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• Mining Sector In The World and In Turkey
“TECHNOLOGY DEPTH IN ROCK”
FROM THE EDITOR

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MINING COMPANIES IN TURKEY'S TOP 500 INDUSTRIAL ENTERPRISES OF 2010 by Madencilik Türkiye Magazine
22nd World Mining Congress which will be held between 11 - 16 September 2011, will be the second experience for Istanbul and Turkey in terms of WMC. After the 10th World Mining Congress in Istanbul with the topic “Mining and Mineral in the Service of Mankind” in 1979, this new Congress’ topic will be “Innovations and Challenges in Mining”. Even with these two topics, it’s possible to see the progress of mining business in the world through “need” to “essential” or “to accepted” to “to developed”.

Anatolia, the cradle of civilizations, started to use copper circa 9000 years BC. Around Çayönü Hill - Diyarbakır, a number of copper beads, awl fragments aged 9000 - 8200 BC were discovered. The oldest underground mine in Anatolia was discovered at Kozlu, Tokat, aged 5000 years BC. First mining tool, a miner shovel was discovered in a copper mine at Murgul Deposit, Borçka, Artvin and was dated to 1st millenium BC. After flintstone and obsidian, rich metal deposits of Anatolia also gave numerous different opportunities to the mankind to hunt and defend, to feed and to make tools. The amount of resources, capability of mining and creating equipments were the main elements to survive and to strengthen the tribes and civilisations. The first use of silver and gold coins as money by Lydians, made the civilizations of Anatolia shape the future. Through 2000 years till now, Anatolia owned by various important empires, has become a bridge for eastern and western cultures. Today, Turkey starts to recall Anatolia’s role in the modern civilisation and with the help of record high metal prices, restarts to place special emphasis on its mining sector and production.

Turkey has always been a strategic center for different companies on different industries due to its geographical location between Europe - Balkans - Asia and Middle East. Being a peninsula Turkey has an important advantage to transport the commodity overseas through three seas surrounding it: Mediterranean, Egean and Black Sea. Cultural motives of the region including hospitality and being open minded help the foreigners to build their business and to live. Government’s recent policies on mining sector give full support to exploration and production. It won’t be wrong to say that Turkey has a huge mineral potential due to its geological features and it is well known that with the early exploration data, Turkey knows only 100 meters deep of the surface. Even there is no world class deposit in Turkey, the potential is expanding and the number of projects increase every year.

In this issue, you will have the chance to take a look at Turkey’s mineral exploration and geological framework, written by Özcan Yiğit, Associate Professor of Economic Geology at Çanakkale Onsekiz Mart University, Turkey; to understand the gold mining industry in Turkey written by Muhterem Köse, Gold Miner’s Association; to have a brief outlook to the world and Turkey’s mining industry with actual numbers written by Association of Mining Sector Presidents’ Council. Turkish mining news and company profiles are also in the content list.

Mining Turkey, English version of Madencilik Türkiye, will continue to inform world mining industry about Turkey’s mining sector regularly. Madencilik Türkiye Magazine aims to inform Turkish mining sector about latest news and new technologies since September 2009. Madencilik Türkiye became a brand in the Turkish mining industry at short notice with its online bookstore, short courses and Bulletin of Mineral Rights & Concessions.

Please get in touch with us to have a hard / soft copy, to send articles or to give advertisements.

And now, please enjoy the congress!
New steps on Turkey’s boron production

General Directorate of Mineral Research and Exploration (MTA) finalised the main part of the drilling programme which aims to explore new boron deposits. As a province which reserves most of Turkey’s boron deposits, Kütahya hosts the project which is a joint venture of Eti Mine Works General Management (ETİ) and MTA, both public institutions. The drilling programme includes 16 drill holes at Emet, Hisarcık and Çavdarhisar district. The process is ended in 13 holes and the samples will be analysed at ETİ’s laboratories. The drilling programme has reached total 300 meters so far.

Tincal, colemanite and ulexite are the primary boron minerals that Turkey produce boron. 72 % of the world boron deposit happens to be in Turkey, followed by Russia 8 % and by USA 7 %. ETİ supplies 40 % of the world boron demands after Rio Tinto Borax. Eti Maden planned for the production of 3.9 million tons of raw ore in 2010 and realized 134 % of the program with 4.5 million tons of production. The production of boron chemicals and equivalent products was 1 million tons in 2009.

ETİ has also announced its new technology, “Near Infrared Optical Separator” to use on residual waste material after the production of colemanite. A NIR Separator with the capacity of 10 t/h is built at Bigadiç Boron Plant and it’s planned to create an income of 35 million USD, with the enrichment capacity of 88 %.

<table>
<thead>
<tr>
<th>Country</th>
<th>Capacity (Thousand Tonne)</th>
<th>World Boron Reserves - Source: Eti Mine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey</td>
<td>1,785</td>
<td>Total Reserve (Thousand Tonnes B₂O₃)</td>
</tr>
<tr>
<td>USA</td>
<td>1,560</td>
<td>Distribution (%)</td>
</tr>
<tr>
<td>China</td>
<td>545</td>
<td>Turkey 864,500 72</td>
</tr>
<tr>
<td>Chile</td>
<td>415</td>
<td>Russia 100,000 8</td>
</tr>
<tr>
<td>Argentina</td>
<td>196</td>
<td>USA 80,000 7</td>
</tr>
<tr>
<td>Russia</td>
<td>151</td>
<td>China 47,000 4</td>
</tr>
<tr>
<td>Bolivia</td>
<td>78</td>
<td>Chile 41,000 3</td>
</tr>
<tr>
<td>Peru</td>
<td>75</td>
<td>Peru 22,000 2</td>
</tr>
<tr>
<td>India</td>
<td>48</td>
<td>Bolivia 19,000 2</td>
</tr>
<tr>
<td>World Total</td>
<td>4,853</td>
<td>Iran 16,200 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Argentina 9,000 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serbia 1,000 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kazakhstan Unknown -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 1,199,700 100</td>
</tr>
</tbody>
</table>

Production Capacities of Boron - Source: Eti Mine
YOUR EPCM PARTNER IN YOUR INVESTMENTS

PROMER offers EPCM (Engineering, Procurement, Construction Management) services and also safe, economic, innovative solutions for the customers by using latest technology with experienced background for the mining plants. PROMER is a dynamic company which has ability to adopt different types of design which needs to be revised according to the global and economic aspects.

WE PARTICIPATED IN ENGINEERING WORKS OF ALL GOLD MINES IN TURKEY
TurkPower Corporation announces the purchase of 50.09% working interest in Maksor Madencilik, the 100% owner of the Kuluncak Iron Ore Project in Turkey, for a total purchase price of 15 million EUR and 73 million shares of Turkpower. The payment is scheduled for 6 payments, starts with the down payment of 1 million EUR which was made in 2010, ends with the final payment and share issuance due December 28th, 2011.

Turkpower President Ryan E. Hart says “This is a great day and milestone for TurkPower and its investors. With the purchase of controlling interest in the operational Kuluncak iron ore mine, TurkPower is taking its first step toward its goal of becoming a leading junior mining company in Turkey. The purchase adds a tangible and operational asset to the Company’s balance sheet and leads to expected profitability in 2011. It also gives the Company leverage and credibility for future mining ventures and acquisitions in the booming mining industry of Turkey.”

Turkpower Corporation is a Turkish-American consulting and service operations firm with a focus on Turkish energy and mining services. Kuluncak Iron Ore Mine is an open-pit mine which has estimated reserves of about 21 million metric tons according to a two year feasibility study.

