

### DOCUMENT 3: SPECIFIC STRATEGY FOR TURKEY and FOR TURKISH COAL ENTERPRISES (TKI)"

#### Background:

Turkey officially joined to GMI on 30 September 2010. It is participating in this initiative with the Coal Mines, Landfills, Oil and Gas Subcommittees.

Turkey has signed the Global Methane Initiative (GMI) Terms of Reference and is committed to be an active Partner in the Coal Subcommittee. Turkey is interested in developing clean energy opportunities for use of methane captured from its large coal reserves.

Much of Turkey's coal is low-quality lignite, which totals approximately 11,6 billion tonnes. However, Turkey has 1,3 billion tonnes of hard coal reserves as well, which belongs to Turkish Hardcoal Enterprises (TTK).

Turkish lignite reserves are apportioned between different entities as such:

- Turkish Coal Enterprises (TKI): 2.5 billion tonnes;
- Electricity Generation Company (EUAS): 4.8 billion tonnes;
- Private Sector: 1.7 billion tonnes;
- General Directorate of Mineral Research Exploration (MTA): 2.6 billion tonnes.

Coal represents about 20.8 percent of Turkey's total power generation, with lignite comprising 66 percent of that amount, or 13 percent of the total power generation (EURACOAL, 2007).

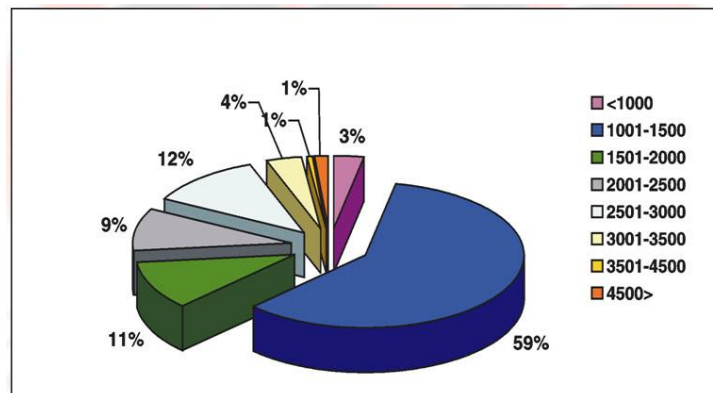


Figure 1: Average Calorific Values of Turkish Lignites

#### Methane issues in TKI's underground operations:

In 2008, at Soma Region of Turkish Coal Enterprises, high methane emissions were observed during underground mining operations. Subsequently in 2008 and 2009, methane concentrations were measured regularly in various parts of the mine, and methane concentrations in the range of 5 to 10% in gobs and 0.10 to 0.21% in ventilation air were found. Even after stopping all mining operations in an effectively ventilated longwall, methane concentrations were still in excess of 1%, and in some cases they were even higher than 4%.

Turkey's commitment to GMI and to Coal Subcommittee activities stems from its two main interests: a) Mine safety professionals in Turkey have pointed out that the excessive levels of methane in mines and inadequate methane control practices resulting from violations of ventilation requirements were the key factors in some of the recent mine explosions. Therefore, controlling mine methane is critical to prevent these accidents; b) In addition to being safety hazard coal mine methane is also a greenhouse gas that contributes to global warming. However, on the positive side, it has the potential of being used as an energy source, if captured and utilized properly. For these two reasons, to prevent mine explosions and to gain benefits from methane as a fuel in the Soma Region and in other places with high methane contents in the coal seams, Turkish Coal Enterprises (TKI), which is Turkey's leader institution and market player, established a research team to bring coal mine methane (CMM) drainage systems and gas power plants to Turkey.

According to the report of this team, a project is being implemented with a group of consultants to determine CMM capacity and to prepare a CMM utilization Project for Soma Region of TKI.

This document has been prepared as a draft TKI (Turkish Coal Enterprises)-specific strategy overview for TKI and for Turkey.

