkish Hard Coal Enterprises (TTK). In recent years, TKI and TTK have leased out coal reserves to private companies and several private mines are in operation. TKI was established in 1957 to operate the coal mines of Turkey and it is the major brown coal producer in the country, operating 30 opencast and nine deep mines, which produced a total of 33 Mmt of low quality lignite in 2009. In addition to TKI, Elektrik Üretim A.Ş. (EÜAŞ) and the private sector produced 36 and 7 Mmt, respectively (EURACOAL, 2010). TTK was established in 1983 to operate hard coal mines in the Zonguldak basin and is operating five deep mines that produced approximately 2.8 Mmt in 2010 (EURACOAL, 2010). This enterprise carries out the exploration, production, and marketing of domestic hard coal (TTK, 2010; EURACOAL, 2010). The private sector accounts for only about 8 percent of coal production, but about 35 percent of coal production reported by the state enterprises is mined by private companies under subcontract (EURACOAL, 2010).

Turkey has both active surface and underground mines. However, about 90 percent of the country's lignite production comes from surface mines (MBendi, 2010). More specific details about mines, reserves, and location of Turkey's coal can be found on an interactive Google Map developed by the MENR (MENR, 2010).

33.2 Overview of CMM Emissions and Development Potential

The Global Methane Initiative (GMI) International CMM Projects Database currently identifies one project currently underway for the optimization of degasification systems to reduce methane emissions from Turkish coal mines (GMI, 2014). U.S. EPA's Coalbed Methane Outreach Program

(CMOP) has funded two pre-feasibility studies for CMM development in the Zonguldak region, awarded Virginia Tech a grant to study CMM and CBM potential in the country, and is currently working on a project at the HEMA Energi Mine in Amasra, Turkey, that is focused on mine pre-drainage and CMM utilization.

33.2.1 CMM EMISSIONS FROM OPERATING MINES

CMM emissions from operating mines in Turkey are shown in Table 33-3.

Table 33-3. Turkey's CMM Emissions (million cubic meters)

Emissions	2000*	2005*	2010**	2015 (projected) [†]
Underground Mines	41.24	37.40	41.99	
Post-Underground Mines	NA	NA	6.00	
Surface Mines	71.96	66.40	80.85	
Post-Surface Mines	NA	NA	6.74	
Total emitted (= total liberated – recovered & used)	113.20	103.80	135.58	127.68

Sources: *UNFCCC (2010 [converted from Gg and rounded to the hundredths]); **UNFCCC (2013); [†]USEPA (2012)

33.2.2 CMM EMISSIONS FROM ABANDONED MINES

No information was found on CMM emissions from abandoned mines in Turkey.

33.2.3 CBM FROM VIRGIN COAL SEAMS

Coal bed methane (CBM) from the Zonguldak hard coal region could play a very significant role in Turkey's energy economy. The CBM in-place resources in two districts of the Zonguldak hard coal region are presently estimated to be at least 3 trillion cubic meters (Mustafa and Balat, 2004). In 2012, the U.S. Trade and Development Agency funded a CBM feasibility study in support of HEMA's CBM program in the Zonguldak coal region. HEMA has drilled a series of wells throughout their license area and intends to initiate full-scale development in late 2014.

33.3 Opportunities and Challenges to Greater CMM Recovery and Use

As indicated in Table 33-4, Turkey has acceded to the UNFCCC.

Table 33-4. Turkey's Climate Change Mitigation Commitment

Agreement	Signature	Ratification
UNFCCC	---	February 24, 2004 (Accession)
Kyoto Protocol	---	---

Source: UNFCCC (2014)

33.3.1 MARKET AND INFRASTRUCTURE FACTORS

In May 2001, Turkey enacted a new Natural Gas Law. Prior to this law, most of the natural gas market and infrastructure was dominated by the Petroleum Pipeline Corporation (a.k.a., BOTAS, a state-owned company). The new gas law requires that the natural gas transmission, storage, and distribution networks be open to competition and monopolistic elements be unbundled. BOTAS still owns the majority of the transmission infrastructure and most of the market, but distribution, storage, and import is open to competition. BOTAS has begun transferring ownership of its import contracts to private entities to comply with its mandated 20 percent of total market share. Revisions to the Natural Gas Law are being debated to improve the privatization effort and to further reduce dominance of BOTAS (MONDAQ, 2010).

Although Turkey has moved toward liberalizing its coal industry and no rules ban private sector involvement, no foreign companies have made investments (Kayıkçı, 2010). Seeking to increase its domestic electricity generation, Turkey is looking to expand its domestic lignite production instead of relying on external natural gas resources. With potential for thermal power generation, Turkey has opened up six of its lignite fields to the private sector under a royalty model (MBendi, 2010).

Turkey has several international natural gas lines that bring the resource into the country, which may make Turkey a major player in energy transit (EIA, 2009).

33.3.2 REGULATORY INFORMATION

The Ministry of Energy and Natural Resources is the main body of the Turkish mining and energy sector, responsible for the preparation and implementation of mining and energy policies, plans and programs, in coordination with its dependent and related institutions, and other public and private entities. The Ministry's duties related to the mining sector mainly include organizing and controlling the mining license for production of in-country natural resources, in order to contribute to the economy.

There have been several updates to laws regulating mining in recent years. They have, however, been struck down in court, and licenses and permits are still regulated from one law dating back to 1985 and two others from 2005. Three licenses relating to mining exist: a prospecting license, an operation license, and an operation permit (Kayıkçı, 2010).

33.4 Profiles of Individual Mines

No information profiling individual Turkish coal mines was found. Updates on future CMM projects in Turkey can be found at <https://www.globalmethane.org/partners/turkey.aspx>

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