by Madencilik Türkiye

Mining Turkey

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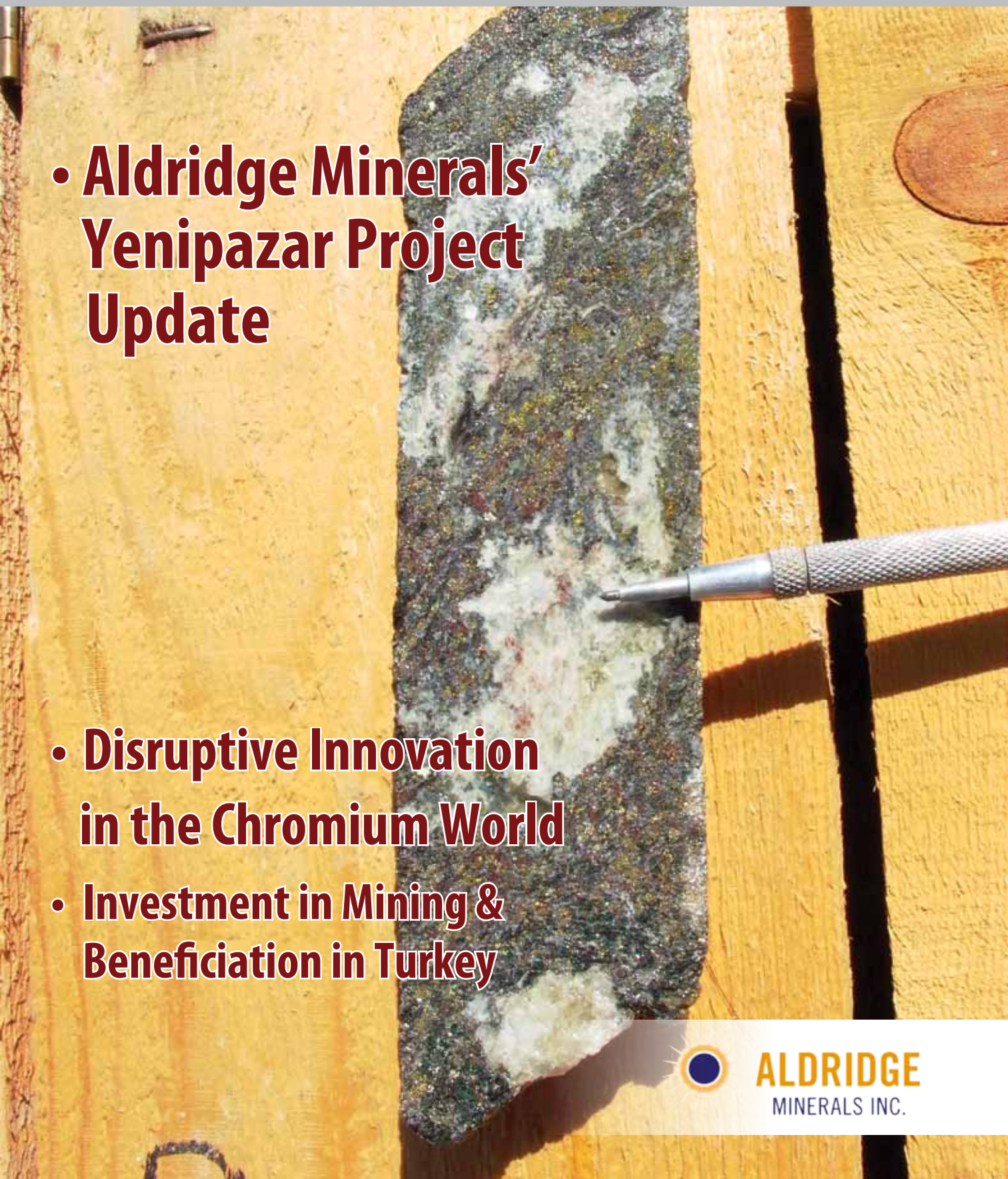

- Aldridge Minerals' Yenipazar Project Update
- Disruptive Innovation in the Chromium World
- Investment in Mining & Beneficiation in Turkey

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Mining *Turkey*

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Cover Photo

Aldridge Minerals Inc. is a near development stage mining company focused on advancing its Yenipazar polymetallic VMS deposit (Au, Ag, Cu, Pb, Zn) in Turkey. The Yenipazar gold-silver-copper-zinc-lead property is the company's most advanced property and is located at the geographic center of Turkey, approximately 220 kilometres east-southeast of Ankara, the capital city. Detailed information about the project is at the page 24.

ALDRIDGE MINERALS INC.

From Exploration to Production in Turkey by Foreign Companies

O. Çağım Tuğ | cagim@miningturkeymag.com

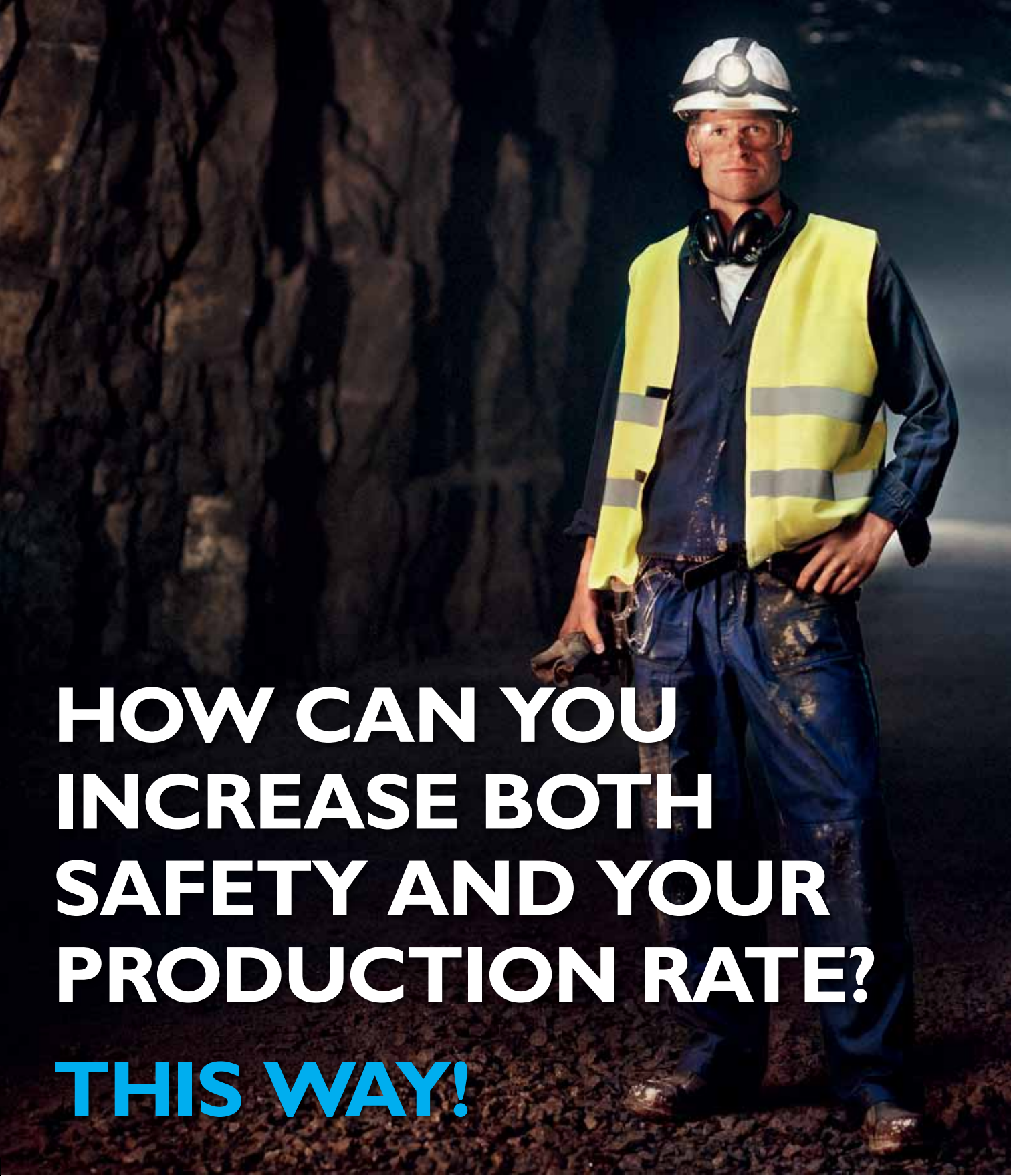
Turkey, with its high potential of precious metals, chromium, industrial minerals and marble, is one of the strongest potential investment areas of Europe. The government supports mining and production; provides special tax reduction in the new incentive system and even the drilling expenditures seems to be involved to it. During six months period from our last issue published in March 2012, nothing has gone backwards, all the projects are on the trail, government's support is growing and Turkish people are much more interested in mining ever.

Turkey becomes an attractive exploration area especially for gold and precious metals miners because of several reasons as I mentioned above. Since Eurogold has found the first gold mine in 1989 which was a placer deposit, quite a number of foreign companies entered Turkey to take their chances. Since that time, some companies purchased operations and some others along with junior companies continued on exploring all around Turkey with fresh ideas using new techniques and technologies with the motivation of increasing metal prices. After Eurogold, Çayeli Copper Mine started its production in 1994 by Çayeli Bakır İşletmeleri AŞ, which was a joint venture of Gama (6%), Turkish construction company, Eti Holding (45%), a company owned by the Turkish government, and Inmet Mining (49%). In 2002, Inmet bought the six per cent owned by Gama for $11 million. The Turkish Government privatized ÇBI in September 2004. Inmet Mining Corporation purchased the remaining 45% of the shares belonging to the Turkish Government in 2004 for $64 million through a public tender process and now owns 100% of Çayeli.

In 2006, Tüprag Metal Madencilik's (subsidiary of Eldorado Gold) Kışladağ gold mine started to produce gold and opened its second gold mine in Turkey, Efemçukuru Gold Mine in 2011. Alacer Gold (merger of Anatolia Minerals and Avoca Resources in 2011) started its commercial production at Çöpler Gold Mine in 2011 and became the third gold producer in Turkey. Since 80's, Teck is in Turkey but never started to production. AMR Mining produce rare earth metals with surface mining methods at Aksu Diamas deposits and they apply hydromining at Çanaklı area. Alamos Gold, Aldridge Minerals, Ariana Resources, Mediterranean Resources, Stratex International and Red Crescent Resources (RCR) have advanced level projects, planning to start production in 2012 or 2013. Centerra Gold, Chesser Resources, Eurasian Minerals and Kefi Minerals are the other foreign companies that have advanced exploration projects. For more information, please visit their websites. You will find detailed information about their projects in our subsequent editions.

In this issue, we prepared a detailed project outlook of Aldridge's Yenipazar Prospect, as an example of advanced level project. You will find the brief outlook of mining in Turkey as usual along with company profiles. Peter Laznicka's article on "Lithotheque System of Ore Deposit Records in Mineral Exploration: Turkey and the World" will give you a different idea on keeping databases of mines and lithologies in the old way. Sait Uysal's interesting article on graphite which is on the important and critical raw material lists of EU and BGS, shows the potential of graphite in Turkey. Turkish mining industry's actual atmosphere can be respired by two articles in this issue: "Investing in Turkish Mining Industry" by Sean Dessureault and Mustafa Kahraman from Arizona University and "Investment in Mining & Beneficiation in Turkey - A National Imperative" by Alan Clegg, Chairman of Afrasia Mining & Energy Consulting.

Mining Turkey Magazine, the voice of mining in Turkey, is on its way to give the most reliable and up-to-date information. Please e-mail me about your requests and critics to keep us on the right track! ●



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Orhan Yılmaz: We Are the Real Champions of Import of Turkey

Orhan Yılmaz, the General Manager of Eti Mine Works, who made some explanations in Eurasia - Mena Mining Summit carried out in May, gave a presentation in which he shared the topics not known much and commented wrongly about boron. At the summit, the topics explained by Yılmaz in the panel the theme of which is "The Future of Boron, Thorium, Uranium and Energy", included important information for anyone either within the sector or non-sectoral. Important details of the speech of the General Manager were as follows:

Yılmaz mentioned the followings in his speech: "We have the large part of the boron reserves. When considered like this, it is thought that we need to have the big part of the market, as well. The biggest weakness of the sector of boron is that the consumption side is weak. Boron and boron chemicals are not products which are sold as much as they are produced as assumed. Areas of usage are limited. We supervise the whole process from the mine till the chemical. The rumors that we sell the mine crudely still afloat in the streets. This is exactly inaccurate. We do not sell even 1 kg of crude mine. We produce chemicals from mine, we can produce until the latest phase of boron chemicals. We only sell the chemical we produce.

We have made really serious enterprises about production in recent years. We seriously increased our capacity and use of capacity. We were making production of 435,000 tonnes while having a capacity of 570,000 tonnes in the year of 2000. That is we were working below our capacity. Upon reaching 2011, we are making a production of 1,780,000 tonnes while the capacity is 1,725,000 tonnes. That means we are making production over our capacity. We are aiming to exceed the capacity use of 2 million tonnes in 2012 and 2013.

So, what brought us to this point? The worldwide increase in energy prices is a bad situation for the world but good for us. Because, by this means, the whole world have begun to concern themselves with the issue of energy efficiency recently. One of the most important elements in energy efficiency is the materials of isolation. One of the most important raw materials of isolation materials is boron chemicals.

As another issue, the topic of alternative energy has also become a current issue in recent years. Boron chemicals are the second main elements taking place in the production of solar tubes used in the panels to generate power via solar energy.

Use of composite in many areas from airplanes to automobiles thanks to economical and other reasons is becoming widespread. You need fiber to produce composite material. And to produce fiber, you need boron chemicals. That is why we increased our production capacity and amount in order to supply boron chemicals for this market."

Orhan Yılmaz spoke within his speech, in which he especially emphasized the condition of his establishment in the national economy, told the followings: "While our establishment was exporting $180 million at the beginnings of 2000, this year, we reached an exportation of $1 billion. We have a great meaning for national economy."

Yılmaz, indicating that they have been an indisputable leader in the world market in terms of both product range and profitability since 2005, stated that they will increase their production estimation of 2 million tonnes to 5.5 million tonnes within the 2023 target of the government and planning as well as financing of the investments within this scope are ready.

According to what Yılmaz cited, China being in the first place, Exportation of Eti Mining achieving a serious growth in the Far East and America, to China was $9 million in 2002 but it was almost $450 million last year. This year it is estimated to climb to $500 million. Besides, while boron chemicals were being consumed as 3,1 million tonnes in 2000's over the world, last year this number rose to 4,3 million tonnes. The market share of the establishment was recorded as 47% last year. This year, the market share is expected to be over 50%. Therefore, the establishment is in the condition of indisputable boron leader of the world.

One another issue is one of the biggest difficulties of the world: CO_2. We, by using boron chemicals, can transform the SO_2 and CO_2 in stack gas to another chemical as 100% percentage in laboratory scale and as 100% for SO_2, 70% for CO_2 in facility conditions. These outcomes were studied over and over and made certain. We will take out a patent for the study in the upcoming days. This issue is my doctorate topic." He ended his speech with these words.

New Ferro Silicone Manganese Plant at Denizli Province

GMY Madencilik Ltd. announced that they will build a ferro silicone manganese facility at Çardak county of Denizli province which will reduce the import of the commodity. The construction begins at the land assigned by Denizli Chamber of Industry and planned to start production within 1 year. Company partner and manager Mustafa Güçlü stated that GMY Madencilik will invest $50 million for the first phase, $130 million total for this project. He also mentioned that manganese is exported as a raw material and imported back for the use of iron-steel industry.

This facility will aim to meet the local demand and reduce the foreign dependency along with the Turkey's first ferro silicone manganese plant at Kastamonu province which has opened in December 2011. The plant's capacity will be 300 - 350 tonnes per day and will employ 550 people.

Park Holding's 2011 Annual Report Reveal Boost of Production

Turkish energy, mining, media, commerce giant Ciner Group's subsidiary Park Elektrik Üretim Madencilik AŞ published its 2011 annual report. According to the report the company's copper concentrate production has increased 107%, asphaltite production has decreased 9% and total net profit rate increased from 44% to 59% compared to 2010. The company's net sales from January 1st to December 31st are 151.1 concentrated copper, 19.7 million Turkish liras copper cathode, 1.7 million Turkish liras asphaltite and totally 172.5 million Turkish liras approximately.

Park Elektrik announced an important increase of reservs in 2011. According to the report prepared by Micromine Consulting Services, company's run-of-mine ore reserves reached to 39.8 million tonnes with the grade of 2.4%. The company produced 1 million tonnes of run-of-mine ore in 2011.