Drilling Programme Update By Teknomining

Dublin headquartered mining and exploration company Teknomining Plc announced an update on drilling programme reveals high levels of commercial grades of nickel at its license in Diyarbakir, Turkey. Independent laboratory testing of the sample cores reveals minimum inferred resources of nickel at approximately 5 million tonnes, according to IP / Resistivity an Magnetic Report of CFT Engineering. Michael Holden, CEO of Teknomining says that besides commercial grades of nickel, sample results shows a significant presence of Cobalt, Copper, Chromium, Iron, Magnesium, Manganese, Titanium, and Zinc. High nickel presence in the sample results coupled with the strength of the current price of nickel provides Teknomining with an extremely valuable exploration asset. The Company has commissioned CFT Engineering to supervise the drilling programme on the which covers an area of 3.65 km². Independent laboratory testing of sample cores has been carried out by OMAC laboratories.
Çayeli Bakır is proud of Black Sea Region of Turkey and Turkey’s largest underground Metal Mine. 42nd in the highest taxpayers list of year 2010 and export champion in Rize province while placed 34th in the country wide highest 1000 exporters list. CBI inheres Corporate Responsibility with profound importance for protection of Environment, Safety and Health of people and good Community Relations and looks forward with self confidence.
Turkey plans to explore and produce the raw materials and minerals that are imported. A mine map which has the information about mines and their feasibility informations, has been created with the cooperation of Ministry of Economy and Ministry of Energy and Natural Resources. At his visit to Korea, Minister of Economy Zafer Çağlayan stated that, in the light of this information, a mining rush will be started to close the current account deficit of the country. "As Turkey is the biggest importer of scrap iron and steel, 9 billion USD is spent every year to import these metals. Even only by the intermediary services expenses, Turkey can clear the 1 billion USD current account deficit. Total added value of the project is much bigger," said Çağlayan.

The major commodity that Turkey import are coal, copper, aluminium, gold and iron, excluding oil and gas. 95 % of gold, 80 % of copper, 80 % of aluminium, 50 % of iron and 20 % of coal from the Turkey’s total need is imported. It’s unquestionable that these raw materials are crucial for the industry and the production.

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Import (Billion USD)</th>
<th>Total Mining Product Import (Billion USD)</th>
<th>Mining Products to All Imported Commodity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>54,502</td>
<td>901</td>
<td>1.653</td>
</tr>
<tr>
<td>2001</td>
<td>41,399</td>
<td>500</td>
<td>1.209</td>
</tr>
<tr>
<td>2002</td>
<td>51,554</td>
<td>999</td>
<td>1.937</td>
</tr>
<tr>
<td>2003</td>
<td>69,340</td>
<td>1,265</td>
<td>1.810</td>
</tr>
<tr>
<td>2004</td>
<td>97,540</td>
<td>1,615</td>
<td>1.656</td>
</tr>
<tr>
<td>2005</td>
<td>116,774</td>
<td>2,181</td>
<td>1.868</td>
</tr>
<tr>
<td>2006</td>
<td>139,576</td>
<td>2,814</td>
<td>2.016</td>
</tr>
<tr>
<td>2007</td>
<td>170,062</td>
<td>3,530</td>
<td>2.076</td>
</tr>
<tr>
<td>2008</td>
<td>201,964</td>
<td>4,541</td>
<td>2.248</td>
</tr>
<tr>
<td>2009</td>
<td>140,926</td>
<td>4,247</td>
<td>3.014</td>
</tr>
</tbody>
</table>

Imported Mining Products Excluding Oil and Gas
Source: Turkish Statistical Institute (TÜİK)
Ariana Resources announced that the geophysical programme which was designed to determine the sub-surface extent of the known vein outcrops and their connectivity, generate drill targets and subsequently expand the resource for the wider Red Rabbit Gold Project, was completed over the Kızılçukur vein system and high priority drill targets defined on high resistivity anomalies. The programme demonstrated that the potentially mineralised structures of areas previously drill tested, continues at depth and along strike. The drilling programme for the prospect will be planned to gain a further understanding of the 2 km of mineralised quartz veins containing high-grade gold and silver. Kızılçukur Prospect is located 21 km north-east of Kızıltepe.

For the new vein system which was discovered at Kızıltepe, the Managing Director of Ariana Resources Dr. Kerim Şener stated: “The identification of an additional high grade vein system at the Kızıltepe deposit further underpins the high prospectivity of the Red Rabbit Project area, and demonstrates the potential for increases to our current JORC compliant resource of 448,000 oz Au equivalent. These new vein discoveries represent a key development in the evolution of the Red Rabbit Project, as we simultaneously advance towards production in 2012 and conduct exploration activities across the project area to feed into the current resource, extending the mine life and further improving the economic fundamentals of the project.”

First Gold Poured From Red Rabbit Project After Test Production

PRACTICAL SOLUTIONS FOR THE GLOBAL MINING LIFE CYCLE

Specializing in every aspect of global mining projects, from exploration to development, to production and reclamation.

Active in Turkey since 2003
Tüpraş granted to start production at Efemçukuru and granted permits of the expansion of Kışladağ

Tüpraş Metal Mining (Turkish subsidiary of Eldorado Gold) announced the affirmative results of the permissions for the two project’s Environmental Impact Assessment (EIA). Kışladağ Gold Mine which has started its production in 2006 is the milestone for Eldorado in Turkey. 12.5 million tonnes of ore will be placed on the leach pad annually from the open pit mine after the permits that they gained for the expansion project undertaken in 2010.

Efemçukuru Mine, which is the second gold mine for Tüpraş, is an underground operation. The mine gave start to production in June and planned to produce 70,000 - 80,000 ounces of gold in 2011.

The company’s CEO, Paul Wright stated his appreciation for the permissions resulted on time and without any deferment for the Efemçukuru. As the other application for the expansion of the project Kışladağ comes to a conclusion, the amount of material processed in Kışladağ Mine will be increased by 25% annually.

Tender by TTK to generate electricity from methane gas

Turkish Hard Coal Enterprises (TTK) is issuing invitations for tender to generate electricity by the methane gas released during production from the TTK owned coal mines and exploration of methane gas in some licenses owned by TTK. The subject of the tender is going to involve all the works related to generate electricity for 30 years royalty. Tender guarantee fee is determined as 100,000 USD. The companies which get their compliance certificate before November 23rd, 2011, will submit their sealed bid proposals at December 21st, 2011 2:00 pm and the proposals will be evaluated at the same day at 3:00 pm by the Head of Purchasing Department.

Besides its economical value, generating electricity by the aspirated methane gas from the coal mines plays an important role for improving the safety of the underground mines. Most of the cities in many developed countries generates energy by methane gas derived from solid waste efficiently, which is known as an important green technology.

Kışladağ Gold Mine At Night

Entrance of Efemçukuru Gold Mine

Karadeniz Coal Mine
Mine Planning with mine2-4D, mineCAD and EPS

Mine2-4D, mineCAD and EPS form a complete automated mine planning and scheduling system that delivers cost and performance improvements through efficient and solution driven features.

Producing fully integrated long and short-term mine plans, Gantt schedules linked to 3D designs, 3D animations, and complete reconciliation is fully supported through an integrated, interactive process – and has never been this easy!
Mineral exploration in the last decades revealed that Turkey forms a prime sector within the Tethyan Metallogenic Belt (TMB) with proven metallogenic credentials, though changes in the mining law triggered foreign investment since mid 1980’s. Pro-mining investment climate along with low-production costs and well-established infrastructure, as well as a bull metal market played a critical role in attracting exploration companies to reveal the metal endowment of a long-time neglected favorable geologic setting in this large underexplored country. Industrial minerals, especially boron, trona, clays and perlites as well as dimension stones, have been long-time appreciated commodities; metallic minerals, especially gold, are the new paradigm. The country was the leading producer of only chromium with modest copper, lead, zinc, silver and antimony production, now it has become a major gold producer on the fringes of Europe. Yearly gold production in 2010 was more than 0.5 million ounces and continues to increase with several new gold mines. Gold mining, except as by-product, started with Ovacık in 2001 and continued with Kışladağ in 2006 and others including Küçükdere, Mastra, Çöpler, Kaymaz, Gıcık, Çukuralan, Efemçuruku, and several more to come.