**Table 1: Summary Template for Presenting TKI-Specific Strategies in the CMM Sector**

<b>"TURKISH COAL ENTERPRISES"</b>	
<b>Step</b>	<b>Short Description</b>
<b>Step 1) Reference broader national-level initiatives</b>	<p><i>Turkish Coal Enterprises' Methane Outreach Program for Coal (MOPC):</i></p> <ul style="list-style-type: none"> <li>- Promotes the recovery and use of coal mine methane (CMM) by working cooperatively with coal companies and related industries in Turkey and abroad.</li> <li>- CMOP possesses the resources, experience, and knowledge to implement the recommended activities listed in this TKI-specific strategy.</li> </ul> <p><i>Turkish Coal Enterprises' Climate Exchange:</i></p> <ul style="list-style-type: none"> <li>- Turkey has acceded to the UNFCCC in February 24, 2004.</li> <li>- The Turkish coals that have much higher carbon dioxide emission on a calorific-unit-value basis were compared to other energy sources. Important steps for achieving very low or zero emission coal burning were taken with research and development in the last few years at reasonable costs through the TKI-ITU (Istanbul Technical University) Joint Project on "producing gas and liquid fuel from coal". This project was signed with ITU in October of 2007 to generate clean coal with high calories, low sulfur and oxides, NOx, CO2 and dust emission from lignite of our country. Furthermore technological research is being pursued to generate gas and liquid fuel from coal. In the pilot facility with a 250 kg/hour capacity, which will be established at Tuncbilek, the lignite will be gasified, and necessary research activities will be conducted for generating synthesis gas, IGCC, liquid fuel and various chemicals (TKI Strategic Plan-December 2009).</li> <li>- Circulars issued by the Ministry of Environment and Forestry with regards to the protection of air quality are taken seriously and are being considered very important by the Institution. According to these circulars, air quality measurements of each province are monitored by the Ministry of Environment and Forestry, and the properties of coal to be used in these provinces is determined accordingly. By taking into consideration the critical levels of pollutants set for different provinces, the parameters of domestic coal to be used in heating as well as the rules to be abided by are established.</li> <li>- Regarding to the critical limits to be set for each province, the following parameters were included in the calculation of critical limit values; Mean temperatures of the provinces, heating coefficient, meteorological conditions, settlement area, socio-economic conditions, population, gross national product, pollution mode. The numbers of geographical centers where limit values are likely exceeded is 102 (Province – District), and population in these area is approximately 25.6 million. Ratio of this figure to total population is 36%. The number of centers that is not exceeding the limit values is 256, and their population is 28,6 million. The ratio of the aforementioned is 41% compared to the total population.</li> </ul>

**Step 2) Authors and process**

- Mr. Ömer SEZGİN, GMI Official Delegate List of Turkey, Administrative Liaison, Deputy General Director of TKI.
- Ms. Şahika YÜREK, GMI Official Delegate List of Turkey, Administrative Liaison, Head of Planning and Project Section of TKI.
- Dr. C. Özgen KARACAN, GMI Official Delegate List of Turkey, Coal Subcommittee, Assoc. Prof of PNGE and Senior Engineer at NIOSH-OMSHR.
- Mr. Ali SAĞIR, GMI Official Delegate List of Turkey, Coal Subcommittee, Head of Underground Operation Section of TKI.
- Mr. Metin AKTAN, Mining Engineer at Underground Operation Section of TKI.

Process for developing TKI-specific strategy

Turkish Coal Enterprises will develop their TKI-specific strategy based on the consensus of the core authors listed above.

Organizations that could be solicited for feedback include: Ministry of Energy and Natural Resources, Turkish Hard Coal Enterprises (TTK), GMI, local offices of mine safety and environmental protection, and environmental nonprofit organizations.

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

**Figure 2:** Key Stakeholders in Turkey’s CMM Industry (GMI, CMM Country Profiles, page 266)

Step 3) Summarize TKI's coal sector in relation to CMM/CBM projects

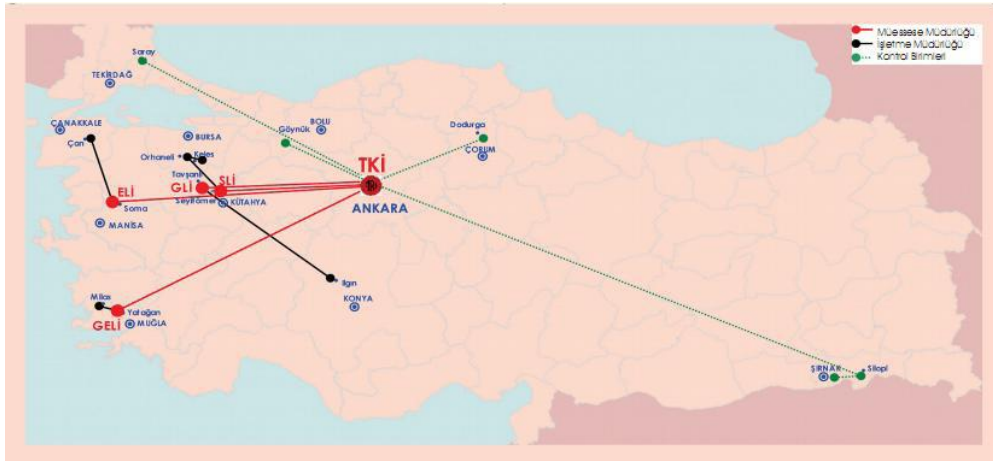


Figure 3: Geographical settlement of the Institution

Annual coal production: 28,5 million tonnes (2010).