The main foundation of Ciner Group, Park Holding announced the agreement with Chinese Harbin Electric International Corp to cooperate for production, power plant operations and mining in June. For the first stage companies will develop projects for 600 MW power plant in Ilgın county of Konya province and in Kosovo.

Clear the Way For Boron
Production via Private Sector

It will be made possible for the mines, the production right of which is held by the government according to 2840 Numbered Law, to also be produced by private sector. According to the draft presented by Taner Yıldız- the Minister of Energy and Natural Resources- in the 5 March 2012 dated meeting of Council of Ministers, following a law amendment of a single item foreseen to be made in the 2840 numbered related law; private sector will also be able to take part in the production and marketing of mines like boron, uranium and thorium. If the draft is agreed, in the forthcoming periods, the production and benefication activities of the mines of boron salts, uranium and thorium will be able to be conducted by third parties via a tender initiated by Eti Mine Works but ownership of the mine will still be held by the government.

The excuse of the amendment wanted to be made is presented to the Council of Ministers as follows: "To remove several differences in the application; to provide the fast and effective application of production techniques suitable for today's technology at the stage of production and benefication of the mines of boron, uranium and thorium; to enable to achieve some sort of works via service procurement in order to be able to reduce the production costs." As it is known, according to the 10.06.1983 dated and 2840 numbered law, production and sale of the mines of boron salts, uranium and thorium are made by government and this authority is used by General Directorate of Eti Mine Works on behalf of the government.

Minister Yıldız: "We Are Not Privatizing Boron Mines"

Law amendment offer which was discussed at the Council of Ministers and proposes the production of boron products by private companies via service procurement by the government got reactions from various quarters by being commented in the national media that boron mines are being privatized. Following these reactions, Taner Yıldız, the Minister of Energy and Natural Resources, replied to privatization claims in his speech he gave in a meeting he attended. Yıldız, by mentioning that boron has a strategic importance said "Privatization of boron mines is not included either in our plans or targets". Yıldız, citing that a study is being made on this issue, specified that they felt the need to correct some kind of misunderstandings in Şanlıurfa though they underscored it and continued as follows:

"Boron is of our precious mines, it has a strategic importance. We have no thought of privatizing the boron. We have neither such an intention nor an objective. We want the boron we have to be processed with high technology in certain factories; again not vesting in any entity, not vesting in the mine. As a government, we want to increase our turnover. I am repeating over and over again, no private sector company can get and utilize the boron mine. The issue is under control of the public and will stay like this. Privatization of boron mines is not included either in our plans or targets. We will not let the production of boron mine by favor of private sector. We will only permit establishing factories on behalf of us and processing the mine we provided on behalf of us. What will happen to the mine taken out? Again we, as the public, will get the mine taken out." He said.

Magnesite AŞ Plan to Increase
Production Capacity

Eskişehir based magnesite producer Magnesit AŞ, announced that they are planning to increase production capacity. According to Milliyet Business' news, Magnesite AS, the exporter to 32 countries, plans to build a second rotary kiln with the capacity of 100.000 tonnes/year dead burnt magnesite. General Manager of the company Ekrem Bulur stated that the value of this investment will be €25 million and there is another plan to build vertical shaft kiln and refractory mortar production plant for another 15 million euro. Yearly production capacity of the company will reach to 290.000 tonnes when the building is accomplished and this will be the 45 - 50% of Turkey's total dead burnt magnesite production, he added.

With the capacity increase, the company plans to increase their export value from $63 million to $70 million. The export value is expected to reach $85 million in 2013. Magnesite AS export 80% of its production to 32 countries like Germany, India, Qatar, USA, UAE, Austria, South Africa, Canada, Vietnam, Phllippines, Saudi Arabia and New Zealand. Their target markets are Russia, Lebanon, China, Ukraine, Iraq, Chile and Mexico. The company was the 131. in the list of Istanbul Chamber of Industry's Turkey' Top 500 Industrial Enterprises of 2011 and has around 1000 employers.

Ermaden to Put Hasançelebi into Operation with New Incentives

Erdemir Mining (Ermaden) is continuing his studies with the aim of establishing a pelletizing plant in order to process the iron reserve in the town of Hasançelebi in the district of Hekimhan in Malatya. The company is planning to unearth the underground ore with the investment of $500 million it will make. In the field in which establishment of also a pelletizing plant is cited, employment of at least 1000 people is expected.

Approaching to the end in the current reserve amounts of Divriği iron deposits – belonging again to Ermaden- from which 52% of the iron production of our country is carried out, has diverted the eyes to the field of Hasançelebi. With the calculation of depletion of last reserves in Divriği in the year of 2017, the must of importing the product gained from here makes Hasançelebi project more valuable.

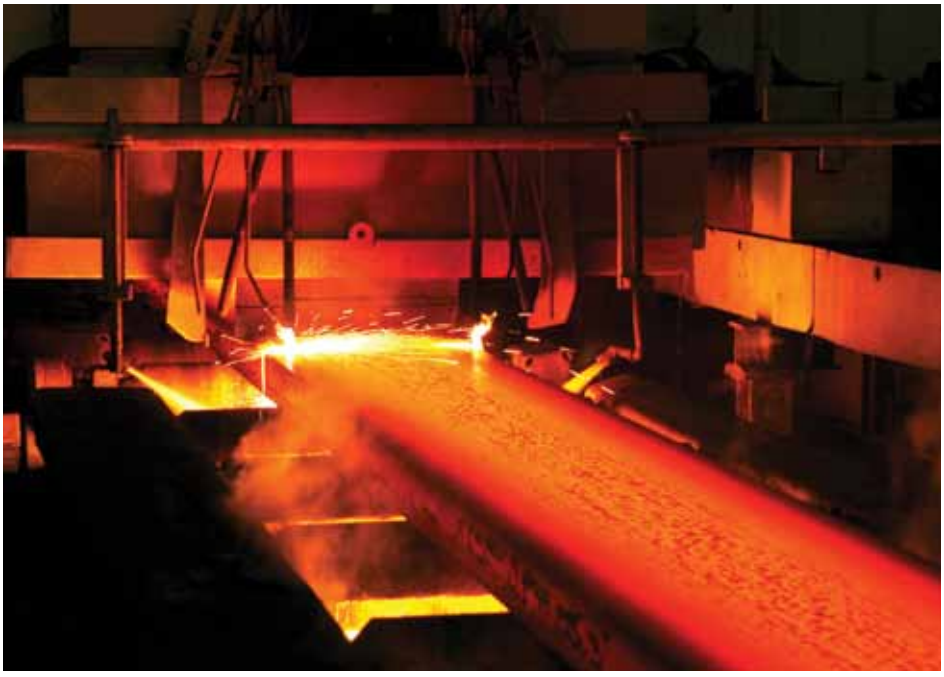
In the explanation made to AA correspondent by Sedat Orhan, General Manager of Ermaden, said that new technologies are needed to be used in this field by mentioning that the ore in Hasançelebi has 3 times less grade compared to Divriği mines and thus it does not seem to be economical with the current technology. Orhan said; "We are waiting for the new incentive law to be put into practice. We believe that the incentive law will enable this investment to be carried out".

Orhan who told that technological tests related to ore in Hasançelebi are completed and feasibility studies of the plant to be established according to this are continuing, emphasized that making the economy earn the Hasançelebi ore is needed to be considered as a strategic investment. Orhan said "Private incentives are needed to let this investment of almost $500 million to be economical."

Orhan the General Manager also spoke as follows, "We are aiming to establish a plant which will be able to process for 64 years in the town and produce 3 million tonnes of pellets annually. Incentive explanations made in last weeks made us really happy. We are waiting for the detailed studies of the related ministries. Incentive evaluations are very important for us. We are hopeful of the future of incentives which will reinforce the realization of investment and enable an economical business management. We carry on the studies in Hasançelebi with our experiences from Divriği. We have an experienced staff and keep it." Orhan indicated that in the event of developments are completed as planned, following the nationalization period, they foresee that the plant will enter a period of being actualized and opening to investment will be possible in 2013. Orhan stating that they foresee the plant to start production in 2017 according to time schedules, put into words that permanent employment of 1000 people will be enabled in the plant and during the project process, the employment will rise up to almost 2000 people.

Orhan telling that the project is exciting said "We can consider this project as the project of century in Turkey. It is a very big project. The locals also want this investment very much. It is a project whose EIA is attained; that is it has no negative side to the environment. There is no chemical waste. It will be a plant requiring to completely take ore in the nature and enriching it by processing physically."

The field of Hasançelebi the operation of which was not considered in the past years because of low tenor will be able to be evaluated as economical with the use of high technology. Average tenor in the field is 19,49% (Fe_3O_4) while the amount of reserve detected in the field is calculated as almost 1 billion tones. In the plant in which annually 3 million of pellet production is aimed, service life has been calculated as 64 years. At the end of the reserve enlargement studies to be carried out newly, extending the service life is also possible.



Latest Updates on Ariana Resources and Red Rabbit Project

Very likely Turkey's the next gold producer Ariana Resources announced several updates on their Red Rabbit Gold Project last few months. Ariana reported bonanza-grade drilling results from its exploration drilling programme between the Arzu South and Arzu North veins at the Kızıltepe sector of the Red Rabbit Gold Project in Western Turkey, in May. This high grade mineralized zone identified on the extension of the Derya vein and the sample results returned with highest grades ever recorded from the Kiziltepe deposit including: 12.1m @ 13.1 g/t Au + 187.6 g/t Ag (16.5 g/t Au equiv.); including 3.2m @ 38.7 g/t Au + 511 g/t Ag (48.0 g/t Au equiv.); and including 1m @ 65.9 g/t Au + 760 g/t Ag (79.7 g/t Au equiv.). Exploration drilling has also determined that the Arzu North vein system extends to the southeast beneath cover, rather than being truncated by an E-W structure as previously considered. Intercepts from this drilling include: 34m @ 1.04g/t Au equiv.; 7.6m @ 7.60g/t Au equiv.; 5.8m @ 5.71g/t Au equiv.

In July, Ariana published additional drilling results at Kızıltepe Sector. The drilling programme was designed to test parts of the Gamze and Fidan vein structures, which lie between the planned pits at Arzu South and the Banu. The results were encouraging: o 2.05m @ 9.57 g/t Au + 146.22 g/t Ag (12.23 g/t Au equiv.) o 4.00m @ 2.59 g/t Au + 38.25 g/t Ag (3.29 g/t Au equiv.). Several low to moderate grade, shallow depth intercepts have been returned from the Fidan vein system, including: o 1.00m @ 4.53 g/t Au + 5.3 g/t Ag (4.44 g/t Au equiv.) o 1.00m @ 2.88 g/t Au + 43.60 g/t Ag (3.67 g/t Au equiv.).

Ariana announced that they acquired four new prospective licenses totalling 4,058.08 hectares via auction in line with the company's strategy to expand its exploration footprint across western Turkey in June. Dr. Kerim Şener, Managing Director of Ariana Resources said that: "These new licenses add to the pipeline of exploration properties that we are developing in western Turkey in line with our strategy to expand our portfolio of exploration properties targeting the delineation of multi-million ounce deposits. Each license was acquired in auction following a careful selection process with all four licenses showing individual potential to host gold mineralization. An exploration programme will be initiated in July 2012 in order to define targets for possible drill testing in 2013." about these licences.

Ariana announced that they will be the operator of the joint venture with overall responsibility for implementing the exploration programmes and $1.77 million has been allocated by Eldorado in 2012 for advanced stage exploration programmes under the joint venture agreement. This

agreement covers the highly prospective Artvin Province of north-eastern Turkey where exploration campaigns are underway at the Salinbaş and Ardala gold prospects. ●

Global Yatırım Holding Plan to Produce Feldspar at Muğla

Turkish finance, real estate, energy and port management company Global Yatırım Holding will start to produce feldspar with a joint venture with Standart Teknoloji Savunma Enerji ve Madencilik Sanayi ve Ticaret AŞ (STS). A share transfer agreement has been signed by shareholders for the royalty of a feldspar mine at Muğla province and 75% total capital of the STS. The share transfer will be completed when the parties fulfill the preconditions.

STS produce 130,000 tonnes feldspar per year and export 70% of the commodity to Italy and Spain at the present time for glass and ceramic industry. The price of the transaction is undeclared. ●

Drilling is Also Wanted to Be Included into the Incentive

Miners, reacting positively towards supporting mining as a sector in the new incentive system, also want the drilling activities which are the musts of the sector to be included into the incentive. According to the news of the newspaper of Bugün, sector representatives gave examples of incentive applications from foreign countries while stating that an incentive in which drilling is not supported would be missing.

İsmet Kasapoğlu, the President of the Assembly of Mining Sector of Turkish Union of Chambers and Commodity Exchanges, indicated that drilling is absolutely needed to be promoted within new incentives bringing a new excitement to the sector while emphasizing that drilling is an inseparable part of mining and no mine can be found without drilling. Kasapoğlu, giving the foreign companies operating in our country as an example, told that they received incentive in their own country by stating that foreigners would use some of the profits they gained in the countries they operate for exploration and emphasized the importance of exploration and thus promoting drilling.

Ümit Akdur, the President of the Association of Gold Miners said "Exploration is the most risky and money requiring part of mining. There is a big demand, within the sector, towards promoting the drillings. We informed the authorities about that if exploration is not carried out, mining would not be available, as well." He also indicated that incentive towards new investments is made in mining but exploration and drilling activities which are the main elements of mining are also needed to be included into the incentive. Akdur reported that exploration and drilling activities can easily be integrated into the new incentive system by stating that positive adjustments related to the drilling can be made in the regulations to be made about the incentive.

Alacer's Çöpler Gold Mine
Update in the First Half

Alacer Gold announced its second quarter results of Çöpler gold mine production in 13th of August. At Çöpler, 76,621 attributable ounces were produced during H1 2012. Due to clay content of the ore and heavy snow in the winter, crusher throughput and heap-leach performance in Q1 negatively impacted. The cash costs/ounce is decreased 11%, from $312 to $347 $/ounce, probably due to the repairs of crusher screen and feeder area in Q2. In response to the increased amount of high clay content ore encountered during Q2 2012, the mine plan of Çöpler has been adjusted to deliver larger volumes of lower clay content ore from the Manganese and Marble Pits during H2 2012. The adjusted mine plan requires accelerating waste removal in the Manganese and Marble Pits and deferring waste removal in Main Pit in H2 2012 which will allow access to higher grade low clay content ores from Manganese and Marble pits beginning in September 2012.

Alacer announced an update on exploration at the northern extension to Çöpler main zone in the end of July. According to the news release, in the previously untested old Çöpler Village area, initial drilling has intersected thick gold mineralization in all holes. Mineralization remains open to the north over a strike length of 500m in this area of the Main Zone. Results include 167.5m at 1.9g/t gold from 114.2m in CDD355A and 91.7m at 1.6g/t gold from 59.5m in CDD364. High-grade mineralization within the current sulfide pit boundary but outside the current resource has been intersected in several holes. Results include 24.3m at 12.6g/t gold from 107.8m in CDD357. Extensive gold mineralization continues to be intersected below the current sulfide pit boundary and outside the current Main Zone resource.

According to the news release, work is in progress to finalize a new Çöpler resource estimate during Q3 2012. The new estimate will include additional data from drilling completed from September 3, 2011 to June 30, 2012.

Exploration Goes On at Cevizlidere

Tunçpınar Madencilik authorities stated to our magazine that the exploration program continues at the company's asset and one of the Turkey's most promising copper deposit Cevizlidere prospect at Ovacık - Tunceli. According to Tunçpınar's PR Manager Hacı Karakuş's statement to Hport, there are still numerous works to be accomplished to clarify the edges of the mineralization. Following this work, some drilling programs have to be done to reveal the mining site and then a feasibility study has to be accomplished. Karakuş continued "We are not planning to produce gold in this prospect because the gold mineralization is low grade. Our company informed its legal liability about the subject to the relevant institutions, organizations and representations. Human health, environment and protecting sentimental values are very important for us. Due to moral responsibility, environmental and community values will be protected along with a successful practice of actual laws, legislations, international standards for a sustainable mining activity." and show the company's sensibility.

Tunçpınar Madencilik is a joint-venture of Çalık Group and Alacer Gold. According to an equal shares agreement, which comprise this prospect along with 15 projects in 2011, Çalık Group and Alacer Gold gave a start to Tunçpınar Madencilik at Cevizlidere prospect. At the prospect, it is estimated to be 450 million tonnes copper reserve with % 0,4 Cu along with 0,11 g/t Au. 5.000 meters drilling has been accomplished at the prospect so far and the mineralization shows signs of extensions along the mineralisation and to the deep.