This synopsis metallogenic assessment of Turkey is based on the author’s Turkish Mineral Deposit Database (TMDD). TMDD is a comprehensive GIS database containing more than 11,000 deposits and prospects and includes metallic, industrial, and energy raw materials comprising more than 20 different databases.

GEOLOGICAL FRAMEWORK

Metallogeny in Turkey is mainly a result of the development of the Tethyan Metallogenic Belt along with low-production costs and well-established infrastructure, as well as a bull metal market played a critical role in attracting exploration companies to reveal the metal endowment of a long-time neglected favorable geologic setting in this large underexplored country. Industrial minerals, especially boron, trona, clays and perlites as well as dimension stones, have been long-time appreciated commodities; metallic minerals, especially gold, are the new paradigm. The country was the leading producer of only chromium with modest copper, lead, zinc, silver and antimony production, now it has become a major gold producer on the fringes of Europe. Yearly gold production in 2010 was more than 0.5 million ounces and continues to increase with several new gold mines. Gold mining, except as by-product, started with Ovacık in 2001 and continued with Kışladağ in 2006 and others including Küçükdere, Mastra, Çöpler, Kaymaz, Gıcık, Çukuralan, Efemçuruku, and several more to come.

A fourfold division of Turkey separates the country into east-trending tectonic belts: from north to south, Pontides, Anatolides, Taurides, and Border Folds (Fig. 1. inset). This convention is still the simplest and most widely accepted tectonic division of Turkey, though it has been extensively modified into many different terranes (Fig. 1). The most prominent tectonic features of the country are the İzmir - Ankara - Erzincan suture dividing the Pontides in the north from the Anatolide - Tauride platform to the south and

Metallogeny in Turkey is mainly a result of the development of the Tethyan Metallogenic Belt forming by the convergence of the African, Arabian, and Indian plates and their collision with Eurasia in the area of the former Tethyan oceans. TMB extends from the western Mediterranean via the Alps to southeastern Europe, through Turkey, the Lesser Caucasus, Iran, and the Himalayas to China. Mineral deposits and prospects of Turkey were mostly formed during the closure of Neotethys sensu lato.
the Bitlis Suture marking the northern edge of the Arabian plate in southeastern Turkey. In a broad sense, these two sutures divide Turkey into three geologically distinct domains (Fig. 1).

The oldest rocks forming the crystalline basement of Turkey are characterized by metamorphic massifs, e.g., the Menderes Massif in western Turkey. Metamorphic facies range from greenschist and amphibolite facies to eclogite and granulite facies and range in age from Precambrian to Oligocene. Multiple phases of metamorphism are commonplace in many of the massifs. Paleozoic rocks are typically non-metamorphosed sedimentary rocks, exposed mainly in the northwestern, southeastern, and southern parts of the country. A Paleozoic rock succession hosts the country’s largest hard coal deposits around Zonguldak. Mesozoic rocks consist of mainly limestones, volcanic rocks, flysch sequences, and ophiolitic assemblages. Triassic and Jurassic rocks have limited exposures, in contrast to Upper Cretaceous submarine volcanic rocks cropping out in northeastern Turkey. Ophiolitic rocks were obducted mostly in the Upper Cretaceous. Cenozoic rocks that cover large areas and obscure older sequences are mainly characterized by subaerial volcanic and shallow-water sedimentary successions which host world-class borate deposits. Intrusive rocks, exposed extensively in northwestern, central, and northeastern Turkey (Fig. 1), are primarily granitic, granodioritic, and syenitic compositions, whereas gabbroic rocks are mostly associated with ophiolitic assemblages. Available scattered radiometric ages from intrusive rocks indicate two broad age ranges of pre-Middle Jurassic and Late Cretaceous to Miocene. Subaerial to submarine volcanic rocks range from Upper Cretaceous to Cenozoic in age, mostly Neogene, with minor Jurassic and Lower Cretaceous examples.

TYPES, STYLES AND DISTRIBUTION OF MINERAL DEPOSITS

Diversity in the geologic and tectonic setting makes the country favorable for a wide spectrum of mineral deposits, different in types, time and space, related to subduction, collision, post-collision and rifting processes (Fig. 1). Among many different mineral deposits, Au-Ag-Cu-Mo-Pb-Zn bearing systems are the focus of interest for most mineral exploration companies, i.e., porphyry Au-Cu-Mo, skarn, epithermal Au-Ag, volcanic-associated massive sulfides (VMS), and Mississippi Valley types (MVT). In addition to these, current interest in lateritic Ni-Co is high, especially after the Çaldıağ heap-leach operation, and there is rising interest in sedimentary-rock hosted Cu in central Turkey. Changes in the mining regime also triggered sandstone-hosted uranium exploration by foreign companies. Podiform chromium deposits as well as karst- and lateritic bauxite deposits of the country have not attracted much foreign investment into the country yet. However, some of the iron deposits, supporting the large steel industry of the country, have started to attract foreign investment recently.
Porphyry Cu-Au-Mo deposits and prospects form three-roughly east-trending belts in Turkey, i.e., Pontides, Anatolides and Border Folds, and are mainly associated with Late Cretaceous to Miocene granitoids of both island and continental arc setting. Known porphyry deposits and prospects are clustered in four major districts within these belts, which are northeastern, east-central, western and northwestern Turkey (Fig. 1). Recent exploration efforts generated new prospects outside of these clusters as well, e.g., Konya area in south-central Turkey. Notwithstanding many porphyry Cu-Au-Mo systems with known resources, the only economical porphyry deposits are located within the Anatolides porphyry belt, e.g., Kışladağ and Çöpler gold deposits. Eocene to Miocene age rocks are the causative intrusions for porphyry gold mineralization. Majority of the porphyry systems lack a well developed supergene profile, i.e., enriched zones and/or oxidized leach cap. Kışladağ porphyry in western Turkey with current reserves of 10.2 Moz gold reserves and 16.5 Moz total gold resources including reserves is the largest gold deposit in Turkey. Çöpler porphyry with 4.6 Moz gold reserves and 6 Moz gold resources is the second largest porphyry deposit.

Halilağa porphyry Cu-Au deposit in the Biga Peninsula in northwestern Turkey is a new discovery with ongoing definition drilling. Halilağa will probably be one of the largest porphyry Cu-Au systems in Turkey with multi-million ounces of gold and a couple Blbs of copper. Other porphyry systems with significant resources include Güzelyayla, Gümüşhane (=Arda), Balçılı and Ulutaş in northeastern Turkey, Bakırçay in northern Turkey, Derıköy in northwestern Turkey, Cevizlidere and Karakartal in east-central Turkey and Muratdere, Sarıçayır, and Tepeoba in western Turkey.

Numerous skarn deposits distributed throughout Turkey follow the general trend of the porphyry belts. Most of the known deposits do not have sufficient tonnage to form an economical orebody, except in Fe skarns, e.g., Divriği [133.8 Mt @ 56 % Fe and 0.5 % Cu] in east-central Turkey, and Ayazmant and Şamlı in...
western Turkey. Most of the Fe-Cu, Pb-Zn, W or Mo skarns were poorly appreciated, but recent studies showed that they may be related to porphyry or iron oxide copper gold (IOCG) type mineralization, e.g., skarns in Çöpler and Keban districts in east-central Turkey, Bursa - Kütahya district in western Turkey and Dereköy district in northwestern Turkey, and IOCG systems in Hasançelebi [685 Mt @ 19 % Fe] and Divriği districts in east-central Turkey and Şamlı and Ayazman in western Turkey. Uludağ [16.5 Mt @ 0.44 % WO₃] is one of the economical W skarn deposit in western Turkey.