Lignite Reserve:

Turkey: 12,4 billion tons ; TKI : 2,49 billion tons ; %28,38 of Turkey's reserves.

Turkey:84 million tonnes/year ; Production of TKI : 36,4 million tonnes/year; %45,5

Licences: 181 Coal

Employee : 8224

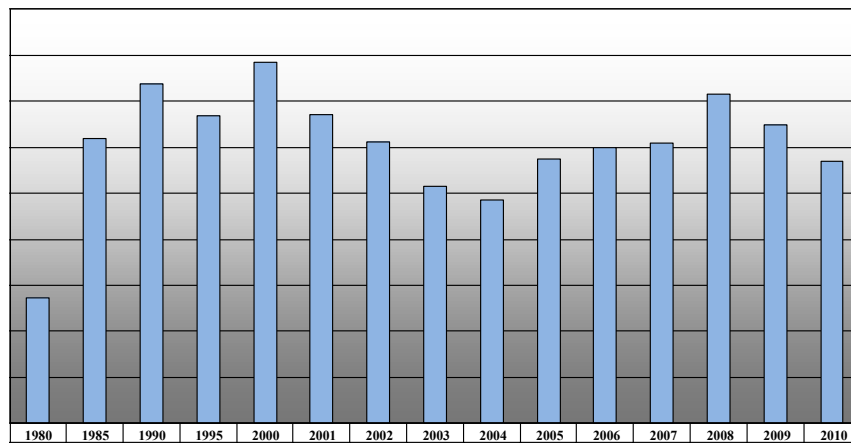


Figure 4: Annual Production of TKI.

The Turkish government has complete control over coal mines, power stations, and the grid. The Turkish Coal Enterprises (TKI) and Turkish Hard Coal Enterprises (TTK) are both government run, and the government has a defacto monopoly over coal production. TKI was established in 1957 to operate the coal mines of Turkey and it is the major brown coal producer in the country, operating approximately 40 mines. The coal is relatively low quality. TKI is also an important producer of lignite for the power plants. TTK was established in 1983 to operate hard coal mines in Zonguldak basin and is operating five deep mines as of 2007. This enterprise carries out the exploration, production, and marketing of domestic hard coal (TTK, 2010; EURACOAL, 2007).

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 Ministry of Energy and Natural Resources (MEN, 2010b).

**Step 3) Continued**

Are there commercial scale CMM recovery and use projects?

- The Global Methane Initiative (formerly Methane to Markets Partnership) International CMM Projects Database currently identifies no CMM projects in Turkey, in operation or in development (M2M Projects, 2010). Two direct sales projects with a combined greenhouse gas (GHG) emission reduction of 7,452 metric tonnes of carbon equivalent (MTC02e) per year.

- Limited information was found on CMM emissions from operating mines in Turkey

Emission Category	1995	2000	2004	2005	2006	2007	2008
Underground mine	38.75	41.24	33.55	37.40	39.98	42.44	44.84
Post-underground mine	NA	NA	NA	NA	NA	NA	NA
Surface mine	62.45	71.96	52.52	66.40	73.22	86.18	90.79
Post-surface mine	NA	NA	NA	NA	NA	NA	NA
Total emitted (= Total liberated – recovered & used)	101.20	113.20	86.07	103.80	113.19	128.62	135.63

Source: UNFCCC (2010a) (converted from gigagrams [Gg])

**Figure 5: Turkey’s CMM Emissions (million cubic meters)**

- No information was found on CMM emissions from abandoned mines in TKI.
- Turkey has acceded to the UNFCCC in February 24, 2004.

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

Source: \*UNFCCC (2007); \*\*UNFCCC (2010b)

**Figure 6: Turkey’s Climate Change Mitigation Commitment**

*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 exist: a prospecting license, an operation license, and an operation permit (Kayıkçı, 2010).

**Step 4) and others**

Due to no ongoing CMM projects in TKI, the other steps needn’t to be written.