CORRECTED

This is the corrected version of the news and it is different than the printed magazine.

Stratex Sold %51 of Muratdere Project to Pragma

Stratex International plc, the AIM-quoted exploration and development company focused in Turkey, East Africa and West Africa, announced that Turkish investment company Pragma Finansal Danışmanlık Ticaret A.Ş. has successfully completed a four month due-diligence programme on the Stratex' Muratdere porphyry copper-gold-molybdenum project in Turkey.

Following the successful conclusion of the programme, Lodos Maden Yatırım Sanayii ve Ticaret A.Ş., a wholly-owned mining investment company of Pragma, has signed a definitive share purchase agreement to acquire 51% of the company holding Muratdere assets from Stratex. Completion occurred after the payment of $1.7 million to Stratex in August. Lodos will then have the right to acquire up to 70% by making additional payments, undertaking further drilling, and completing a feasibility study. Stratex CEO Bob Foster said, "We are delighted that Pragma has successfully completed its due diligence and, through its wholly-owned mining investment company Lodos, has now entered into a definitive agreement for the acquisition of a majority stake in the Muratdere project. There is little doubt that Muratdere has the potential to be a substantial copper-gold-molybdenum deposit and we look forward to further updates as they continue to evaluate the resource and establish the most appropriate way to exploit the contained metals."

The Muratdere copper-molybdenum-gold porphyry deposit has a JORC-compliant inferred resource of 51 million tonnes grading 0.36% copper, 0.12 g/t gold, 2.40 g/t silver, 0.0125% molybdenum and 0.34 ppm rhenium.

Stratex announced updates on its Inlice and Altıntepe development projects in June. According to the press release dated June 13th, approval of Inlice environmental impact study has been granted and GBM Minerals Engineering Consultants Ltd will undertake rapid review of feasibility study to finalise the conceptual design and provide updated project economics. For the Altıntepe project, infill drilling of Çamlık East Zone for detailed resource modelling has been completed.

600 MW Thermal Power Plant Construction at Tufanbeyli

Energy and Natural Resources Minister Taner Yıldız stated that the ministry initiated the project of a thermal power plant at Tufanbeyli county of Adana province. Within the program of reducing Turkey's foreign energy dependency, the thermal plant will be built which is a cheap and local energy source of electricity, at the lignite project with 323 million tonnes reserves.

The royalty agreement has been signed between General Directorate of Turkish Coal Enterprises and TEYO Yatırım ve Dış Ticaret AŞ with the presence of Minister Yıldız, in June. Within the agreement, the investor will not pay any value but will give shares to the state of the electricity produced.

TEYO Yatırım ve Dış Ticaret A.Ş. CEO Ferudun Korkmaz, disclosed that $1.2 billion would be invested in the project and that it would be completed in six years. He informed the participants of the signing ceremony that the plant is targeted to produce $3.6 billion kWh of power, and TEYO will pay TKİ $50 million for the lease. The Chinese partner of TEYO, Weiqu Energy Investments Co. Ltd., indicated that China believes Turkey is the country to invest in and more investments are on the way.

Turkish Invasion
of PDAC - Canada

PDAC celebrating its 80th year this year brought together investors, analysts, administrators in mining, geologists, researchers and international government authorities all over the world in 2012. PDAC, one of the most important activity of the world in terms of mining, beat a record this year with almost 1,000 participant firms and visitors over 30,000.

The fair which is arranged annually by PDAC and nearly 9.000 people from exploration and development industry are the members of which is considered as a very important activity by Joe Oliver, the Minister of Natural Resources of Canada, for the sake of preserving Canada's number one position towards exploration investments in the world.

A great majority of exploration and operating companies in Turkey are among the participants of the fair. Besides almost 100 company representatives from Turkey, General Manager of Mining Affairs Mehmet Hamdi Yıldırım and General Manager of Mineral Research and Exploration Mehmet Üzer also took place in the fair activity.

A record number of participants and visitors from Turkey enabled Turkish mining sector to attract great attention in the fair. In this sense, Turkey was among the enhancing countries in PDAC 2012 and increasingly arrival of international investors recently will display the actualization of this interest. As happened this year, participation of senior bureaucrats from Turkish mining sector into PDAC activity in the upcoming years will contribute importantly to Turkey's international recognition.

Taking part of two Turkish firms in the exhibition area of the fair was proud for our country. Booths of the companies of Spektra Jeotek –drilling services and producer of equipments- and Teksomak –producer of drilling machines were the center of interest of the visitors. Participation of these two precious firms to such an important fair like PDAC and the great interest they got were the evidences that Turkish firms have a voice on international platform by their technological superiority and competitive capacity.

Teksomak Co. Ltd. which was established in 2002 as the machine group of Tekson Engineering Mining Inc. that has been carrying on its operations on engineering since 1983, has been supplying drilling machine and equipments for geological survey, exploration and production companies. The firm known also for the importance they give to R&D studies, introduced its products to visitors in PDAC 2012.

Spektra Jeotek established in order to serve drilling, undertaking and engineering in 1985 is one of the most important mine drilling firms of Turkey. The company giving drilling service intensively also abroad besides its activities in Turkey, introduced Spektra Drilling Canada to the sector, that they launched recently in Canada.

ALS Minerals

ALS Minerals is the global leader in providing analytical and assay services to the exploration and mining industry.

Over 10 years experience in Turkey

ALS Turkiye has been serving the mining sector since 2001. With its experienced staff, consistent quality and dependable client service, ALS Turkiye now operates in its large, new analytical laboratory in Izmir, which is ISO 9001:2008 accredited.

ALS Izmir lab capabilities include:

- Expanded sample preparation with isolated soils/stream sediment sieving area
- Large Fire assay laboratory for gold analyses with AAS and Gravimetric finish (Au-AA23, Au-AA24, Au-AA25, Au-AA26, Au-GRA21 and Au-GRA22)
- Silver and base metal analysis with AAS finish (Ag-Pb-Zn-Cu-Fe-AA45 and AA46)
- Total sulphur and sulphide sulphur by LECO (S-IR07 & S-IR08)
- Specific gravity determinations on rocks as well as pulps by pycnometer
- Mine related environmental control analyses with methods including metals by ICP and anions by IC

NEW! This summer the Izmir lab's capabilities are being expanded to include geochemical analyses by aqua-regia and 4-acid 'near total' digestion ICP analyses (ME-ICP41 & ME-ICP61) in order to provide very fast TAT for your exploration projects.

Contact us to discuss cost-effective solutions:

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Mining Companies in Top 1000 Exporter Enterprises of 2011

Turkey's total exports for all commodities reached $134.6 billion in 2011. Mining products accounted for 2.9% of the country's total exports, with a decrease of 0.3% comparing to last year but the value of the mining products export has reached to record high $3,876,383,000 with an increase of 6%. There were 33 mining companies ranked in the list Top 1000 Exporter Enterprises of 2011.

2011 Rank	2010 Rank	Name of the Enterprise	2011 Exports ($)	2010 Exports ($)	Change (%)
13	13	Şişecam Dış Ticaret A.Ş.	844.381.366,73	758.601.332,03	11,31
15	16	Eti Mine Works General Management	826.292.756,82	629.551.355,59	31,25
39	34	Çayeli Bakır İşletmeleri A.Ş.	288.455.539,54	260.584.394,48	10,70
83	73	Eti Aluminium Inc.	153.653.529,34	153.633.921,64	0,01
174	135	Ekin Maden Ticaret	81.621.682,22	90.516.765,38	-9,83
189	217	Kaleseramik	77.146.766,28	60.005.703,96	28,57
245	246	Magnesit AŞ	63.408.798,99	52.972.036,75	19,70
291	299	Kaltun Madencilik San.	55.062.467,60	45.849.350,32	20,09
299	902	Aşçim Çimento Beton Nak. San.	54.007.349,32	17.584.799,35	207,13
307	578	Cihan Maden ve Metal Ürünleri San.	53.012.892,75	26.044.443,99	103,55
311	200	Alfa Mermer San.	51.746.604,97	64.566.239,84	-19,86
330	258	Çinkom Çinko Kurşun Metal ve Mad.	49.624.744,10	51.967.538,10	-4,51
341	412	Nuh Çimento San.	47.852.387,56	34.529.936,89	38,58
366	373	Eti Elektrometalurji	45.366.398,82	37.157.390,74	22,09
417	244	Dedeman Madencilik San.	41.505.327,96	53.699.706,46	-22,71
421	197	Cvk Dış Ticaret	41.118.953,40	65.401.353,92	-37,13
481	554	Leonardo Granit San.	36.047.820,50	27.016.221,58	33,43
511	366	Göltaş Göller Bölgesi Çimento San.	34.235.837,37	37.589.585,19	-8,92
535	682	Olimar Madencilik	32.994.274,48	22.749.549,68	45,03
585	527	Demir Export	30.733.243,47	28.145.101,41	9,20
613	485	Koçak Madencilik San.	29.375.645,49	29.796.367,23	-1,41
619	349	Çimentaş İzmir Çimento Fabrikası	29.130.200,13	39.487.386,69	-26,23
622	655	Traçim Çimento San.	28.996.613,33	23.779.823,29	21,94
631	517	Dimer Diyarbakır Mermer İnş. San.	28.710.936,04	28.342.566,47	1,30
730	...	Akmetal Dış Tic. Madencilik San.	24.678.369,90	...	...
835	901	G-M Mermer Granit San.	21.945.428,82	17.613.956,55	24,59
849	839	Metamar Mermer Granit Madencilik	21.568.444,74	19.008.237,99	13,47
898	...	Eti Soda Üretim Paz.	20.507.566,06	...	...
912	...	Eti Bakır AŞ	20.052.954,23	...	...
915	652	Plato Mermer Madencilik San.	20.037.052,25	23.808.774,09	-15,84
936	...	Alabanda Madencilik	19.645.827,38	...	...
979	885	Kop Krom Madencilik	18.792.493,22	17.930.395,44	4,81
995	...	Türk Maadin Şti.	18.606.467,15	...	...

ŞIŞECAM TOOK THE FIRST PLACE

Şişecam Dış Ticaret AŞ, producer and exporter of float glass, glassware, glass packaging and chemicals, ranked 13th in the list and took the first place among mining product exporting companies with an 11.31% increase by value. Eti Mine Works General Directorate, the only authorized producer of boron in Turkey, ranked one place up, took the 15th place. World's top borate producer enterprise continued its leadership in the world borate market last year and planning to increase the production this year. State controlled Eti was the 4th enterprise in the list of "Most Profitable Enterprises of 2011" according to Istanbul Chamber of Industry. Eti Mine Works announced this year's export target as $1 billion.

Çayeli Bakır İşletmeleri (subsidiary of Inmet Mining) was the 3rd mining company in the list with its copper export value of $288.5 million. Eti Aluminum, a Turkish private mining company, has finished year as the 4th biggest mining products exporter, with about the same value as last years $153.6 million.

5 NEW PRODUCERS IN THE LIST

There are 5 new entries to the list this year: Akmetal Dış Ticaret Madencilik Sanayi (Turkish chromium producer), Eti Soda Üretim Paz. (The second largest trona (natural soda ash) ore bed in the world is being operated by Eti Soda, which is a company of Turkish conglomerate Ciner Group), Eti Bakır AŞ (Turkish copper producer, which is a company of Turkish conglomerate Cengiz Holding), Alabanda Madencilik (Turkish industrial minerals producer company of Çine Akmaden Madencilik Corp), Türk Maadin Şirketi (Turkish chromium producer). Some companies

This year the value of mining products export is expected to be $4.2 billion and more mining companies expected to rank in the list. ●

Turkey's Mining Products Exports of the First Half of 2012

The leader of economic growth by employing 750,000 people, mining industry in Turkey seems to reach its goal, to grow 10% this year. In the first half of this year, mining products exports have increased 5.29% comparing to the same period last year and soared to $1.93 billion. Especially in June, mining products export overcame the $400 million level with the record high $411.8 million. Istanbul Mineral Exporters' Association Chairman of the Board Mehmet Özer states that they expected the growth to be around 10% level and the mining assets exports to reach $4.2 billion and natural stones export to $1.85 billion.

NATURAL STONES TOOK FIRST PLACE

The largest share of Turkey's mining products exports was natural stone exports by 44.3% and the value of exports reached to $857.9 million. Metallic ores with $645.5 million, industrial minerals with $320.2 million, ferroalloys with $67.2 million and other mining products with $39.7 million are the next commodity values that Turkey exports.

Natural stones continued to make a substantial contribution to Turkey's exports in 2012, increased 11.29% comparing to the same period last year. 53.9% of the natural stones export was processed natural stones exports and 46.1% was block exports.

THE LEADING EXPORT MARKET IS CHINA

For the first six months period, China continued to be Turkey's leading export market by far, with an increase of 14% compared to the last year. The value of the commodity sales were more than $760 billion. The next largest destinations for Turkey mining products exports are USA ($159 billion), India ($74 billion), Italy ($64 billion) and Belgium ($57 billion). If we look at the figures closely, it can be seen easily that there are some deficits on the export figures compared to the same period last year. The countries that Turkey's export value has decreased are all EU member countries and it point out the impact of the economic crisis in Europe. The deficit related to EU member countries has been recovered by India, Morocco, Mexico, Spain, Taiwan, Saudi Arabia and Egypt. Lead was the leading commodity exported to Morocco. ●

Turkey's Mining Products Exports Country Basis (First 30 Countries)

		January - June 2011		January - June 2012		Change (%)	
		Amount (Kg)	Revenue ($)	Amount (Kg)	Revenue ($)	Kg	$
1	China	2.799.947.110	668.297.113	3.436.911.621	760.447.685	23	14
2	United States	257.278.201	143.077.373	295.201.301	157.862.556	15	10
3	India	127.749.722	45.246.705	147.264.779	73.794.699	15	63
4	Italy	1.119.995.475	66.973.413	1.162.301.332	64.032.500	4	-4
5	Belgium	164.674.726	54.111.147	145.915.612	57.150.291	-11	6
6	Iraq	205.114.190	47.189.822	231.063.174	54.757.510	13	16
7	Russia	542.301.394	44.911.402	529.862.828	51.705.892	-2	15
8	Spain	472.002.845	32.763.184	498.909.668	48.523.217	6	48
9	Saudi Arabia	121.720.244	34.173.240	167.431.086	46.176.637	38	35
10	Germany	273.748.812	46.913.900	155.786.218	33.901.432	-43	-28
11	Austria	79.617.358	36.789.970	90.206.835	32.458.977	13	-12
12	Israel	156.023.930	26.263.442	182.805.825	30.208.523	17	15
13	Sweden	103.205.606	31.876.745	65.264.036	29.714.167	-37	-7
14	United Kingdom	82.077.971	31.673.765	59.607.611	29.546.026	-27	-7
15	France	96.550.720	29.330.667	64.364.911	27.989.347	-33	-5
16	Taiwan	59.598.722	18.079.844	80.959.308	26.292.698	36	45
17	Canada	25.884.483	22.507.961	28.470.682	25.409.472	10	13
18	UAE	170.314.493	19.140.827	108.878.397	24.530.962	-36	28
19	Netherlands	167.474.611	40.640.317	118.314.965	22.377.192	-29	-45
20	Azerbaijan - Nakhchivan	47.033.136	17.087.630	47.517.481	20.162.122	1	18
21	Morocco	7.199.027	1.834.593	40.015.079	19.725.371	456	975
22	Ukraine	160.664.856	22.608.714	232.470.185	18.451.085	45	-18
23	Bulgaria	92.081.091	44.618.288	66.442.358	16.323.878	-28	-63
24	Finland	26.705.302	26.593.131	13.520.596	13.159.049	-49	-51
25	Australia	28.306.113	17.527.391	27.137.874	12.114.299	-4	-31
26	Egypt	94.975.822	8.799.447	117.256.419	12.108.740	23	38
27	Georgia	117.349.386	7.786.848	57.663.566	10.179.495	-51	31
28	Romania	112.978.150	12.304.426	79.547.642	10.096.797	-30	-18
29	Lebanon	26.325.186	7.729.124	28.088.878	9.964.422	7	29
30	Mexico	5.017.179	5.301.408	10.521.883	9.762.699	110	84