Epithermal gold deposits and prospects are mainly explored for Au-Ag and base metal endowments in Turkey, but some Hg-Sb bearing epithermal systems are also important, e.g., Sızma - Konya Hg district and İvindi Sb-Au district. Gümüşköy in Kütahya is a Ag-only mine in Turkey, and has reserves of 21.5 Mt at 178 g/t Ag, containing approximately 123 Moz. Epithermal systems are concentrated in two regions, namely northeastern and western Turkey. Epithermal systems in northeastern Turkey are spatially and genetically related to Late Cretaceous to Eocene submarine to subaerial calc-alkaline volcanic rocks, while Eocene to Miocene subaerial volcanic rocks form the main host lithologies in western Turkey (Fig. 1). All styles of epithermal systems are present in Turkey. Some of the epithermal deposits with extensive argillic alteration zones in western Turkey are also exploited for industrial minerals such as clays and silica. High-sulfidation (HS) epithermal systems are mainly concentrated in the Biga Peninsula in northwestern Turkey, i.e., Ağdı Dağı and Kirazlı, while classical examples of low-sulfidation (LS) systems occur in Ovacık in western Turkey and Küçükder in the Biga Peninsula. Intermediate-sulfidation (IS) style epithermal deposits and prospects are not well recognized or characterized in many areas.

Ağdı Dağı and Kirazlı in the Biga Peninsula with 1.4 Moz and 0.49 Moz gold resources respectively, not including the

Yusufeli Gold Property - North Eastern Turkey
12 km mineralized trend - 100 % owned by Mediterranean
Four project areas with almost 100 sq km under licence
with four operating licences, three in conversion process
to operating license and seven exploration licences

* Tac & Corak - Advanced Stage Projects
  Over 2.5 M oz Au Eq. resource - 1.8 M oz capped gold
  Preliminary assessment completed June 2011
  and Environmental Impact Assessment application
  planned in 2011

* Celtik & Cevreli - Exploration Stage Projects
  Celtik Discovery - 18.5 m of 6.51 g/t Au & 0.9 % Cu and
  from the surface 20 m 1.62 ppm Au Cevreli Project - 39.5
g/t Au in rock samples and 1,745 ppb in soil samples

Less than 15 % of the Yusufeli property explored to date
Tac & Corak Deposits - Open for expansion
Celtik & Cevreli Projects - Strong discovery potential
Cintat Valley - Exploration target

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You can find more detailed information about Yusufeli Project
in the september issue of Madencilik Türkiye Magazine
Fig. 1. Distribution of mineral deposits and prospects of Turkey with emphasis on host-rock lithology, paleo- and neo-tectonic setting, inset showing classical four-fold tectonic division of Turkey.
newly discovered Çamyurt zone, and Taç and Çorak in northeastern Turkey with 1.1 Moz and 0.76 Moz gold respectively are examples of HS epithermal deposits. Ağı Dağı and Kirazlı deposits have ongoing feasibility studies. Recently discovered Öksüt and İnilce in south-central Turkey are other examples of HS systems. Ovacık Au-Ag open pit and underground mine is a typical LS epithermal deposit. Efemçukuru LS system is the largest epithermal deposit in Turkey with 1.5 Moz current gold reserves, and just started production from an underground operation. Çukuralan (Kaplan) with 0.743 Moz Au reserves recently started production in western Turkey, and Mastra gold deposit with 0.453 Moz Au reserves in northeastern Turkey produced gold from an underground and open pit mine. The other examples of LS systems with significant resources include Kısacık and Akbaba, in western Turkey. Şahinli in the Biga Peninsula is an example of an IS epithermal prospect. Other epithermal prospects with significant gold resources include Altıntepe and Dereköy in northeastern Turkey.

Polymetallic VMS deposits are one of the major sources of base-metals in Turkey and have several producing mines. Kuroko- and Cyprus-style VMS deposits are restricted to the Late Cretaceous bimodal volcanic rocks in northeastern Turkey, e.g., Murgul [40 Mt @ 1.25 % Cu, 0.1 % Zn, 0.05 % Pb, 0.2 g/t Au, 25 g/t Ag with past production of 38 Mt grading 1.1 % Cu] Çayeli, Tirebolu and Lahanos districts, and ophiolitic rocks of the Küre district, e.g., Aşıköy [11.23 Mt @ 1.56 % Cu, 2.48 g/t Au, 10 g/t Ag] in Küre northeastern Turkey and Ergani district [Anayatak: 14.6 Mt @ 1.39 % Cu] and Madenköy [25.8 Mt @ 2.06 % Cu, 0.93 % Zn, 31.49 % S plus Au-Ag] in southeastern Turkey (Fig. 1). The single known highly-metamorphosed VMS deposit of Yenipazar in central Turkey contains Cu-Pb-Zn-Au-Ag ore. Turkish VMS deposits contain common by-product Au, but some deposits contain gold-rich orebodies with epithermal affinities, e.g., Cerattepe in northeastern Turkey.

Many carbonate-hosted Pb-Zn deposits are hosted by Middle Cambrian to Jurassic shelf carbonates in a belt extending along the Tauride Mountains in southern and southeastern Turkey (Fig. 1), including from west to east Bolkardag, Yahyali (=Zamanti), Tufanbeyli, Malatya, Keşan, and Hakkari districts. These deposits may include MVT, Irish type, sedimentary-exhalative (SEDEX), and carbonate replacement (CR) type deposits. Several of the deposits possess non-sulfide (oxide) zinc. Additionally, many small carbonate-replacement Pb-Zn deposits are distributed throughout Turkey.

Podiform chromite deposits of Turkey are related to Alpine-type peridotites that are a part of ophiolitic assemblages covering large areas, with the most im-
Important zones in northern and southern Turkey (Fig. 1). Age of emplacement of ophiolitic rocks ranges from Jurassic to Cretaceous, but occurred mainly in the Late Cretaceous. Most of the obducted ophiolites are associated with closure of the Neotethyan oceans sensu lato. Turkey has been an important producer in the world metallurgical-grade, high-chrome chromite market. The chromitite deposits are usually small in size, as in most other podiform chromite deposits (rarely >1 Mt ore), with complex structural relationships and podiform, lenticular, irregular, shapeless, and/or banded type geometries. Most of the reserve and resource data for chromite deposits are not up to date or reliable; some old figures give resources of 31.1 Mt at 30 to 48 percent Cr₂O₃.

Karst-type and lateritic bauxite deposits of Turkey are located in the Tauride belt in southern and southwestern Turkey (Fig. 1), except the Kokaksu district in northwestern Turkey. Most of the deposits contain either bauxite (including iron-rich compositions) or diasporite, and the majority of them are karst-type allochthonous deposits occurring as pockets or layers in Triassic to Upper Cretaceous limestones. Seydişehir district, including the Doğankuzu, Mortaş, and Kızıltaş deposits, is one of the most productive districts in Turkey with 26.3 Mt of resource at 55 to 67 % Al₂O₃, 4 to 13 % SiO₂, and 13 to 19 % Fe₂O₃.

Lateritic Ni-Co-(Fe) deposits of Turkey are related to the same ophiolitic terranes hosting the chromite deposits. Though the ophiolite formation occurred mainly during the Jurassic to Cretaceous, the laterite profiles formed in subtropical to tropical conditions in the Eocene to Miocene. The Çaldağ lateritic deposit with 33.3 Mt at 1.14 % Ni, 0.07 % Co in western Turkey is amenable to hydrometallurgical recovery of Ni and Co with sulfuric-acid heap leaching.

Other deposit types which have either known examples or potential may include Carlin-type systems, e.g., Diyadin with 3.3 Moz Au resources in eastern Turkey, orogenic gold (OG) deposits including mesothermal and listwanite-hosted, placer deposits, mainly Au, sediment-hosted Cu, iron oxide copper gold (IOCG), sandstone-hosted U, e.g., Temrezli, Kiruna-type Fe deposits, e.g., Avnik district, sedimentary Mn deposits, SEDEX Fe deposits, volcanogenic Mn, volcanogenic U, deposition fault related gold deposits, manganese-hosted Au systems, distal-disseminated Au-Ag, and shear-zone hosted Cu deposits.