Turkey's Mining Products Exports Commodity Basis						
	January - June 2011		January - June 2011		Change (%)	
	Amount (Kg)	Revenue ($)	Amount (Kg)	Revenue ($)	Kg	$
Salt	258.399.813	20.501.578	26.088.310	3.726.275	-90	-82
Iron Pyrites	0	0	22.150	3.578	100	100
Sulfur	23.208.793	4.020.322	21.536.723	4.357.565	-7	8
Grafite	92.464	91.089	366.220	475.028	296	421
Quartz, Quartzite	169.219.506	19.745.816	176.452.564	21.678.342	4	10
Kaolin & Clay with Kaolin	16.685.669	764.065	43.344.781	1.358.370	160	78
Bentonite	154.629.787	18.072.352	141.511.576	16.643.379	-8	-8
Other Clays	6.845.513	2.057.249	8.494.613	1.920.812	24	-7
Calcium Phosphate	614.422	161.855	329.193	56.230	-46	-65
Barite, Whitherite	70.752.776	8.383.764	52.080.456	7.302.210	-26	-13
Pumice	68.549.234	4.725.880	44.192.964	3.471.821	-36	-27
Grindstone & etc.	14.382.423	905.839	21.061.267	1.894.638	46	109
Dolomite	11.891.683	1.308.537	13.394.392	1.445.865	13	10
Magnesite	149.752.659	49.054.440	207.116.937	43.896.372	38	-11
Gypsum	377.796.952	31.606.223	418.795.682	34.649.356	11	10
Mica	415.125	136.369	408.045	136.041	-2	0
Natural Steatite, Talk	1.272.610	610.401	989.918	427.357	-22	-30
Natural Cryolite ve Siolite	2.012.968	370.926	316.000	61.823	-84	-83
Natural Borats & Concentrates	244.972.636	78.583.490	269.202.620	85.796.837	10	9
Feldspars	2.091.012.900	70.393.720	2.145.549.989	70.365.352	3	0
Perlite	171.808.680	9.064.716	208.861.215	11.076.073	22	22
Sepiolite	514	1.660	3.002	4.102	484	147
Celestine	3.000	1.032	10.001	3.735	233	262
Other Industrial Minerals	231.880.348	18.200.077	107.264.784	8.851.150	-54	-51
Iron Ores	87.556.530	8.238.989	211.344.054	17.572.564	141	113
Manganese Ores	45.068.078	6.912.182	41.756.580	6.142.836	-7	-11
Copper Ores	120.766.883	183.702.433	161.418.226	208.082.500	34	13
Nickel Ores	183.371.700	8.777.550	160.150.000	7.617.050	-13	-13
Cobalt Ores	499.910	574.967	25	242	-100	-100
Aluminum Ores	78.370.610	2.904.005	68.129.360	2.160.246	-13	-26
Lead Ores	26.110.540	37.916.612	40.708.189	63.156.996	56	67
Zinc Ores	152.629.919	102.484.334	165.113.104	89.682.395	8	-12
Chromium Ores	1.039.810.807	226.980.400	1.068.612.084	214.551.011	3	-5
Molybdenum Ores	21.994	525.352	0	0	-100	-100
Tungsten, Uranium, Thorium & Titanium Ores	20.006	21.590	26.000	63.960	30	196
Zirconium, Niobium, Tantalium, Vanadium Ores	600	4.384	1.588	58.081	165	1.225
Precious Metals (Gold, Silver, Platinum)	72.015	15.123	0	0	-100	-100
Antimony Ores	1.643.160	14.686.769	1.414.240	11.179.061	-14	-24
Tin Ores	44.666	137.615	880	16.278	-98	-88
Other Metallic Ores	125	240	0	0	-100	-100
Granulated Cinder	269.001.551	18.434.655	283.074.453	22.294.555	5	21
Metallic Ashes	5.903.651	3.330.681	2.672.314	2.319.082	-55	-30
Other Cinders & Ashes	4.171.440	105.140	6.740.000	137.880	62	31
Mineral Fuels	29.469.053	3.406.181	28.569.547	3.836.232	-3	13
Natural & Artificial Abrasive Dust, Rubber	2.228.404	16.272.364	2.859.090	18.696.690	28	15
Cinder Wool, Rockwool & Other Minerals Wools	9.350.994	9.277.014	11.164.656	11.439.262	19	23
Refined Mica & Products	14.930	183.543	34.134	343.755	129	87

Turkey's Mining Products Exports Commodity Basis						
	January - June 2011		January - June 2011		Change (%)	
	Amount (Kg)	Revenue ($)	Amount (Kg)	Revenue ($)	Kg	$
Other Rock & Mineral Products	2.266.415	19.051.456	3.117.628	16.350.547	38	-14
Ferro-chromium	34.610.348	51.893.826	41.733.000	60.400.235	21	16
Other Ferro Alloys	9.754.287	14.735.191	4.091.875	6.792.155	-58	-54
Total	6.182.266.230	1.070.695.845	6.224.299.646	1.083.666.305	1	1
Raw & Rough-hew Granite	152.268.332	1.460.934	51.727.705	638.760	-66	-56
Marble - Travertine, Raw & Rough-hew	705.843.285	110.570.130	558.686.281	96.742.616	-21	-13
Rectangular Blocks or Slabs of Granite	71.313.603	5.212.534	72.342.450	4.869.879	1	-7
Rectangular Blocks or Slabs of Marble - Travertine	1.403.721.385	218.195.731	1.833.729.196	293.519.949	31	35
Raw / Rough Natural Stones Total	2.333.800.847	335.554.701	2.516.829.209	395.836.692	8	18
Processed Marble	641.470.416	307.896.384	680.959.314	327.638.915	6	6
Processed Travertine	182.759.236	95.908.313	211.335.251	111.756.446	16	17
Processed Granite	11.058.594	7.013.667	11.460.397	7.857.890	4	12
Other Processed Rocks for Construction	24.637.536	14.172.140	14.025.196	9.134.982	-43	-36
Processed Arduvaz	634.805	1.317.522	369.036	1.080.923	-42	-18
Pavement and Flagstones	89.686.235	3.410.114	5.590.816	1.401.054	-94	-59
Tile Stones & Dusts	11.384.206	5.597.973	8.102.120	3.003.244	-29	-46
Processed Natural Stones Total	961.631.028	435.316.113	931.842.128	461.873.454	-3	6
Natural Stones Total	3.295.431.875	770.870.814	3.448.671.337	857.710.146	5	11

"BLOCK EXHIBITION: TURKISH MARBLE MEETS DESIGN" Exhibition in Milano, April 2012

Drill Rig Technology by Teksomak

Teksomak is the machinery group of Tekson Drilling Company. Since 2002, Teksomak's main activity is to manufacture drilling rigs for exploration drilling, blast hole drilling, and drilling products. From the very beginning, Teksomak has directed itself as an international company, with competitively priced products and a level of service which many foreign companies cannot provide. Teksomak' s vision relies on that "to manufacture and serve high quality of drilling rig and equipments to everybody who drills no matter where they are". Teksomak always aim to be a successful, satisfactory and profitable drilling rig and equipments manufacturing company. So far, Teksomak achieved to be the best known with reliability and finest quality of the products in the regional market and in the worldwide. Customer satisfaction is the basic principle for our company. Teksomak is providing machines and equipment for geological exploration companies and mining companies.

Our manufacture spectrum is Pathfinder10 Multipurpose Drill Rig, Frontier200 Reverse Circulation, Explorer60 Full Hydraulic Drill Rig, Explorer30 Full Hydraulic Drill Rig, Rocker34 Wagon Drilling and VDD5 Wagon Drilling.

Frontier200 is for reverse circulation drill rig and can be mounted on crawler for hard ground conditions. Rod rack is fixed on Frontier200 Reverse Circulation Drill Rig. Cyclone can me mounted on Frontier200 Reverse Circulation Drill Rig or separated from it on the trailer.

Pathfinder10 is multipurpose drill rig for coring, drilling, blast hole drilling, water well drilling and reverse circulation drilling. It can be built on different frames such as regular skid frame, wheel, hydraulic crawler and truck. The rotation head can be swung aside for hole cleaning or grouting equipment.

Exploration drill rigs have variety of drilling capacity and hole sizes, can be designed either with electrical engine or diesel engine, and have automatic hydraulic synchronization system between chuck and rod holder to handle the rods. There are two types of drilling rigs available on our production line being Explorer30 and Explorer60. Explorer30 has 120 meter capacity drilling rig that is developed for the small underground tunnels and short distance surface drills. It is light weighted and user friendly.

There are also two types of blast hole drill rigs are available on Teksomak's product line, VDD5 and Rocker34. Rocker34 has more capacity than VDD5 and also has crawler for the difficult ground conditions.

Teksomak, known as reliability and finest quality of the products in the market, is providing drill rigs and equipment for geological exploration both underground and surface. Teksomak R&D department works for developing machines and drilling technology continuously and strong after sales services help

customers to provide constant working conditions in difficult environments. Teksomak targets continual progress and quality since our inception, Teksomak has become a company that manufacture World-class Drilling Rigs. ●

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Dassault Systèmes Acquires Gemcom Software

It was announced on 12th July that Dessault Systèmes, the 3DEXPERIENCE Company, world leader in 3D design, 3D Digital Mock Up and Production Lifecycle Management (PLM) solutions, has acquired Gemcom for approximately US$360 million. As part of the acquisition all of Gemcom's products and employees remain in place, and Gemcom will continue to serve the mining industry. The announcement heralds the beginning of exciting opportunities and technological developments which will bring a new era of possibilities to the mining industry as a whole.

Dassault Systèmes provides business and people with virtual universes to imagine sustainable innovations, with solutions to transform the way products are designed, produced and supported. The Company's collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 150,000 customers of all sizes, in all industries around the globe.

With the acquisition of Gemcom, Dassault Systemes' objective is to 'model and simulate our planet, improving predictability, efficiency, safety and sustainability within the natural resources industry and beyond'. In order to support this goal, the Company will create a new brand, GEOVIA, which will see Gemcom transition to this new name, GEOVIA will compliment Dassault Systemes' exisiting brands, CATIA, SolidWorks, ENOVIA, SIMULIA, DELMIA, NETVIBES, 3DSWYM, 3DVIA and EXALEAD.

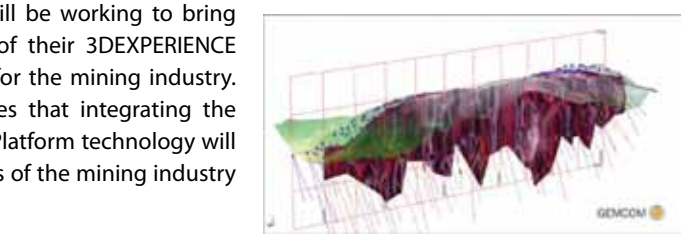
In a press release issued by Dassault Systemes, the Company's President and CEO Bernard Charlès said, "Raw material provisioning and long term resource availability is a major concern for society. (This) announcement is a significant step towards fulfilling our purpose of providing 3D experiences for imagining sustainable innovations to harmonise products, nature and life."

"This acquisition will clearly benefit our clients, bringing global support and enterprise collaboration. Advanced technologies in 3D modelling and simulation will not only enable engineers and geologists to model and visualise resources but also improve sustainable mine productivity. We believe that with Dassault Systèmes' support we will be able to address global issues for our customers as a real partner. None of our competitors can match that in this industry." said Rick Moignard, President and CEO of Gemcom. Rick will become the CEO of the GEOVIA brand.

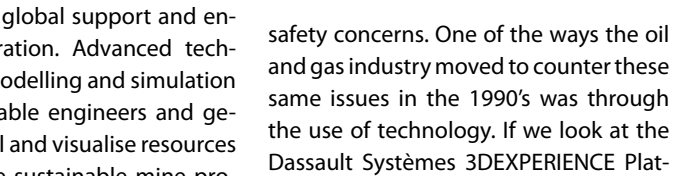
The company will be working to bring the innovation of their 3DEXPERIENCE Platform to life for the mining industry. Gemcom believes that integrating the 3DEXPERIENCE Platform technology will provide the basis of the mining industry of the future.

"Our first priority is mining. We will never leave the mining space and our team continues to be focused on mining, and on our clients and developing technology for them." Rick commented.

"The mining industry is facing some major issues around skills shortage, deeper more remote mining projects, environmental regulations, and health and safety concerns. One of the ways the oil and gas industry moved to counter these same issues in the 1990's was through the use of technology. If we look at the Dassault Systèmes 3DEXPERIENCE Platform we see a lot of technology that is used in other industries that could be repurposed into the mining space to help solve some of these issues. There are numerous parallels between what Dassault Systems has done in other industries and what we could adapt to mining. This is a great evolutionary step in the life of Gemcom." Says Rick.



"We wanted to find a company that would take time to understand our customers and add value to the Gemcom offering. Dassault Systems brings industry technology that can be adapted to mining and not only create a sustainable competitive advantage, but is also so advanced that it will change the way the industry does business." ●



GEMCOM becomes GEOVIA

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SGS Ankara Geochemical Laboratory

For its quality and versatility of services provided to clients SGS is a world wide leading analytical service company. One of SGS staples is an analytical service for mining industry. In this sector SGS employs top notch specialists and it has state of the art techniques at it disposal. SGS mining analytical service fulfills all demands of the industry, covering analysis applied in exploration, environmental, grade control, metallurgical and commercial settlement segments of mining industry.

For a long time SGS presence in Turkish mining industry was confined to sampling and control assay of ores and concentrates. Now SGS Turkey is providing mining industry of east Mediterranean and Caucasus with complete spectrum of analytical service.

SGS Geochemical Lab in Ankara is one of largest and best equipped labs of that profile in the region. SGS Geochem Lab. is a full scale laboratory conveniently located in a new development of Sincan industrial zone.

With the best expertise this lab will provide clients with noble metals (gold, silver and PGM) analysis known everywhere as assay. This method has been in use by human civilization for centuries but nowadays it is highly sensitive and accurate. The whole process is automated which will allow SGS to provide clients with sensitivity down to 1 ppb (10-7%) and precision lower than 5%. The brand new state of the art computer operated sample fluxing system that is installed in the lab will guaranty almost ideal uniformity of sample presetting for fusion, assuring its quality. Atomic adsorption and ICP spectrometers will provide assayers with linear range from the lowest concentration up to ore grade. On the higher end we will be able to do gravimetric determination of gold and silver which is suitable for high grade golden and silver ore, concentrate and bullion at the accuracy and precision of umpire assay.

SGS Ankara also will offer to clients different cyanide leach tests. Carrying out gold assay with cyanide leach at the same facility will provide clients with highly reliable and reconciled data on amiable gold in tested samples. In addition the involvement of SGS metallurgy gurus from Cornwall UK SGS metallurgy centre will assure that the optimal process parameters will be recommended to provide the best gold recovery.

SGS Ankara Geochem Lab is capable of providing clients with a broad spectrum of geochemical analysis for exploration. First of all it is multi element analysis. The laboratory can deal with any type of sample collected by client. It can be water, soil, lake or stream sediment, rock, drill core. By choosing right sample decomposition method and instrumental finish lab chemists will assure that elements of interest won't be lost and that client will get the most accurate result at economically reasonable price. SGS Ankara is able to do almost total digestion with 4 acids as well as two types of fusion, namely lithium metaborate and potassium peroxide ones. SGS Ankara spectroscopy lab is equipped with state of the art PE Optima 7300 ICP instruments and with Varian AA240 FS spectrometers. These instruments are fast which all in all will cut down turn around time to a few days.

Another unique method available from SGS Ankara Geochem is MMI (Mobile Metal Ion). SGS is the owner and sole provider of MMI® Technology and it has over 15 years of experience with it. MMI® Technology is an innovative analytical process that uses a unique approach to the analysis of metals in soils and weathered materials. Target elements are extracted using weak solutions of organic and inorganic compounds rather than conventional aggressive acid or cyanidebased digests. These elements have been gradually drifting through milennias from ore bodies deep in the ground to the surface. Low concentrations of the exytracted elements can be determined by ICP spectroscopy. Plotted on the exploration area map analytical data will show true anomalies and exploration team will be able to pick drilling targets unerringly. The information obtained by MMI will guaranty that drilling targets are not false anomalies or nugget effect anomalies, saving therefore exploration companies milions of dollars.

SGS Ankara will cover also environmental segment of Turkish mining industry. Combination of Furnace/IR Cell LECO instrument with classical titration allows the laboratory to perform acid base account tests which are nowadays a consisting part of every mining operation in the world.

Continuing traditional SGS Turkey line of business SGS Ankara Geochem Lab will provide clients with control/umpire assay for Cr, Mn, Fe ores as well as Cu, Zn and Pb concentrates.

The combination of modern analytical methods, state of the art instruments, educated and thoroughly trained professional staff assures that SGS commitment to provide clients with best service at competitive price will come true at ISO 9001 accredited SGS geochemical lab in Ankara.

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Pozitif Drilling Industry and Trade Ltd

Pozitif Drilling Industry and Trade Ltd was established by three driller brothers in 2007 to offer a new alternative in global drilling industry. In a short period of time, the company has recorded a consistent growth and established a strong place in worldwide drilling services and innovative hard rock drilling technologies for the mining industry.

Having its headquarters in Ankara -the capital city of Turkey- Pozitif Drilling has the ability to operate all around the world with its specialized equipment and skilled personnel. The company provides drilling services like surface and underground coring, reverse circulation and multi-purpose.

Pozitif Drilling is proud of its health and safety applications and procedures which are in place to prevent and control the physical injuries and environmental damages. Main aim is to gain customers' trust and satisfaction through Pozitif's proven reputation for performance, quality, innovation and safety.

Pozitif Drilling's fleet has expanded through additions of new equipment and investments over the years. Today it keeps all necessary equipments both in its warehouse and in the stocks of its drilling sites to avoid time loss in case of breakdowns. Pozitif's know how, experience and practice on drilling techniques and utilization of drilling additives in difficult ground conditions, distinguish the company among its competitors.

OUR POLICY

Our in-depth knowledge and experience in difficult, harsh, and remote environments enable us to meet the demands of our clients perfectly. We know that each project is unique and has to be undertaken carefully in order to deliver on time. Health, safety, security and the environment (HSSE) rank high in our priorities. We believe that integrating these quality principles into the culture and activities of our organization will help us to be the prominent of the industry and therefore will create confidence among our clients.

HEALTH, SAFETY AND ENVIRONMENTAL POLICY

As Pozitif Drilling, we respect the world we live in. We care our earth & people by establishing and integrating principles into all aspects of our business, from the manufacturing of our tools through the drilling services we offer.

We are committed to;

- Protecting the environment and give full attention to environment.
- Providing and maintaining a safe and healthy working environment for all our employees and visitors by eliminating the hazard and risk concepts in the working environment,
- Complying with the Constitution of the Republic of Turkey, international conventions which are approved and applicable by Turkish Grand National Assembly related to laws, regulations, rules and notices and other obligations,
- Prevent environmental pollution and use totally environment-friendly sources of raw materials during all operations by following scientific and technologic developments of our industry.
- Designing and manufacturing products that are safe, energy efficient and minimize impact to the environment.
- Keeping the environmental impacts under control and reducing damages formed or can be formed from the beginning to the end of the projects,
- Increasing consciousness of environmental responsibility of our employees from the top unit to the lowest by training all of them about the environmental aspects.
- Continuous improvement in occupational health and safety, preventing from possible occupational accidents by following technological developments,
- Continually improving our HES standards, culture and performance, and will transparently report our performance goals and metrics.

OUR VISION

Our vision is to establish an incident-free workplace and to place environmentally and socially sound, qualified and reliable drilling services to the global market by integrating technology, talent and professionalism. ●

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CWP Coal Washing Plants Machinery

CWP Coal Washing Plants Machinery Industry & Trade Ltd. Co. was established in 1990 and located in Izmir, Turkey. The company's main business is the design, engineering and manufacture of heavy media coal washing plants, component machinery, as well as machinery for beneficiation and classification of sand, gold and similar granular material. CWP has been active in the coal processes for more than 20 years and has commissioned more than 35 plants which are still operative in Turkey, Georgia, Serbia, Russia and Middle East. It has agencies in South Africa, India, Indonesia and Mongolia and available to serve worldwide.

Having commissioned a 450 TPH Heavy Media GFC (Gravity Feed Cyclone) Coal Washing Plant in Turkey last year, CWP has recently been awarded a new contract for turnkey commissioning of a 150 t/h capacity project that includes TRI-GFC (Three Product Gravity Feed Cyclone) coal washing plant in the domestic market. The company is also about to

finalize the contract pace for 2 new projects with similiar capacity and systems in the Caucasus and the Middle East and several projects which were quoted previously are confirmed to be contracted.

Day by day, the firm has enlarged its product variety with the continuously developing in-house R&D and design department. CWP is able to manufacture most of the components of a plant which is a cost effective feature of the company in favor of its customers. At the end of successfully R&D projects CWP has introduced its "New System Horizontal Vibrating Screen", "Circular Motion Banana Type Vibrating Screen", "New Type Coal Centrifuges". CWP's "New System Horizontal Vibrating Screens" and "Circular Motion Banana Type Vibrating Screen" are manufactured with their new vibrating mechanism which ensures a more accurate and steady vibration. They are used in various mining sectors for screening, rinsing and dewatering of the mines and minerals such as coal, gold, iron, zinc, lead, chromium, sand and etc. with high efficiency. "New Type Coal Centrifuges" introduce more efficient vibration, dewatering with less energy consumption and longer service life with better lubrication. More information for the mentioned equipments and more can be found at company website.

CWP's experience on coal processes, state of the art technology and quality are combined to serve the best available solution for its customers. ●

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Aldridge Minerals' Yenipazar Project -

Probably Will Be the Third Biggest Metal Mining Project of Turkey

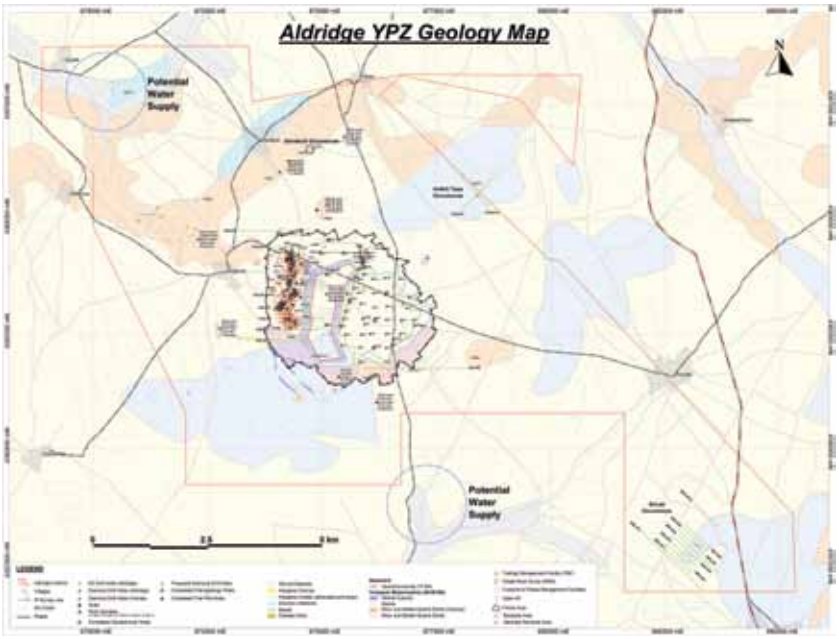
As the Turkey's financial development goes on, Turkey's mining industry also growing at impressive rates in all commodities. Turkey being Europe's leading gold producer, ranking 17th in the world in terms of nominal GDP and 2nd fastest growing GDP behind China, Turkish Government's focus on mining and production today is more than ever before.

Precious metals and gold production is considerably new in Turkey, however the potential and production is growing every year. Exploration companies that worked in Turkey for years desires to profit by producing this valuable mineral at the world standards. Aldridge Minerals who is totally focused on its Yenipazar polymetallic VMS deposit (Au, Ag, Cu, Pb, Zn), take firm steps forward to be the third biggest gold project in Turkey after Kışladağ Gold Mine owned by Tüprag Metal Madencilik (subsidiary of Eldorado Gold Corp.) and Çöpler Gold Mine owned by Anagold Madencilik (subsidiary of Alacer Gold Corp.). According to the press release dated July 6, 2012, Mario Caron, President and CEO of Aldridge Minerals stated that: "Since Aldridge began to implement a change in management in the fall of 2011, our focus has been to advance our Yenipazar project in Turkey given the significant size of its mineral deposit, access to skilled labour and modern infrastructure, and support from local stakeholders." and continued "The rejection of our renewal application supports current management's position that PNG is too volatile and that our efforts, as evidenced by recent progress, will deliver greater rewards if concentrated in Turkey.".

YENIPAZAR PROJECT AT A GLANCE

If we take a closer look to the Yenipazar project, it is clear to see why the company consumes all its energy to the proj-

ect. The Yenipazar Project has a currently determined strike length of at least 1,700 meters averaging 200 meters in width and approximately 20 meters in thickness at depths between 30 and 190 meters. Much of the ore body is sitting at a depth of approximately 50 to 120 meters. The project is favourably located at the geographic center of Turkey, approximately 220 kilometers east-southeast of Ankara, the capital city which makes it easily accessible via public roads and has good access to rail transportation and electrical power supply.



According to the last press release (dated June 13, 2012) about the update of NI43-101 mineral resource estimation for Yenipazar, the project reached 2,62M gold equivalent ounces at 3.05 g/t. Based on all geological and drilling work completed to the end of 2011 (54,774 meters), and includes 7,202 meters of diamond drilling, indicated resources increased 9.9% to 26,684,000 tonnes from 24,284,000 tonnes and inferred resources increased 432% to 1,159,000 tonnes from 218,000 tonnes. Aldridge President and CEO Mario Caron emphasizes that with the progress that has been made, it is clear that Yenipazar is a world-class VMS deposit with excellent potential for becoming a near-term producer.

Compared to the December 2010 mineral resource estimate, the metal grades of the resource have remained fairly stable while the total size of the resource has increased. The total Indicated resource has grown by almost 10% while recent geotechnical drilling that encountered mineralization has added significantly to the Inferred resource base. The updated mineral resource is summarized in the tables below:

Category	Tonnes	Gold g/t	Silver g/t	Copper %	Lead %	Zinc %	Au Eq g/t
Indicated	26,684,000	1.04	31.3	0.30	1.04	1.40	3.05
Inferred	1,159,000	0.48	27.7	0.22	1.00	1.95	2.51

Contained Metal						
Category	Gold M OZ	Silver M OZ	Copper M LBS	Lead M LBS	Zinc M LBS	Au Eq M OZ
Indicated	0.89	26.85	176.5	611.8	823.6	2.62
Inferred	0.02	1.03	5.6	25.6	49.8	0.09

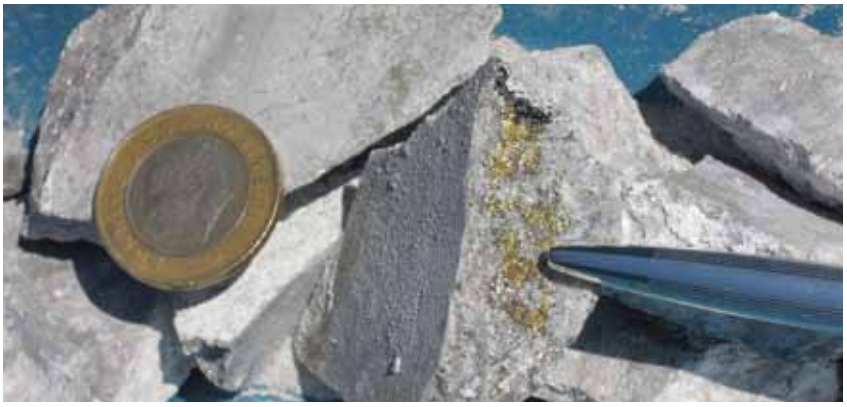
The Company published a Preliminary Economic Assessment (PEA) in

December 2010 that generated robust economic returns. The metallurgy identified at the time was preliminary in nature and necessitated significantly more test work for better optimization.

The PEA contemplated the production of a copper concentrate, a lead concentrate, and a zinc concentrate, with only about one third of the gold reporting to the copper concentrate and the majority of the silver reporting to the lead concentrate. In December 2011, Aldridge announced additional metallurgical testing completed by G&T Metallurgical Services, which indicated that production of a gold gravity concentrate prior to base metal flotation may more than double gold recoveries reported in the PEA.

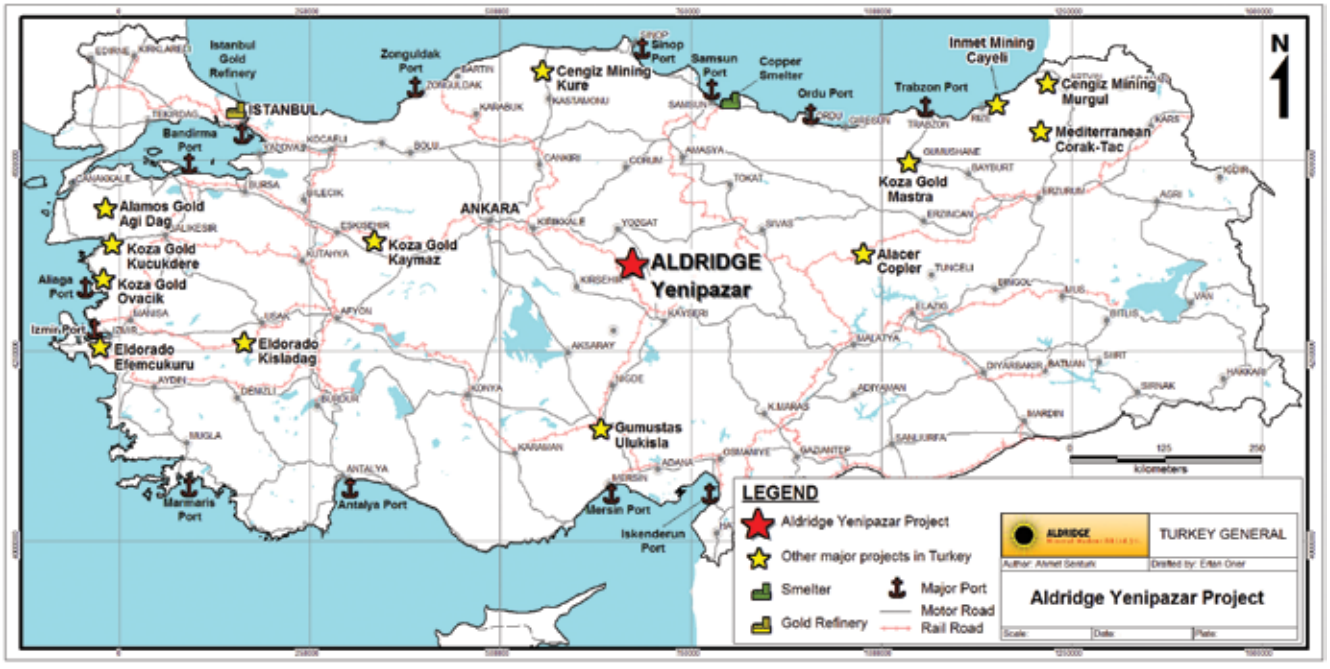
Metal	Total Recoveries	Gold Gravity Concentrate	Copper Concentrate	Lead Concentrate	Zinc Concentrate
Gold	92.0%	65.0%	20.0%	5.0%	2.0%
Silver	90.0%	10.0%	10.0%	65.0%	5.0%
Copper	75.0%		75.0%		
Lead	75.0%			75.0%	
Zinc	77.0%				77.0%

SGS UK, which is currently conducting all metallurgical test work for Aldridge, has expanded upon the work by G&T. The process contemplates a separate gold circuit followed by sequential flotation of copper, lead, and zinc. Aldridge expects the flowsheet to be finalized for the purposes of the Feasibility Study near future. The matrix of metal recoveries that formed the basis for the resource update, which incorporates all testing completed to date, is set out in the table below.

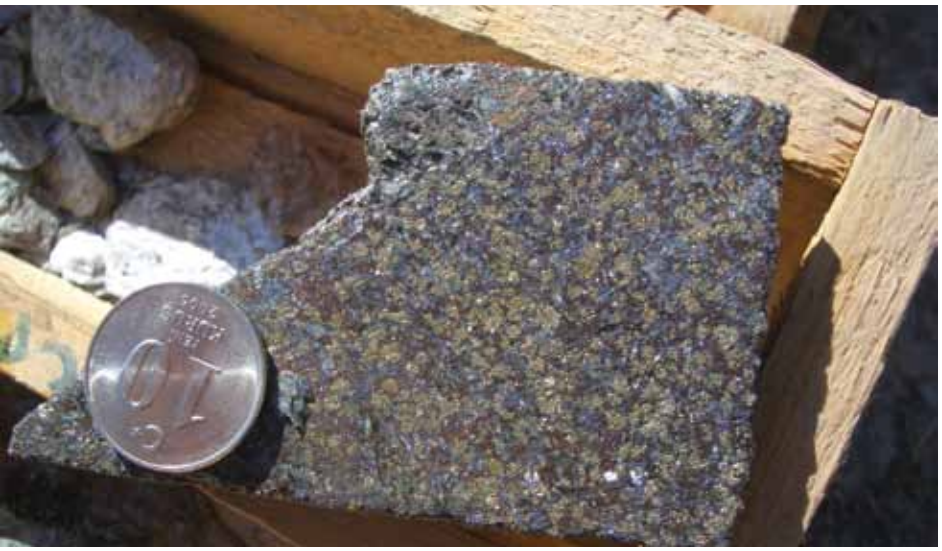


CURRENT TARGETS FOR YENIPAZAR

The main focus of Aldridge Minerals for the short term is to finish the diamond drill twinning program which will be included in a subsequent resource estimate that will form the basis for the feasibility study according to the Country Manager Serdar Akça and Turkish Subsidiary Exploration Manager Ahmet Şentürk. The purpose of the program is to twin up to 99 existing reverse circulation ("RC") drill holes with the objective of increasing in particular the precious metal grades as found in previous diamond-RC duplicate pairs. The RC holes will be subsequently removed from the resource database so that only the more



Yenipazar Location Map - Turkey is Emerging as a Major Mining Area



accurate diamond data remain for the duplicated holes. The 99 scheduled holes address about 81% of the RC-drilled gold resource, and about 75% of the Ag-Cu-Pb-Zn resource.