For further discussion of detailed Turkish metallogeny see:

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Özcan Yiğit, SEG Fellow, received his PhD from Colorado School of Mines, has worked for many major mining/exploration companies and is currently associate professor of Economic Geology at Çanakkale Onsekiz Mart University, Turkey.
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Chesser Resources

Chesser has been in Turkey since late 2007 and has published a JORC-compliant gold resource of 303,000 oz at its Sisorta joint venture project, as well as assembling a host of other exploration projects. Their flagship is Kestanelik low-sulphidation epithermal vein gold project, which lies within view of the Dardanelles in the western part of the country. Rick Valenta, managing director who has had a long career in minerals exploration around the world including a period in Turkey with Fronteer Development Ltd. During regular visits to Turkey he met Cem Yüceer, Chesser’s talented and young country manager.

Rick and his team was responsible for identifying the jewel in Chesser’s exploration crown: the Kestanelik Project.

“THE FLAGSHIP”: KESTANELIK
Kestanelik has most of the keystones that you would hope to find in this type of gold exploration project: It is an epithermal vein project of the same type as Cerro Negro in Argentina and Cracow in Australia, the defined veins are wide enough, and have returned a significant number of wide drill intersections at greater than 10 g/t Au. Chesser is now carrying out a 30,000 m drill programme on the project, with plans to have a JORC compliant resource after the conclusion of the programme. Chesser’s Ankara-based team, composed of talented people boasts a solid background in modern exploration, with years of previous experience at a number of major international mining companies. Earlier this year, Chesser completed a 10,000 m drilling over the targets defined by the previously completed geo-physical surveys which extended the outcropping 2.5 km of mapped veins by more than an extra 18 km of additional interpreted veins under cover. Chesser has also extended its soil sampling coverage way to the East, to the prospect with some encouraging soil sampling in areas where no drilling has yet taken place. This prospect have interpreted veins lying below this shallow gold-anomalous cover. Moreover, the texture and chemistry of the veins sampled so far have led Chesser to believe the area is at the top of the precious-metals zone of the epithermal system. This is good because the company expects to drill, to reveal continuing grade at depth, with the mineralisation still quite close to the surface, but with the best grades of the system still intact and available to mine. As Kestanelik is so accessible, the cost of the infrastructure and services required to establish mining operations should prove to be a major attraction. Good infrastructure, power, roads and other services lie nearby. The Turkish government is a supportive landowner and the local nearby population is well educated, motivated and receptive to a sustainable mining enterprise.

OTHER INTERESTS
Chesser is not just focusing on this property; it has other areas of interest. At Karayai, a copper-gold porphyry project not far for Kestanelik, a drill program has been underway. At Sisorta, in north-eastern Turkey, plans for further exploration and development are being planned. Chesser also has some 100 % owned properties in Pontides and carrying out some exploration activities. Chesser will keep an eye for advanced stage projects both in Turkey as well as the vicinity. Chesser Resources will keep investing Turkey and is looking forward to a golden future of this lovely country.

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Kestanelik has all the ingredients that you would hope to find

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Future of gold mining in Turkey looks highly impressive and bright given the developments in the recent years. The last decade marked a substantial development in the field of gold production in Turkey. Gold production, which first started in the year 2000, is estimated to reach approximately 25 tonnes in 2011.

Investing in gold exploration in Turkey was prompted by some changes in the Mining Law in 1985. Later on, an article named “Geology and gold mineralization in western Turkey” which was penned by Prof. Dr. L. T. Larson in the Mining Engineering Journal in November 1989 helped to increase interest in Turkey.

Eurogold, an Australian company, made the first significant discovery with epithermal gold formation in Izmir - Bergama-Ovacık which has boosted the interest in Turkey.

Ovacık Gold Project being the first gold mine project in Turkey, received a strong opposition in Turkey. However, after several years of hard work in establishing good understanding with the people who had concerns about the operation, the mine was commissioned in 2001.

Ovacık Mine was followed by others in the following years;


In 2011 Eskişehir - Kaymaz (Koza Gold) and Niğde - Ulukışla (Gümüştaş Mining) are expected to be in operation. In 2013, it is estimated that gold production will be launched in Konya - İnlice (Stratex), Çanakkale - Kirazlı & Ağrı Dağı (Alamos), Red Rabbit - Sındırımı - Balıkesir (Ariana Resources) and Ağrı Diyadin (Koza Gold) projects.

Gold production in Turkey is estimated to reach 25 tonnes in 2011 and 40 tonnes in 2013.
Between the years 2000 - 2010 approximately 1,200,000 meters of drilling has been done and a risk capital of around 500 million USD has been spent for gold exploration. In return, around 800 tonnes of operable gold reserve has been identified.

Gold production in Turkey is estimated to reach 25 tonnes in 2011 and 40 tonnes in 2013.

The 2010 amendments in the mining law extended the exploration period from 5 to 7 years, which provided certain relief to explorers.

**Turkish Gold Production**

(*2011 Estimated)

(Tonnes)

<table>
<thead>
<tr>
<th>Year</th>
<th>Gold Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0.0</td>
</tr>
<tr>
<td>2001</td>
<td>1.4</td>
</tr>
<tr>
<td>2002</td>
<td>4.3</td>
</tr>
<tr>
<td>2003</td>
<td>5.4</td>
</tr>
<tr>
<td>2004</td>
<td>5.0</td>
</tr>
<tr>
<td>2005</td>
<td>5.0</td>
</tr>
<tr>
<td>2006</td>
<td>8.0</td>
</tr>
<tr>
<td>2007</td>
<td>10.0</td>
</tr>
<tr>
<td>2008</td>
<td>11.0</td>
</tr>
<tr>
<td>2009</td>
<td>14.5</td>
</tr>
<tr>
<td>2010</td>
<td>17.0</td>
</tr>
<tr>
<td>2011</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Reference: Turkish Gold Miners Association, 2011
The Government’s activities aiming at enhancement of investment climate in Turkey includes simplification of permitting procedure. One major study within this context includes changes in the legislation in order to enable issuance of permits from various government authorities during the Environmental Impact Assessment (EIA) process at the Ministry of Environment and Urbanization, sort of one-stop office for authorization and permits. This change will be a major step to minimize time and cost of investment in mining in Turkey.
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Maxwell GeoServices

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DataShed is Maxwell’s main data management software package and allows companies to store, view and analyse their data and metadata in one area. An addition to DataShed is the QAQCReporter, which further enhances a company’s geological data capability, allowing them to monitor and report on assay quality control for data across all commodities.

Since its foundation, Maxwell has developed software for data capture and lease management and now offers a range of services to resource companies such as data and database audits, training and mentoring, data management consulting and database hosting.

The staff at Maxwell and their genuine interest in geological data management is what sets Maxwell apart from other companies. Maxwell staff is comprised of geologists and IT professionals, who know how important data is to the success of any business. The staff at Maxwell believe in adding value to a company’s data and this requires constant attention and support. Maxwell staff are on hand at all times to answer questions relating to our software or general data management queries.

What is important for Maxwell is that we use experienced people who understand the client’s business requirements. We then provide a data management solution that fits those requirements... no two data management systems are the same.

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- Underground and Open Pit Mine Planning and Design
- Geological and Geophysical Services
- Geotechnics and 3D-Modelling
- Gas Emission & Utilisation
- Hydrogeology & Water Resources Management
- Risk Management, QSHE
- Environmental and Social Impact Assessments
- Project Management and Specialist Services
- Mine Closure and Site Rehabilitation

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Turkey has also a place in world ranking regarding its chrome, magnesite, feldspar, barite, argil, coal and silver potential.