The Yenipazar feasibility study, being overseen by Jacobs Minerals Canada Inc., also continues to progress. Project costs are within the budgets established for the team of consultants including P&E Mining who is preparing the mine plan and resource update, SGS (UK) who is undertaking metallurgical studies, SRK Turkey which is working on the Environmental and Social Impact Assessment (ESIA) and Golder Associates which is responsible for geotechnical studies. SRK Turkey is also working on hydrological aspects of the project from both geotechnical and water supply aspects. The logistics study on the transportation of concentrates, which included on-site inspections in June of various ports, roads and rail options is progressing as scheduled, according to the press release dated July 20, 2012.

PARTNERSHIPS AND AGREEMENTS

Aldridge Minerals announced at the end of the March that the Company's shareholders have voted overwhelmingly in favour of approving the investment by ANT Holding Anonim Şti which is a private company with interests in media, engineering and construction. With the agreement, ANT Holding purchased 16 million common shares of Aldridge at a price of 0.70 USD per share for gross proceeds of 11.2 million USD. Upon closing of the investment, ANT holds approximately 30% of Aldridge's shares. This strategic partnership will help Aldridge to build strong relationships with local banking and government contacts. Aldridge President & CEO Mario Caron expressed his appreciation with these words: "I am delighted that 100% of the votes cast by shareholders were in favour of the Private Placement with ANT. The Private Placement is the first step in forming a strong relationship with a strategic Turkish partner that will assist us in developing the Yenipazar project in a timely fashion." at March 2012.

According to an agreement in July 2006, Aldridge is allowed to earn 100% interest of the project. The remaining deliverable is the Definitive Feasibility Study by December 2012. Alacer Gold retains 6% net proceeds interest in production (revenue minus operational cost) totaling up to 165 million USD and increasing to 10% thereafter.

Aldridge Minerals will be looking for new investment options after the feasibility study. Economic crises in Europe, cautious trades of China and instability of US economy did not affected Turkey at all as it is expected to be. The Government supports mining and the new incentive system supports mining even more. In this positive atmosphere, after the feasibility study which is planned to be completed in December 2012, the executives are very positive to bear the project to the next step. ●

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Aldridge Minerals Country Manager Serdar Akça.

"Turkifying" a Foreign Mining Company in Turkey through IPO in Turkish Markets

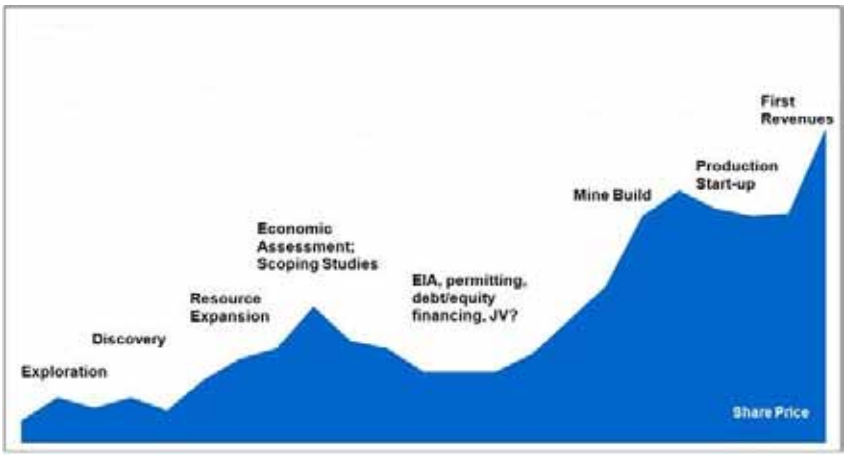
Whether one is a fan or not of the terms "emerging market" or "developing market" there is no denying that both terms fairly describe the current state of the Turkish equities market (I.e. the Istanbul Stock Exchange). However, the Turkish market is nothing new to international portfolio investors, having attracted foreign investors for several decades now and has also developed that elusive factor which is a domestic retail investor base.

As far as mining goes the market has only one listed mining stock so far (a gold miner) but the potential exists, I believe, to see 20 or more mining companies listed on the Istanbul over the next five years. The first wave of these new listings will come from foreign listed miners (those on the AIM in London, the Toronto Stock Exchange or the Australian Stock Exchange) while the second wave should come from locally-owned groups wishing to follow in the footsteps of the foreign miners.

The attractions for foreigners are many and obvious. The first advantage that would accrue is the access to the substantial amounts of capital available in Turkey. The major mining equities markets are overcrowded and it is very hard for mining stocks to attract attention in the very big crowd (1,400 mining stocks alone are listed on the TSX and TSX-V). In Canada in particular the attraction of any miner not operating in the Western Hemisphere is limited (with the exception of West Africa). The Canadian investors just do not "get" MENA and ex-CIS markets, let alone Asian mining projects. The second important factor is the potential to increase the Turkish ownership in projects without necessarily taking on a local partner. Thus miners can "Turkify" their projects by having the Turkish population rather than specific economic groupings as their partner.

One interesting aspect of the Turkish economy that is worth noting is the ongoing dominance of the conglomerate model. In Latin America this mode of doing things amongst groups at the top of the economic pyramid has "gone the way of the dodo" over the last twenty years as specialization and concentration has set in. Yet in Turkey the philosophy of "collecting the set" (being in hotels, energy, textiles, construction, banking etc) still holds its fascination. This practice probably has its origins in the desire to be flexible and ride the emerging markets wave starting with textiles and construction (classic low wage economy activities) and then morphing over time into opportunities in cell-phones and energy which require greater degrees of technology and capital. The perennial feature in many conglomerates is the construction division which can interact with all the other parts and moreover be a beneficiary of the largesse of governments when things are trending towards infrastructure building. Latin American conglomerates though found in the 1990s that finite funds and the eclipse of old businesses (i.e. textiles) and the concentration of others (banking) meant that needed to exit losers and focus down on the growth sectors.

We have noticed a trend now in Turkey that the missing piece from many conglomerates "set" is mining and thus a rush has been engendered into this now trendy activity. Mining however is an activity is not conducive to being bunched with diverse other economic sectors. A certain logic can be made for vertical integration with smelting and on-processing in base metals and those minerals that feed the steel complex (i.e. iron ore, nickel, zinc, manganese and chrome. Gold and silver however have no obvious synergistic effects with other parts of a diversified economic grouping, even if it contains a bank. Beyond this consideration, the mining business needs a special mindset. Short of massive deposits like iron ore and manganese that make themselves evident at surface, the first task of the mining company is to find the deposit and prove its size and grade, therefore its mineability and economic worth. To mining "newbies", the finding might appear to be the easiest part. However with capex to build a mine and



mill often running into the hundreds of millions of dollars, getting it wrong by starting to build without adequately proving the deposit can end up way more expensive than doing the millions of dollars of somewhat thankless and tedious drilling and testing which is the forte of Canadian and Australian mining companies. This embedded work has its value despite not having much more to show after a few years other than a pile of samples and drillcore and voluminous geological reports from consultants. All this hard graft is alien to conglomerate entrepreneurs for whom the past experience has been that everything they touch "turns to gold". This does not happen in mining!

The "lifecycle chart" that we show here gives an idea of how traditional mining markets value mining stocks at different phases along the road to production. The highest values occur at discovery and at production initiation.

The listing of a flock of junior miners at various phases of the mining lifecycle will involve an educational challenge for the mining company executives and investment bankers/brokers as they get their investors up to speed on the alien-sounding metrics that miners are valued with compared to the standard measures used for industrial or financial enterprises. Beyond that the creation of mining-only companies in the capital markets would be the ideal way in which Turkey could create national "champions" such as Brazil has in Vale, for example, rather than having mining as some barely understood orphan activity in the background of a sprawling conglomerate. ●

MEDITERRANEAN RESOURCES LTD.

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Lithotheque System of Ore Deposit Records in Mineral Exploration: Turkey and the World

Siegfried Muessig, one of the distinguished mine discoverers, characterized the principal goal of mineral exploration as "finding a look-alike orebody" (SEG Newsletter No.87, 2011, p.10), by using the time tested method of targeting productive ore types like porphyry coppers using analogy. Regardless of the plethora of exploration models, four million pieces of accumulated references, and a number of talk presentations and courses, an exploration geologist needs to imagine how the expected ore deposit sought would actually look in the field and in drill core and what are the proximity field indicators of possible ore presence. Target visualization comes as a result of long field or mine experience that included a number of ore types and geological situations, supporting the H.H. Read's thesis that "the best geologist is he, or she, who has seen most rocks". Cumulative experience increases with age and the number of ore deposits examined, although the opportunity for frequent mine visits around the world is available to lucky few only, most of whom are not involved in mine finding at all.

Figure 1. Variety of Lithotheque plates (the 7 x 11 inches plate size is constant). LEFT: standard layout of 20 solid samples, Colquijirca Pb-Zn-Ag. CENTER: powdery or friable samples held in plastic "jewel boxes". RIGHT: oversize drill core slabs.

With little opportunity for extensive geological roaming, especially for the juniors, the second best place to visualise and actually touch the "look alike" geological materials are rock and ore collections and repositories. Those in most general museums are of limited help as they emphasize the exceptionality and curiosity aspects. Private mine museums, common in the past but now a rarity, often provided a very realistic representation of mine geology and they were used for training. Nowadays the best source of first-hand geological imagery, that often assisted local ore discovery, are drill core libraries. They are usually run by governments who can afford the substantial cost but are subject to three major limitations: 1) Amount (length) of core tends to be overwhelming and much of it is monotonous and repetitive. This results in users' fatigue, so features of exploration significance are often overlooked. This problem is slightly alleviated by logs of photographic and physical characteristics (e.g. spectra, magnetism, radioactivity) that are now gradually released by several advanced core libraries. They help the geologist to focus on the most prospective core intervals; 2) The drill core inventory is representative of the region (state, country) but material from overseas deposits, much needed to provide the "look alike" visual experience for comparison, is not available; 3) The size, weight and constant growth of the amount of material creates a never-ending demand for space and personnel: a financial and logistic drain to most organizations. There is a way to alleviate these problems, at least for the purpose of introductory familiarization of geologists with the "look alikes" with application of material selectivity, miniaturization and globalization, while still preserving the real rock and ore nature of the information resource.

ENTERS LITHOTHEQUE, THE "ROCK LIBRARY"

LITHOTHEQUE is a collection (library) of sets of miniaturized (about 4 x 5 cm each) ore, alterations, and host rock samples from a deposit, permanently attached (cemented) to page-size aluminium plate, in uniform and fixed order. Each plate takes up to 20 miniature samples (or lesser number of larger samples or core slabs) and one (or more) plates provide visual and non-destructively (physically) testable representation of ore deposit geology (Figure 1). Despite the small size, we have found that one miniaturized sample provides some 80% of petrographic information normally available form a conventional-size hand sample, at a fraction of weight and space required. Best of all, Lithotheque provides a comprehensive

coverage that treats an orebody as an interrelated ore-forming system with the numerous transitions and modifications (e.g. oxidation, alterations, deformation). The geological information conveyed by a Lithotheque is permanent and free of the constant change of genetic concepts and interpretations. Lithotheque plates are held library-style, in racks where they are instantly accessible and available for browsing. Each plate comes with a graphic explanation sheet (see picture below). The space economy (footprint) is amazing: a wall rack 4.5 m long, 2 m high and 30 cm deep holds 1000 Lithotheque plates, that is up to 20,000 individual geological samples! (Figure 2). The collection is clean and attractive so that it could be at home even in corporate boardrooms. Extensive Lithotheque collections from local as well as international deposits contain a mix of geological records that could be compared, contrasted and evaluated in terms of the "look alike" characteristics (Figure 3). This empirical information is of great practical value for exploration planning and mineral prediction.

Figure 2. Lithotheque/Data Metallogenica at the University of Manitoba, 1998. The sample plates representing ore deposits and geology in general are held, book-like, in custom-made racks. The accessibility and space economy are outstanding; a 3.6 m long, 2 m high rack holds 800 Lithotheque plates with up to 20 miniaturized samples each (=16,000 samples).

DATA METALLOGENICA (DM) AND DATA METALLOGENICA ORIGINAL (DMO) EXPERT SYSTEMS

Lithotheque was born in the Queensland (Australia) field in 1970, as a means of factual representation of hundreds of geological and mineral sites visited and evaluated during large area regional reconnaissance. It subsequently grew in size and complexity when this author was a professor at the University of Manitoba in Canada. Numerous components were added to the Lithotheque collection (uniform explanation sheets, folders with field images, original notes, maps, reprints, electronic search files) as well as a parallel collection (Macrotheque) of hand samples with thin and polished sections, organized by depositional environments and lithologic associations ("Geosites"; Laznicka, 2001). This resulted in a versatile expert system of highly realistic visual global ore deposit information we called Data Metallogenica (DM). In 1999 DM relocated to Australia and was installed in a purpose-equipped showroom at the Australian Mineral Foundation (AMF) in Adelaide. Upon AMF termination in 2002 DM has been taken over by Amira International of Melbourne, who have operated since 2002 sponsors-, then subscription-funded DM on-line (www.datametallogenica.com). This website contains informative free preview, and a number of universities enjoy DM on-line access through subscriptions donated by corporate sponsors. DMO is a private extension maintained by this author (www.totalmetallogeny.com/datamet).

Figure 3. Lithotheque representation of ore deposits and occurrences in the Gawler Craton of South Australia, the "home" of the supergiant Olympic Dam Cu,U,Au,Ag,REE IOCG deposit. This is an area under intense exploration where a number of century-old prospects can provide clues to ore presence.

At present, DM and DMO jointly comprise over 4200 Lithotheque sets

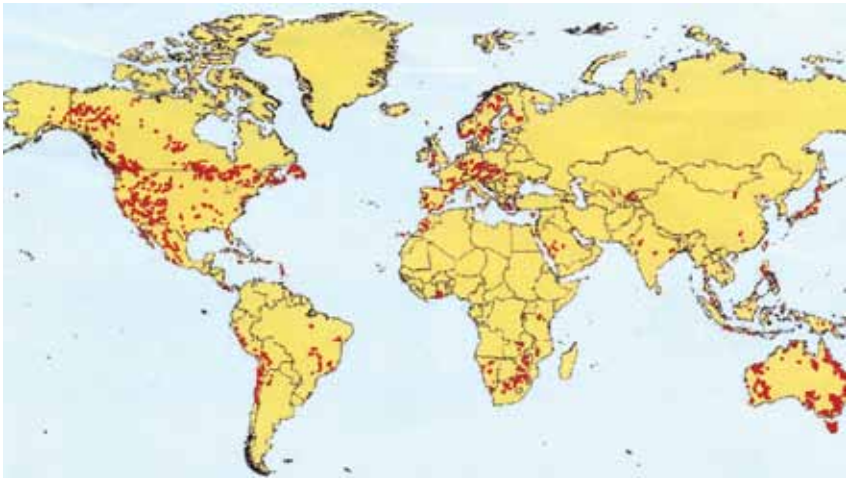
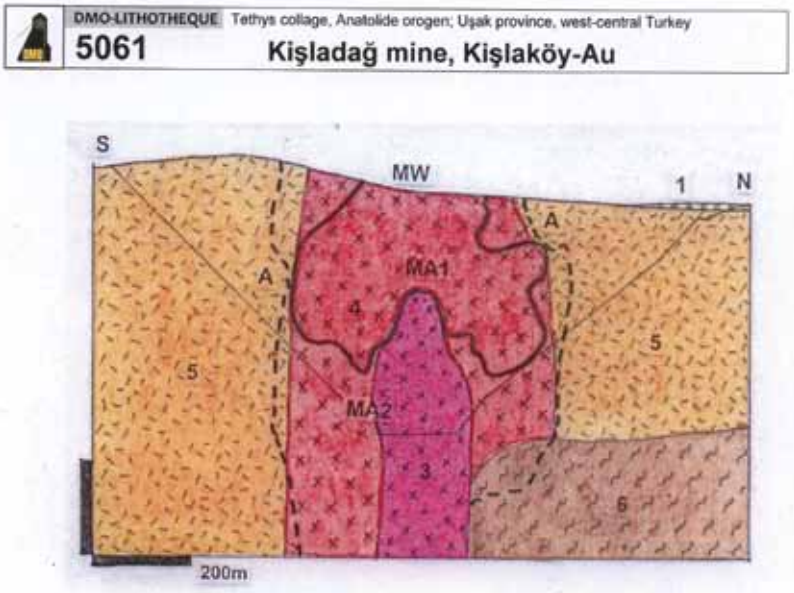


Figure 4. Data Metallogenica (2004 status), locations of Lithotheque sets. The geographically uneven coverage is the consequence of insufficient funding and politico-logistic difficulties in accessing foreign deposits and sending samples out of the country. The gaps in coverage could be reduced by international cooperation.

that represent thousands of mineral deposits in 85 countries and both continue growing (Figure 4). Hundreds of plates of important mineralization types are represented (for example, ~250 porphyry Cu-(Mo,Au); ~55 IOCG; ~25 Carlin-type gold; ~250 VMS; 220 of uranium) and there is also an extensive coverage of the lesser-known metal types (e.g. of Sn,W,Co,Mn,etc.) and of the recently popular commodities like lithium, rare earths, tantalum and other metals that most geologists have never seen. Here, the "look alike" experience is at its best. Turkey is represented in DM and DMO by 12 Lithotheque sets (Table 1) that include the frequently quoted, but poorly understood Murgul-copper, and the ore giants Kişladağ-gold (Figure 5) and Emet-borates. Here, Turkey contributes the "look alike" standards for the rest of the world to explore for. Together with the existing Lithotheque sets from Italy, Austria, Slovakia, Hungary, Romania, Bulgaria, former Yugoslavia, Greece,



Kişladağ cross-section modified after Eldorado Gold Ltd. web technical report, 2011

LTO 5061 LEGEND *PL 11-2011*

Unit No	Unit Description
1	T3-Q cover sediments: colluvium, gravel, silt, minor marl and claystone
MW	Mi3-Q oxidized ore (to 20-100m depth); limonite infiltrations and crusts, residual gold
2	Mi2 post-mineralization, barren stock of fine-grained latite/quartz syenite-monzonite porphyry (NOT SHOWN)
MA	Mi2 porphyry-Au: horseshoe-shaped zone of (minor) quartz, tourmaline, pyrite >> Cu,Zn,Pb,Sb,Mo sulfides, fine gold stockwork and veining in altered silicified and brecciated porphyry around barren late-stage porphyry stock (Unit 2) Rv 429 Mt @ 0.79 g/t Au; Rc 559 Mt @ 0.68 g/t Au, inferred Rc 321 Mt @ 0.43 g/t Au. Total 834 t Au --**MA1**: higher-grade ore (1.15-6.75 g/t Au) --**MA2**: lower-grade ore (~<0.5 g/t Au)
A	Zoned hydrothermal alteration: central K-silicate (biotite) with tourmaline in Unit 4 grade to tourmaline, alunite and retrograde clays; supergene alteration near surface
3 4	Mi2 nested, steeply-dipping, multiple phases of latite (quartz syenite, monzonite) subvolcanic porphyry constitute a semi-circular composite intrusion considered to be a core of a Miocene stratovolcano Intrusion 2 and 2A of plagioclase -phyric syenite-monzonite porphyry Intrusion 1 (oldest) of plagioclase & biotite-phyric quartz syenite-monzonite porphyry (the principal ore host)
Bx	Tourmaline matrix breccias (NOT SHOWN)
5	Mi 1-2 Inai Group, Beydağı Volcanics; quartz trachyte and latite flows, agglomerate, lithic tuff, volcaniclastics
6	Paleozoic Menderes metamorphic complex: mylonitic augen gneiss, schist

LTO 5061 SAMPLE DESCRIPTION (collected and assembled by Peter Laznicka, 2011, guided by Yücel Öztaş, TÜPRAG)
GRID SAMPLE NUMBERING

Unit No	Sample Description	Sample No
MW	Oxidized ore	1, 2
MA	Disseminated gold in clay (3,4), clay-tourmaline (5-8), with pyrite (9,10) and tourmaline-infilled breccias (11,12) in Intrusion #1 (Unit 4) latite porphyry	3-12
2-4 A	Hydrothermally altered latite porphyry, barren or sub-grade gold mineralized; tourmaline-pyrite fracture veined (13-16), argillized (17,18), pyritic (19)	13-19
2	Latite porphyry	20

Figure 5. Kisladag-Au. Lithotheque plate #5061 with a standard explanation sheet (Data Metallogenica Original, Peter Laznicka, 2011)

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Armenia and Iran, ore deposits in a significant segment of the Tethys collage can now be examined in a "rock solid" way.

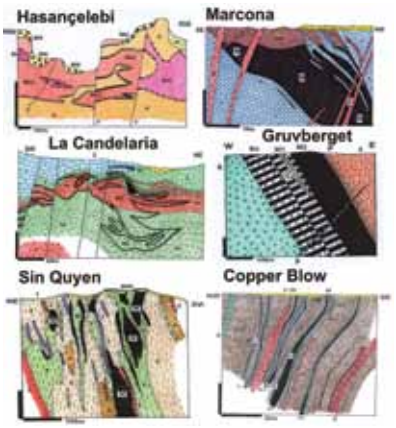


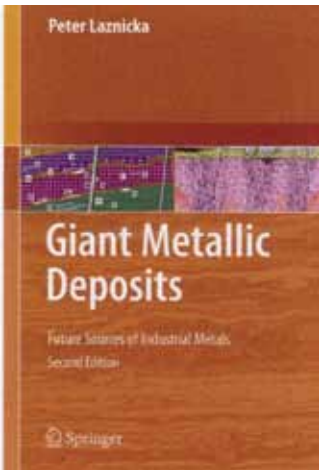
Figure 6a. Lithologic comparison of the Hasancelebi Fe-(Cu,Au) deposit interpreted as of the IOCG (Iron oxides, copper, gold) type, with other deposits of the world so interpreted. Comparison based on actual lithologies can objectively demonstrate the similarity and dissimilarity among deposits placed into a certain ore type in the literature. 6b. Cross-sectional representation of the same deposits included in the Data Metallogenica and Data Metallogenica Original expert systems. Laznicka (2011).

documentation, can be browsed on-line from anywhere in the world, including by geologists in remote bush who can instantly compare local field observations with visual characteristics of thousands of mineral occurrences around the world (Figure 6). DM can inspire and actually assist in ore discovery, although this feature has so far been little utilized because of unfamiliarity. Significant proportion of recent major mineral discoveries have been in the proverbial "headframe shade" (that is, close to existing mine) and/or at or near a site of a known, uneconomic or exhausted, mine or mineral occurrence. Precursor mineral occurrences at or near sites of recent significant discoveries: a near-giant Mo in Queensland, a near-giant IOCG in South Australia, and a concealed Zn-Pb giant in Peru were represented by Lithotheque sets in DM before the major discoveries have been made. One wonders how many old, uneconomic occurrences that are a part of DM and DMO have the potential to evolve into major future mines. Lithotheque (LT) is an excellent tool for no-nonsense education and training. In my 950 page book "Giant Metallic Deposits", now in its second edition (Springer, 2010; Figure 7), descriptions of hundreds of "ore giants" are linked to the corresponding "live" entries in DM, so that a reader with DM subscription can instantly extend the text information by visiting the corresponding, colourful on-line entries and a growing inventory of integrated information. Lectures and short courses I have delivered in Turkey (in October 2011) were heavily assisted by LT images. Exploration workshops supported by the LT physical collec-

Figure 8. Portable Lithotheque of Tasmanian (Australia) deposits and geology to provide physically testable record and a standard for description and interpretation.

PRACTICAL APPLICATIONS OF LITHOTHEQUE (LT) AND DATA METALLOGENICA (DM)

First of all, LT and DM provide a comprehensive record of mineralogy and petrography of mineral occurrences (or other geological situations in general). The present DM/DMO collections cover a number of mined-out and reclaimed ore deposits that can no longer provide sample material. These records can be visually examined, compared and non-destructively tested on site (presently in Adelaide, Australia) and their visual images, together with the supporting



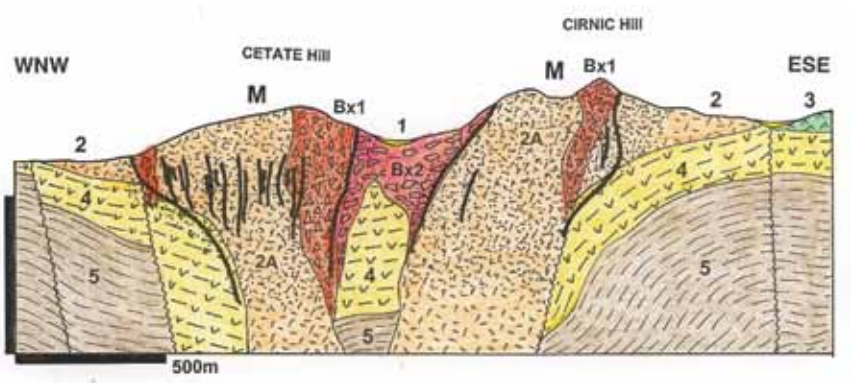


Figure 7. In the "Giant Metallic Deposits…" book deposit descriptions and cross-sections are keyed to Data Metallogenica entries, so that a DM subscribing reader can instantly extend the information search on-line. The section above is of Rosia Montana, a 500 t Au dome-diatreme system in Romania (Lithotheque 2080)

tion have been organized in Australia and prospectors were welcomed to test their exploration concepts using the "look alike" philosophy. Unfortunately, the DM physical collection has not been recently accessible on foot, pending relocation to new premises. Portable LT sets (Figure 8) can serve as standards for field comparison and drill core logging.

WHY NOT ADOPT THE LITHOTHEQUE METHODOLOGY INTERNATIONALLY: IT'S FREE!

Lithotheque and Data Metallogenica are mature systems, gradually developed and used since 1970. Establishing an institutional, regional or national Lithotheque collection is an inexpensive way to enhance mineral databases that most organizations maintain, and to make them more realistic and permanent. Such collections would be held by national organizations and the images displayed on internet; if a number of countries adopted the Lithotheque methodology, the national information could be shared globally. Lithotheque images are ideal for on-line browsing, so potential investors from overseas might be able to asses more realistically the exploration potential of a country and make a preliminary selection of targets. Local (national) Lithotheque sets could be traded and exchanged with overseas counterparts: a most economical way to gradually assemble a set of international "look alike" deposits for use in domestic education and training. This would particularly benefit the developing countries that cannot afford subscription to a supranational resource like Data Metallogenica and/or engage in the costly "frontier research", yet who hold what is the most fundamental and valuable component of geosciences: the local information. Every country "has a geology" and many have mineral deposits worth learning about (Figure 9). A proposal and appeal to adopt the Lithotheque methodology internationally has been published in the December 2009 issue of Episodes that is available for free downloading from www.episodes.journal@gmail.com. I would be happy to provide personal advice and assistance. ●

Figure 9. If a number of countries adopted uniform Lithotheque methodology, they would be able to trade domestic rock/ore sample sets with international partners, and contribute to the internet-based Global Lithotheque of ore deposit images.

Acknowledgement. My 2011 field visits and sample collecting in Anatolia that resulted in Lithotheque plates have-been generously sponsored by MTA. It is a pleasure to acknowledge this friendly collegial assistance, especially of Dr. Okan Delibaş.

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Disruptive Innovation
in the Chromium World

THE BASICS: CHROME ORE, FERROCHROME, STAINLESS STEEL AND ECONOMIC PROSPERITY

The utilization of chromium ore, by and large, is used to convert the mined chromium ore into an alloy of iron and chromium and this is called ferrochrome. Ferrochrome is the basic building material for the burgeoning stainless steel industry. With the addition of metal nickel to iron and chromium, stainless steel is manufactured for its use in a multitude of products from simple table silverware to vastly expensive desalination plants. With its smooth, sleek and shiny surface, and tremendous strength coupled with its most important feature, corrosion resistance, "rustless steel" as it was called by the inventor Harry Brearley in 1913, stainless steel has been in the mainstay of our developed societies. It has revolutionized many of the industries, and is now finding more and more applications everywhere in our lives, from toasters on your kitchen table to high speed trains. With the onset of green revolution and increasing awareness of carbon footprint, and not to mention the cost of fossil fuel, light, durable, aesthetic, and streamlined structures are in vogue and are paving the way for modern technology.

Although stainless steel is essential in our consumer world, it represents only 2% of the total world steel market in volume and its demand is primarily driven by the consumers. Catering, kitchen utensils, and home appliance usage of stainless steel is by far the largest portion of global stainless steel consumption at 34% whereas more advanced, more technologically demanding applications take a smaller bite at 14%. The reason for this is the rapid urbanization of the two most populous countries, China and India and the increased usage of this alloy for consumer usage. Hence, the stainless steel usage is a direct indication of economic development and its usage in more technological applications, such as in automotive, energy and chemicals industries still has a long way to grow. For example, stainless steel consumption per capita in Germany is 5 times more than in China, and Japan's usage is a whopping 14 times multiple of India. It is than not too much of an imagination that the annual growth rates in global stainless steel and its precursor high carbon ferrochrome production to be at a healthy clip of some 6-7% year on year when one notices that the most populous countries, like Indonesia, Brazil, Mexico, Turkey, and Bangladesh will drive this growth primarily for consumer applications. It is estimated that the lion's share of China's 15.5 million tons and India's almost 3 million tons stainless steel output in 2012 will have only one thing in mind: Produce with the lowest cost in mind.

THE CHROME ORE MARKET

Chrome ore witnessed a record level of prices in the first half of 2008, with Turkish 42% grade hard lumpy at 700-750 USD/mt CFR (cost and freight) China levels. The Chinese demand appeared to be insatiable and anecdotally rumored to be driven by the construction frenzy for the 2008 Beijing Olympics. However, the bankruptcy of Lehman Brothers led global economies to a meltdown in September 2008. Since then, the average price of chrome ore has been continuously decreasing driven simultaneously by an increased installed base for ferrochrome production capacity in China.

Interestingly, China is the only country that produces FeCr but does not have the chrome ore reserves although other FeCr producing countries, such as South Africa and Turkey, have an integrated both upstream and downstream chrome ore processing operations. However, this has not slowed down the Chinese expansion in ferrochrome production and it is expected that China, in 2012, will produce double the weight its mills produced in 2008. This could not have happened without the emergence and rapid onslaught of disruptive innovations in this business:

1. Low grade and almost to nothing cost UG2 ores, which is the byproduct of platinum group metal ores coming from South Africa, and,
2. The increased use and investment seen in DC plasma furnaces which are more suited for processing lower grade ores.

DEFINITION OF DISRUPTIVE INNOVATION

Initially introduced by Harvard Business School professor Clayton Christensen after observing the proliferation of many hard disk drive companies started by poorly financed young entrepreneurs in the Silicon Valley in California literally in the shadow of some big, well run and well managed disk drive companies, the apparent dilemma was termed the Innovator's Dilemma and the processes and the products through which the new innovative products emerged was termed the disruptive innovation.

"For example, in 1981, the old 8 inch drives (used in mini computers) were "vastly superior" to the new 5.25 inch drives (used in desktop computers).[9] However, 8 inch drives were not affordable for the new desktop machines. The simple 5.25 inch drive, assembled from technologically inferior "off-the-shelf" components,[9] was an "innovation" only in the sense that it was new. However, as this market grew and the drives ▶

improved, the companies that manufactured them eventually triumphed while many of the existing manufacturers of eight inch drives fell behind." [12]

It was disruptive not because the products were any new inventions and/or groundbreaking but were simpler and more affordable, maybe not as good as what was being already supplied to the markets by the disk drive business leaders, but they were good "enough". Hence, these disruptive innovations have the capability to create their own niche and then experience growth in the industries they have entered and create totally new industries and markets by using cheaper materials, make it more convenient, and address the needs and wants of the vast "unserved" market.