ASSOCIATION OF MINING SECTOR PRESIDENTS’ COUNCIL (MSBK)
Members of the Association of Mining Sector Presidents’ Council: Association of Turkish Miners, Association of Ceramic, Glass and Cement Raw Materials Manufacturers, General Mine Workers Union, Turkish Mine Workers Union, Istanbul Mineral and Metals Exporters’ Association (IMMI), Turkish National Committee of World Mining Congress, Aegean Mineral Exporters’ Association, Association of Turkish Marble, Natural Stone and Machinery Manufacturers (TÜMMER), Society for Mineral Research Center, Association of Industrialists and Businessmen of Ankara, Turkish Cement Manufacturers’ Association, Gold Miners’ Association, Association of Young Mining Businessmen, Association of Central Anatolian Miners and Association of Mining Consultant Engineers.

CURRENT SITUATION IN THE WORLD
17% of the total world metal consumption is used by China and this rate is expected to show an annual increase of about 12%. It is assumed that throughout the next 80 years, over one trillion tons of mineral ore will be consumed only by developed countries.

Many of the metal mines are either found in very little amounts or not found at all in Europe. For example, regarding world reserves, the rate of copper is 5%, iron ore is 2%, nickel is 1.7% and lead is 8.5%.

Development of countries is directly related to their mine consumption. Mine consumption per person in the world is:
- 21 ton / year - in the USA
- 18 ton / year - in the EU
- 6 ton / year - in Turkey.

Increasing demand as a result of the rapid industrialization in developing countries such as Brazil, China and India has made the supply of raw materials needed by the EU harder.

In order to maintain its competitive position, the European Union needs reliance on raw material flow and stability in prices. Reserve distribution of resources other than energy in the world is quite uneven.

Internal production in Europe is far from meeting the whole consumption.

A Working Group established under the presidency of the European Commission reduced the number of critical raw materials to 14 after studying on and analyzing the 41 minerals and metals that had been previously selected, between April 2009 and June 2010. A material the supply of which has the risk of limitedness and is essential for economy at the same time is defined as “critical”. Antimony, Beryllium, Cobalt, Fluorite, Gallium, Germanium, Graphite, Indium, Magnesium, Niobium, PGM (Platinum Group Metals), Alkaline-earth Metals, Tantalum and Wolfram are the raw materials which have been defined as critical. Without these raw materials, it seems impossible to switch to sustainable and environment-compatible production. These advanced technology metals play a very important role in reducing greenhouse gas emission, increasing energy efficiency and developing innovative environmental technologies.

Mineral ores valuing 40 billion USD were extracted in the USA in 2005 other than energy minerals. Value of the enriched products obtained by processing these minerals is 360 billion USD. The contribution of industries based on mines and mining to the economy of the USA as a result of converting the processed minerals into end products is 2 trillion USD.
CURRENT SITUATION IN TURKEY

Role of Mining Sector in Economy

Mining sector creates employment opportunities especially in rural areas, while it also provides basic inputs required by many sectors, industry in particular. It enables infrastructure investments in these regions to a great extent.

Contemporary technology and modern life can exist and develop by using mining products.

The share of mining sector in the national income of developed industrial countries is as high as 10 - 15 %.

Any disruptions to occur in the production or supply process in this sector will affect all other sectors either directly or indirectly.

Although it is known that our country has the potential of a wide range of minerals, this potential could not have been converted into reserves yet.

2. Turkey’s Mineral Potential

Turkey has advantages in terms of the subterranean resources it has. Remarkable world reserves of minerals such as boron, marble and trona are located in our country although the explorations made are not sufficient. Turkey has also a place in world ranking regarding its chrome, magnesite, feldspar, barite, argil, coal and silver potential.

3. Mining Sector’s Economic Indicators

3.1. Mining’s Share of GDP (with current basic prices)

While the share of mining sector in gross domestic product was 1 % in 2000, it started to increase in 2006 and reached 1.4 % in 2010 as seen in Table-1.

<table>
<thead>
<tr>
<th>Years</th>
<th>GDP (x 1,000 TRY)</th>
<th>Mining (x 1,000 TRY)</th>
<th>Share Of Mining (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>758,390,785</td>
<td>8,952,359</td>
<td>1.2</td>
</tr>
<tr>
<td>2007</td>
<td>843,178,421</td>
<td>10,530,738</td>
<td>1.2</td>
</tr>
<tr>
<td>2008</td>
<td>950,534,251</td>
<td>13,458,457</td>
<td>1.4</td>
</tr>
<tr>
<td>2009</td>
<td>952,558,579</td>
<td>14,235,361</td>
<td>1.4</td>
</tr>
<tr>
<td>2010</td>
<td>1,105,101,110</td>
<td>15,785,419</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Table-1 Mining’s Share of GDP (with current basic prices)
Source: Data taken from State Planning Organization’s Basic Economic Indicators, Turkish Statistical Institute.

Total value created by mining products used as input in industrial and chemical sectors such as glass, ceramic, cement, iron and steel, fertilizer is estimated to be around 25 billion USD on the basis of primary product. The share of this value in GDP is 3.6 % which shows the actual role of this sector in economy.

For making full use of all the existing mineral ore reserves with well-planned mining policies, necessary conditions should be provided such as lower capital costs, lower taxes and financial costs, intense use of advanced technologies and higher value-added production. Only then the value-added created by the sector will find the place it deserves in GDP.

3.2. Growth Rates in Mining Sector and GDH

As seen in Table-2, the sector lived through a dramatical recession due to structural crises caused by economic deficiencies between 1999 and 2004. With the increase of native and foreign capital inflow to the sector in 2004, the rate of growth reached 9 % in 2005.

Global crisis, legislation bottlenecks, problems caused by decisions for stay of motion and annulment given by administrative jurisdiction resulted in a -6.9 % decrease of growth rate in 2009. In 2010 however, a growth of 12.9 % was achieved.

<table>
<thead>
<tr>
<th>Years</th>
<th>Mining (%)</th>
<th>GDH (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>5.2</td>
<td>6.9</td>
</tr>
<tr>
<td>2007</td>
<td>8.1</td>
<td>4.6</td>
</tr>
<tr>
<td>2008</td>
<td>5.4</td>
<td>1.0</td>
</tr>
<tr>
<td>2009</td>
<td>-6.9</td>
<td>4.8</td>
</tr>
<tr>
<td>2010</td>
<td>12.9</td>
<td>8.9</td>
</tr>
</tbody>
</table>

Table-2 Growth Rates in Mining Sector and GDH
Source: Data taken from State Planning Organization’s Basic Economic Indicators.

3.3. Capital Structure of the Sector

As seen in Table-3, the share of mining sector’s fixed capital investments
within total investments was about 2.03% in 2010. This puny capital size is an evidence of how it was failed to evaluate the mineral sources of the country efficiently and thus provide the necessary capital required for converting into high value-added products.

3.4. Foreign Capital in the Sector

In the 2006-2010 period, the amount of foreign capital inflow to the sector was 893 million USD whereas the total foreign capital inflow to the country during the same period was 62.759 billion USD. The share of foreign capital inflow to the sector in the total foreign capital inflow to the country is about 1.4%. The inflow of foreign capital to the sector increased in 2010 resulting in a 3.0% share in the total foreign capital inflow.

3.5. Incentives in the Sector

Regarding the investment incentive certificate given in the 2006-2010 period, the total amount of investments was 151.87 billion TRY. 4.62 billion TRY of this total was the amount of mining investments which is a share of 3.04%. Total employment made available by the total investment amount in this period was 564,593 while it was 22,154 in the mining sector which means a share of 3.92% of the total employment. On the basis of incentive amounts, average share of the mining sector in the total amount of incentives was 2.6%.

3.6. Mineral Export

As seen in Table-5, mineral export started growing in 2006 and reached 3.468 billion USD in 2010.

Mineral export’s share in total export was 2.3% in 2006. With the global crisis in 2009, mineral export decreased 23.7% according to 2008 and dropped to 2.39 billion USD. In 2010, the share of mineral export in total export became 3.1%.

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Capital</th>
<th>Mining Public + Private Capital</th>
<th>Share Of Mining In Total Capital (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>171,520.0</td>
<td>2,858.17</td>
<td>1.66</td>
</tr>
<tr>
<td>2007</td>
<td>182,415.0</td>
<td>3,034.07</td>
<td>1.65</td>
</tr>
<tr>
<td>2008</td>
<td>192,093.0</td>
<td>2,959.64</td>
<td>1.54</td>
</tr>
<tr>
<td>2009</td>
<td>163,942.0</td>
<td>3,068.98</td>
<td>1.87</td>
</tr>
<tr>
<td>2010</td>
<td>207,676.0</td>
<td>4,223.56</td>
<td>2.03</td>
</tr>
</tbody>
</table>

Table-3 Capital Structure of the Sector (x million TRY)
Source: Data taken from State Planning Organization’s Basic Economic Indicators.

<table>
<thead>
<tr>
<th>Years</th>
<th>Inflow to Mining Sector</th>
<th>Total Inflow</th>
<th>Share of Inflow to Mining Sector in Total Inflow (%)</th>
<th>Annual Increase in Inflow to Mining Sector (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>120</td>
<td>16,982</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>337</td>
<td>18,394</td>
<td>1.8</td>
<td>180</td>
</tr>
<tr>
<td>2008</td>
<td>151</td>
<td>14,712</td>
<td>1.0</td>
<td>-55</td>
</tr>
<tr>
<td>2009</td>
<td>89</td>
<td>6,17</td>
<td>1.1</td>
<td>-41</td>
</tr>
<tr>
<td>2010</td>
<td>196</td>
<td>6,501</td>
<td>3.0</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>893</td>
<td>62,759</td>
<td>1.4</td>
<td></td>
</tr>
</tbody>
</table>

Table-4 Foreign Capital Inflow to the Mining Sector (x million USD)
Source: Data taken from State Planning Organization’s Basic Economic Indicators.

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Export</th>
<th>Total Mining Export</th>
<th>Mining Share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>85,502.2</td>
<td>2,004.8</td>
<td>2.3</td>
</tr>
<tr>
<td>2007</td>
<td>107,271.7</td>
<td>2,612.4</td>
<td>2.4</td>
</tr>
<tr>
<td>2008</td>
<td>132,027.2</td>
<td>3,136.7</td>
<td>2.3</td>
</tr>
<tr>
<td>2009</td>
<td>102,142.6</td>
<td>2,390.4</td>
<td>2.3</td>
</tr>
<tr>
<td>2010</td>
<td>113,975.6</td>
<td>3,469.9</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Table-5 Export Values on the Basis of Mining Sector Product Groups (thousand USD)
Source: Data taken from State Planning Organization’s Basic Economic Indicators and Istanbul Mineral and Metal Exporters’ Association.

<table>
<thead>
<tr>
<th>Years</th>
<th>Industrial Minerals</th>
<th>Natural Stone</th>
<th>Mineral Ore</th>
<th>Mineral Fuels</th>
<th>Total</th>
<th>Annual Increase %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>430,564</td>
<td>1,027,164</td>
<td>544,436</td>
<td>2,712</td>
<td>2,004,875</td>
<td>36.5</td>
</tr>
<tr>
<td>2007</td>
<td>491,5</td>
<td>1,242,460</td>
<td>866,692</td>
<td>11,809</td>
<td>2,612,442</td>
<td>36.5</td>
</tr>
<tr>
<td>2008</td>
<td>647,702</td>
<td>1,415,292</td>
<td>1,040,277</td>
<td>33,471</td>
<td>3,136,742</td>
<td>20.0</td>
</tr>
<tr>
<td>2009</td>
<td>437,674</td>
<td>1,240,942</td>
<td>709,906</td>
<td>1,856.07</td>
<td>2,390,378</td>
<td>-23.79</td>
</tr>
<tr>
<td>2010</td>
<td>590,512</td>
<td>1,568,219</td>
<td>1,303,165</td>
<td>6,993.07</td>
<td>3,468,889</td>
<td>45.11</td>
</tr>
</tbody>
</table>

Table-6 Share of Mineral Export in Total Export (million USD)
Source: Data taken from State Planning Organization’s Basic Economic Indicators and Istanbul Mineral and Metal Exporters’ Association.
In 2010, 45.2% of the mineral export was constituted by natural stone-marble, 37.5% by mineral ores, 17.0% by industrial minerals and 0.40% by mineral fuels. While natural stone export has maintained its level since 2006, there has been a decrease in the export of industrial minerals and an increase in the export of mineral ores.

### 3.7. Mineral Import

As shown in Table-8, total import in 2010 was 185.5 billion USD whereas total mineral import (excluding crude oil, natural gas, gold and metal import) was 4.492 billion USD. The share of 2010 mining import in the total import is 2.4%. When the imported items are examined, it is seen that most of the minerals known to exist in our country (including chrome, aluminum, zinc, lead, nickel, manganese, titanium ores and concentrates, gypsum, dolomite, marble and travertine) are being imported.

### 3.8. Need for Restructuring for the Effective Management and Coordination of the Sector

For a rational exploration and operation of mineral resources in the country, a new management approach is required which is freed from repression and able to foresee that an incremental increase in state’s revenues is dependent upon the increase of production in the sector.

#### Table-7 Shares of Mining Product Groups in Total Mining Export (thousand USD)

<table>
<thead>
<tr>
<th>Years</th>
<th>Mining Sector Total Export</th>
<th>Industrial Mineral %</th>
<th>Average %</th>
<th>Natural Stone %</th>
<th>Average %</th>
<th>Mineral Ore %</th>
<th>Average %</th>
<th>Mineral Fuel %</th>
<th>Average %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2,004,875</td>
<td>21.5</td>
<td>48.2</td>
<td>51.2</td>
<td>48.2</td>
<td>27.2</td>
<td>32.12</td>
<td>0.1</td>
<td>0.40</td>
</tr>
<tr>
<td>2007</td>
<td>2,612,442</td>
<td>18.8</td>
<td>51.9</td>
<td>45.1</td>
<td>33.2</td>
<td>33.1</td>
<td>1.2</td>
<td>0.07</td>
<td>0.3</td>
</tr>
<tr>
<td>2008</td>
<td>3,136,742</td>
<td>20.6</td>
<td>37.5</td>
<td>45.2</td>
<td>31.1</td>
<td>29.6</td>
<td>0.07</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>2009</td>
<td>3,390,378</td>
<td>18.5</td>
<td>37.5</td>
<td>51.9</td>
<td>31.1</td>
<td>29.6</td>
<td>0.07</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>2010</td>
<td>3,486,889</td>
<td>17.0</td>
<td>37.5</td>
<td>45.2</td>
<td>31.1</td>
<td>29.6</td>
<td>0.07</td>
<td>0.3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

#### Table-8 Mining Import Values (million USD) (except oil and natural gas)

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Import</th>
<th>Total Mining Import</th>
<th>Share of Mining Import in the Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>139,576</td>
<td>2,732</td>
<td>2.0</td>
</tr>
<tr>
<td>2007</td>
<td>170,062</td>
<td>3,530</td>
<td>2.0</td>
</tr>
<tr>
<td>2008</td>
<td>201,963</td>
<td>4,541</td>
<td>2.2</td>
</tr>
<tr>
<td>2009</td>
<td>140,928</td>
<td>4,247</td>
<td>3.0</td>
</tr>
<tr>
<td>2010</td>
<td>185,535</td>
<td>4,493</td>
<td>2.4</td>
</tr>
</tbody>
</table>

#### Table-9 Ratio of mineral export to mineral import (million USD)

<table>
<thead>
<tr>
<th>Years</th>
<th>Mining Export</th>
<th>Mining Import</th>
<th>Ratio %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2,005</td>
<td>2,732</td>
<td>73</td>
</tr>
<tr>
<td>2007</td>
<td>2,613</td>
<td>3,530</td>
<td>74</td>
</tr>
<tr>
<td>2008</td>
<td>3,136</td>
<td>4,541</td>
<td>69</td>
</tr>
<tr>
<td>2009</td>
<td>2,390</td>
<td>4,246</td>
<td>56</td>
</tr>
<tr>
<td>2010</td>
<td>3,469</td>
<td>4,493</td>
<td>77</td>
</tr>
</tbody>
</table>

As seen in Table 9, the ratio of mineral export to mineral import was 77% in 2010.

This approach should cover the following issues:

- Incentives and supports needed by the sector should be provided.
- Acquired mining rights should be taken under state guarantee.
- Legal permission procedures needed for mining activities should be speeded up.

As a means to prevent illegal acts of mine owners, administrative fines should be imposed instead of annulments, within the bounds of possibility.

Requirements of the sector should be met for a planning and coordination which prioritizes economic efficiency in the use and distribution of resources and is also essential for the integration of the sector with other sectors.

Public awareness should be raised based on the facts about mining activities.

The development of efficient management and coordination in bureaucracy is of vital importance for the sector. It has been compulsory that bureaucracy restructures itself in a way to undertake this challenging mission and thus gain self respect and elevate the country. Ministry of Mines should be established for the efficient management and coordination of the sector.

### C. EXPECTATIONS AND OTHER ISSUES

In case the problems that MSBK outlined and proposed to the government are solved, domestic and foreign capital inflow to the sector will increase, the mineral potential of the country will be revealed, new mining establishments will be opened, an important increase in employment will be created, our present mineral ore import will decrease, the industrial raw material need of our country will be supplied from native resources and our competitive power will increase. As a result, our mineral export which was 3.468 billion USD in 2010 is anticipated to show an annual increase of 10% and reach 14 billion USD in 2023.

---

**CONTACTS**

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The İstanbul Chamber of Industry (İSO) has announced the 2010 results of its annual Top 500 Industrial Enterprises survey, the equivalent of the Fortune 500 for Turkey. Around 100 companies in the list are related to mining, raw material and oil production. Due to high metal prices and high economic growth rate after 2008 crisis, nearly all the mining enterprises ended the year with pre-tax profits. According to the survey, Turkish Petroleum Refineries Co. (Tüpraş) takes its place on the top like last year, with the net production based sale of 20,819,067,010 TRY. Electricity Generation Co. Inc. (EUAŞ), the most profitable industrial enterprise of 2010 with 4,850,920,203 TRY took the second place in the list. Oyak-Renault Otomobil Fabrikaları AŞ has the highest export income of 3,236,949,000 USD, is at the fourth place, after another automotive sector company Ford Otomotiv Sanayi AŞ.

Türkiye Kömür İşletmeleri (General Directorate of Turkish Coal - TKİ) is a state-owned company and the biggest coal producer of Turkey since its establishment in 1957. Eti Maden İşletmeleri Genel Müdürlüğü (Eti Mine Works) is another state owned company and the only legal boron producer in Turkey. Park Technique was established under the aegis of Ciner Group in 1995 to produce coal for Çayırhan Thermal Power Plant in the first place. Park Teknik is known to be the most productive underground mine foundation in the world. The list continues with the gold-silver-aluminium-copper producer private companies.

The list of mining companies entered ISO’s Top 500 Industrial Enterprises 2010 survey are in the table below.

<table>
<thead>
<tr>
<th>Rank By No. In Top 500 in 2010</th>
<th>Rank By No. In Top 500 in 2009</th>
<th>Firm or Enterprise</th>
<th>Net Sales Revenue (TRY)</th>
<th>Period’s Profit &amp; Loss (Before Tax Return)</th>
<th>Export (USD)</th>
<th>Production Based Sales (Net-TRY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>18</td>
<td>General Directorate Of Turkish Coal</td>
<td>2,157,540,392</td>
<td>340,110,127</td>
<td>-</td>
<td>2,007,646,209</td>
</tr>
<tr>
<td>43</td>
<td>56</td>
<td>Eti Mine Works General Management</td>
<td>981,594,635</td>
<td>439,378,567</td>
<td>627,167</td>
<td>981,594,635</td>
</tr>
<tr>
<td>98</td>
<td>124</td>
<td>Park Technique Inc.</td>
<td>552,850,803</td>
<td>134,965,879</td>
<td>-</td>
<td>540,749,683</td>
</tr>
<tr>
<td>106</td>
<td>137</td>
<td>Tüpraş Metal Mining Inc.</td>
<td>512,604,951</td>
<td>331,633,918</td>
<td>11,681</td>
<td>512,604,951</td>
</tr>
<tr>
<td>116</td>
<td>144</td>
<td>Koza Gold Operations Inc.</td>
<td>473,241,351</td>
<td>298,781,669</td>
<td>-</td>
<td>470,783,288</td>
</tr>
<tr>
<td>143</td>
<td>195</td>
<td>Eti Silver Inc.</td>
<td>406,088,683</td>
<td>93,016,414</td>
<td>77,895</td>
<td>391,605,691</td>
</tr>
<tr>
<td>161</td>
<td>188</td>
<td>Eti Aluminium Inc.</td>
<td>416,576,089</td>
<td>77,489,106</td>
<td>159,598</td>
<td>351,860,350</td>
</tr>
<tr>
<td>193</td>
<td>265</td>
<td>Eti Copper Inc.</td>
<td>304,748,251</td>
<td>92,599,514</td>
<td>2,112</td>
<td>304,748,251</td>
</tr>
<tr>
<td>206</td>
<td>243</td>
<td>Erdemir Mining Industry Inc</td>
<td>291,582,511</td>
<td>122,873,224</td>
<td>-</td>
<td>291,107,928</td>
</tr>
<tr>
<td>224</td>
<td>189</td>
<td>General Directorate of Turkish Hard Coal</td>
<td>294,416,462</td>
<td>-456,375,035</td>
<td>-</td>
<td>267,558,885</td>
</tr>
<tr>
<td>231</td>
<td>-</td>
<td>Soma Coal Enterprises Inc.</td>
<td>259,662,409</td>
<td>18,975,038</td>
<td>-</td>
<td>257,403,366</td>
</tr>
<tr>
<td>265</td>
<td>313</td>
<td>Demir Export Inc.</td>
<td>244,099,616</td>
<td>-</td>
<td>-</td>
<td>228,068,165</td>
</tr>
<tr>
<td>269</td>
<td>-</td>
<td>Eti Soda Inc.</td>
<td>225,928,276</td>
<td>-</td>
<td>563</td>
<td>225,761,238</td>
</tr>
<tr>
<td>384</td>
<td>363</td>
<td>KÜMAŞ Kütahya Magnesite Enterprises Inc.</td>
<td>158,432,562</td>
<td>22,361,316</td>
<td>52,244</td>
<td>158,107,267</td>
</tr>
<tr>
<td>400</td>
<td>434</td>
<td>Eti Chrome Inc.</td>
<td>155,077,281</td>
<td>4,783,210</td>
<td>-</td>
<td>152,955,088</td>
</tr>
<tr>
<td>420</td>
<td>397</td>
<td>Söğütten Ceramic Inc.</td>
<td>175,399,413</td>
<td>-</td>
<td>-</td>
<td>146,607,086</td>
</tr>
<tr>
<td>436</td>
<td>-</td>
<td>Eczacibaşı Esan Industrial Raw Materials Inc.</td>
<td>183,331,276</td>
<td>-</td>
<td>-</td>
<td>141,661,689</td>
</tr>
</tbody>
</table>

Table: ISO’s Top 500 Industrial Enterprises 2010 List  Source: The İstanbul Chamber of Industry (İSO)
“The Brand of Turkish Mining”

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