Now, as we apply this notion of disruptive innovation in chromium ore processing, all the way from the raw material, i.e., the chromium ore, to the finished stainless steel consumer product, in this case, say a stainless steel lunch tray at a Chinese high school, we must search for the so called three enablers, meaning, the three discrete steps which facilitated the emergence of disruptive innovation

The first step is something called a technological enabler, a technology which enables the use of (in this case) raw materials which cannot be otherwise used efficiently and cheaply with the established technology since the objective is to achieve the lowest input cost. More than 90% of global ferroalloy production employs AC based submerged arc furnace technology which is charged with the lumpy ore because the fine concentrate or the tailings end up in the flue dust. However, the greatest technological enabler is the closed DC type plasma based furnace which typically is charged with ore concentrates, screened fines out of other ore streams, low value ore fractions and blended sweepings such as the UG2 ore from platinum mining operations which is a byproduct of platinum processing and comes at almost no cost.

Reductants are typically metallurgical coal and anthracite. Cheaper carbon sources can also be utilized as they are available. Slag conditioning is done with inexpensive limestone and quartzite stone. All the raw materials are in the size fractions of less than 40mm with no limit on the smallest fraction which eliminates the necessity for expensive pelletizing and agglomeration steps required. Not only it can accept fines with no pretreatment and/or pelletizing, the chromium recovery also increases allowing the feed to be of lesser chromium value. It is sufficient to say that the technology enabling characteristic of DC plasma furnaces practically reduces the typical weight of 30% of a typical ferrochrome operation coming from the raw material feed to almost nothing.

The second enabler is the overall business model which employs the use of lower grade chromium containing UG2 tailings originating from platinum enrichment process, a higher valued metal, favored in jewellery in the east and in an increasing number of industrial applications such as auto catalysts used in cars. South Africa based platinum mines are the source of this metal and its market is forecast to grow at healthy rates. Along with the platinum, it is cheap and easy to obtain a grade of 40-42% chromite (Cr_2O_3) concentrate in tailings which can then be pelletized to feed to the AC ferrochrome furnaces or use it as is to feed the DC furnaces. Because the cost is almost nothing, the additional costs of pelletizing can be warranted. Hence, the business model which uses the not so good, lower grade, not lumpy but in fine size that can be fed conveniently fit the disruptive innovative model discussed above.

Third enabler for the disruptive inno-

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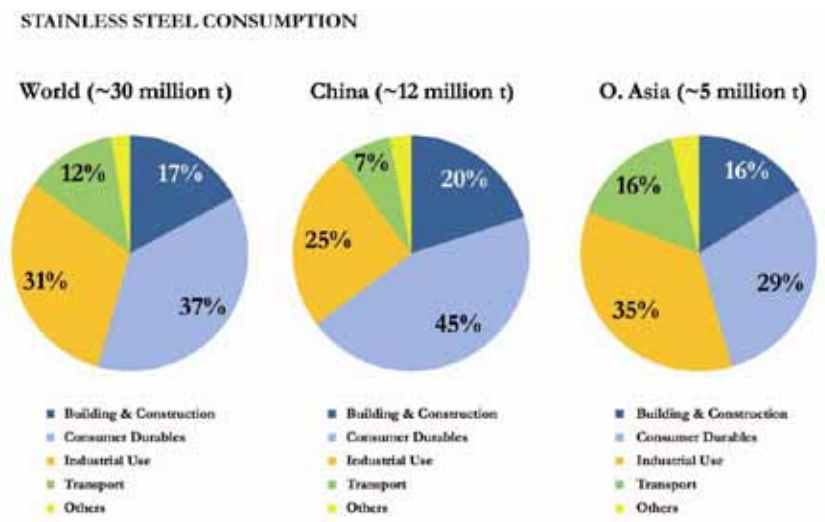
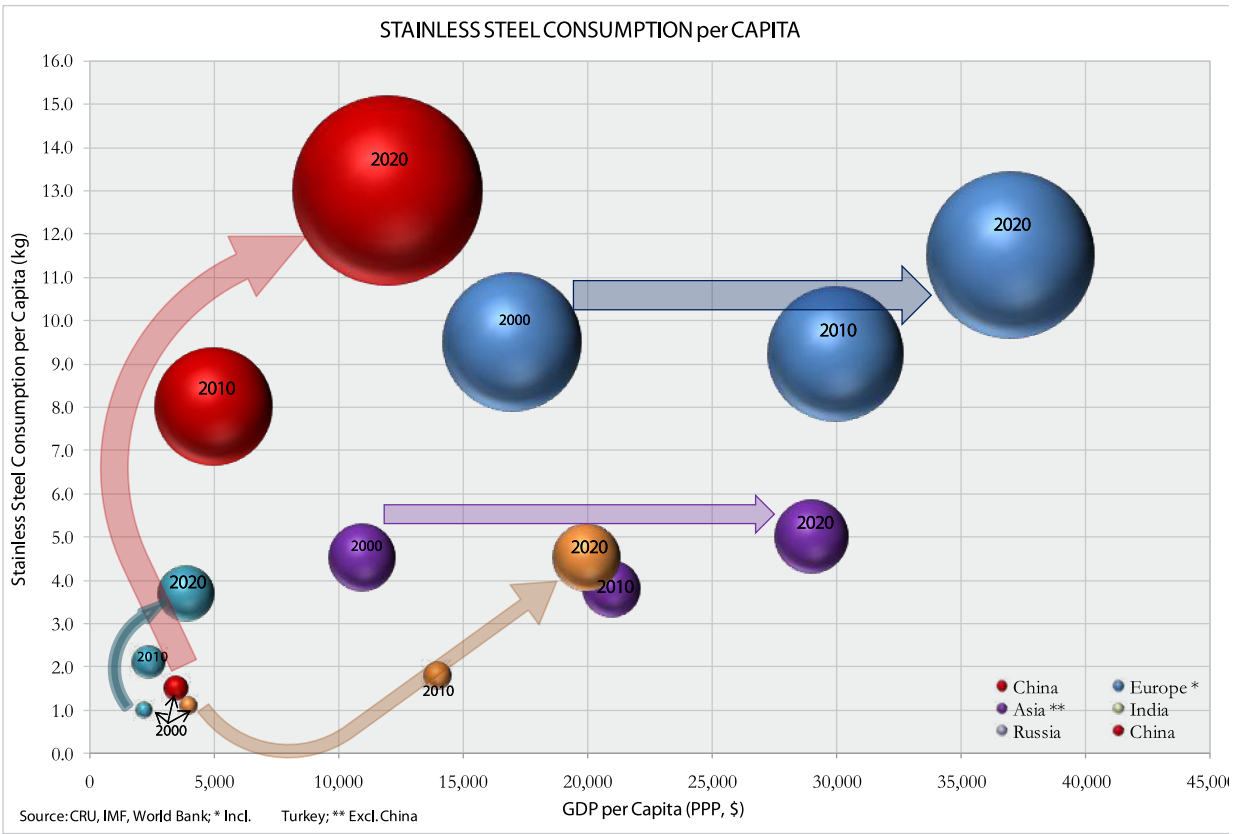


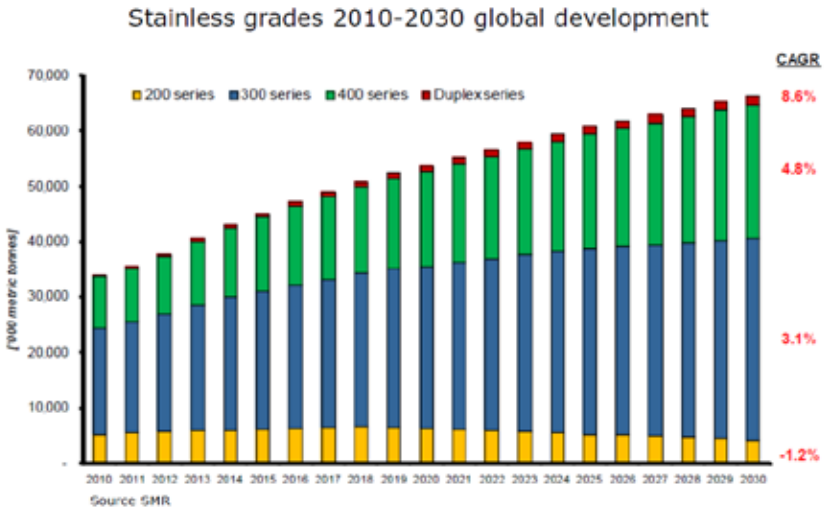
vation to take root and scale up is a commercial system to support it and that has been the emerging consumer markets in the developing countries, especially the most populous ones, China and India. As was previously mentioned, in 2011 34% of the stainless steel by weight was consumed to make catering tools and equipment and appliances. That number goes up to something like 85% by volume. You need a commercial system to nurture this disruptive innovation, support the business model, and scale up, and the argument we are making here is that the third enabler is the consumerization of stainless steel products by the ever increasing urbanization of the masses in the developing and most populous countries.

Within the scope of the third enabler, disruptive innovation now has the room to scale up and make its impact in the form of changing consumer tendencies as supported by the slight but noticeable technological changes.

We said it before that the stainless steel consumption per capita is a sign of economic prosperity and it comes at the later stages in the economic cycle. The below curve shows schematically that China and India's "balloons" will ascend like a rocket while the developed country balloons will continue to be big but suspended in the air. Where will this growth come from in the next 10 years? We think that the market dynamics will be solely driven by the more than 1 billion consumers at different phases of their urbanization and their preferences in their newly found lives in some new 600-700 new cities. Here is a very good example of this trend:

IKEA, a global leader in home furnishings, has replaced the austenitic stainless steel, (more durable, shinier, more expensive nickel containing alias 300-type), that it used for production to less expensive ferritic stainless steel. Other producers are also following suit and this has resulted in 5 times the volatility in the nickel prices between 2005 and 2012 . Generally speaking, it is projected that "lowest" cost stainless steel production will have a higher percentage in the near





future. Hence, the commercial environment which embraces the lowest cost stainless steel made from the lowest grade of chromium ore utilizing a technological enabler, the DC furnace completes this circle of enablers making the discontinuous innovation to take hold and rule the market.

CONCLUSION

Chrome ore, which is found in abundance in the world, especially in South Africa, experienced a dramatic price increase a few years ago, hovering around $700-750 per ton, and then started its descent after the 2008 crisis. We argue here is that a disruptive innovation, enabled by three factors, is fueling this slide for chrome. First, we claim that an increasing percentage of DC furnaces used for smelting chromium ore into ferrochrome is presenting significant advantages over the conventional AC type furnaces by accepting lower grade, cheaper, and ore fines which is a byproduct of another more precious metal, platinum, coming at almost no cost. We claim the latter is the second enabler. For the third enabler, we point out to the tremendous growth seen in the urbanization in China and India, close to 1 billion people moving into urban centers and increased usage of cheapest stainless steel products more for catering and home appliances.

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Graphite: A Critical Raw Material and Turkey

Raw materials and natural resources, have always a critical and strategic role not only today but also in the course of history. In fact, among the reasons for World War 1, efforts to seize Europe's coal deposits in the Alsace-Loren is said to have an important role.

Technology and industry manufacturing countries and Country groups have also recognized the increasing importance of the raw materials todays and were forced to adopt measures, and develop strategies for accessing and securing the supply of these raw materials. European Union is one of the most important of them, particularly due to geographical proximity to Turkey, and Turkey's intensive economic relations with it. The EU started to act and establish an initiative called "Raw Materials Initiative" and prepared, started to developed strategies and alternate sources for 14 raw materials that they thought important and critical. These raw materials are:

Antimony	Indium
Beryllium	Magnesium
Cobalt	Niobium
Fluorspar	PGMs (Platinum Group Metals)
Gallium	Rare Earths
Germanium	Tantalum
Graphite	Tungsten

Table 1: Critical Raw Material for EU1

A similar study has been carried out by BGS-British Geological Surveys, by evaluating over 50 raw materials, by identifying critical risk index for them, and ranks them based on importance. And BGS published a list called "Risk List 2011"

Element or Element Group	Relative Supply Risk Index	Leading Producer
Antimony	8.50	China
Platinium Group Elements	8.50	South Africa
Mercury	8.50	China
Tungsten	8.50	China
Rare earth elements	8.00	China
Niobium	8.00	Brazil
Strontium	7.50	China
Bismuth	7.00	China
Thorium	7.00	India
Bromine	7.00	USA
Graphite	7.00	China

Table 2: BGS Risk List 2011[2]

In both studies made by EU and BGS, two important raw materials, especially for our country, are noticeable immediately;

- Antimony (in the first rank and has a higher risk index than rare earths)
- Graphite

These two raw materials are being produced and have potential to be produced more in Turkey. Now we will have a further deeper look at Graphite.

GRAPHITE AT A GLANCE:

Graphite is a natural form of carbon with the chemical formula C and is characterized by its hexagonal crystalline structure. It occurs naturally in metamorphic rocks such as marble, schist and gneiss. Actually we know graphite in our daily life very well; it was the "lead" part of a lead pencil. Other two important natural carbon forms are Coal and Diamond.

Graphite materials fit into two primary classifications :

- Synthetic Graphite
- Natural Graphite

Synthetic Graphite is an industrial end product rather than a natural resource, so we will mainly focus on Natural Graphite as it is a raw material from a natural resource. Natural graphite can be further divided into three primary types[4];

- Amorphous Graphite
- Flake Graphite
- Crystalline Vein

Each type has characteristic properties and is formed in a unique geologic setting. But in the basis of this classification, structure of carbon element lies. As an

example Flake Graphite has a carbon structure of flaky as it is named.
Graphite has some unique specifications that makes it very important, it is :

- Excellent heat conductor
- Excellent electricity conductor
- Heat resistant (Melting Point 3927 C°)
- Chemical and Corrosion resistant
- Resistant to acids and oxidizing agents
- Lubricating

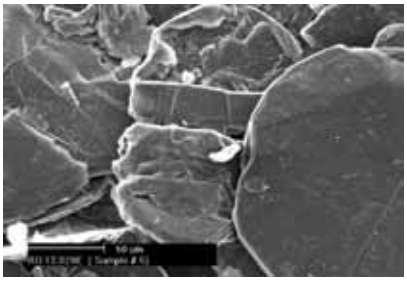
Natural Graphite are being used in many industries, these industries and shares in total natural graphite consumption are as follow[5];

- %41 - Steel & Refractories
- %14 - Automotive Parts
- %14 - Lubricants
- %11 - Carbon Brushes
- %10 - Batteries
- %10 - Others

GRAPHITE PRODUCTION AND PRICES

Natural Graphite production is estimated around 1 million tonnes/ year, as 600,000 tonnes Amorphous and 400,000 tonnes various grade and size Flake graphite. In reality we don't have very exact and certain numbers for production quantities, mainly because Countries statistics related to production not so transparent and accessible, also production figures coming from producers which could include some speculation.

China is the biggest producers and accounting 80% of the total graphite production worldwide. Other important producers are North Korea, Brazil, Mexico, Canada, Norway Madagascar and Sri Lanka. As I said above as we don't have very clear idea about production quantities and China's share in production, but we have very clear indicators about the market shares, when we analyze the United Nations Trade Statistics, we found out that China's share in total graphite export is a around 85%[7]. This means that China is a monopoly in the market. This situation wasn't realized for a long period of time, as there wasn't too much supply problem in the market, and graphite wasn't a hot commodity in the market because of its low price. But in 15 month periods between January 2011 and March 2012 graphite prices increased 140%[7]. To understand how graphite prices developed you can compare the prices in 2006 and 2012 in below table.



	2006[8]	2012[9]
Large Flake %94-97 C + 80 Mesh	800-950$	2500-3000 $
Medium Flake %90 C -80 Mesh	440-495 $	1500-2000 $
Amorphous Powder %80-85 C	240-260 $	600-800 $
Prices are CIF European Port $/ton		

Table 3: 2006 and 2012 Graphite Prices

Prices have significantly increased after 2009, the main reasons for this increase are ; because of the crisis in 2008, producers cut back their capacity and when demand started to come back for graphite in 2009, producers were caught off guard. At the same time, China has closed down or consolidated some production, to better control environmental issues and protect graphite reserves.

Adding further pressure to prices, in January 2010, the Chinese government started going after graphite exporters that had been dodging or underpaying the 20% export tax on graphite, sending exports down and prices up. (China also has a 17% value-added tax on the material.)

Besides this, there are also very serious expectations from Lithium ion battery market. While currently small, it's the most important growth market for natural flake graphite. Lithium-ion batteries contain up to 10 times the amount of graphite as lithium, so the potential is great, especially if electric vehicles (EVs) catch on in the market. It was estimated that Lithium ion battery market could create another 1 million tonnes demand by the year 2020[5]. These expectations and price increases start a boom in graphite market, and currently over 100 graphite projects announced to the market.

But we must add a comment here, first of all it is very obvious that majority of

these projects won't be developed for next stages, and won't be even closer to production, as they are too sensitive on prices, they are very high costs projects, and for mining perspective they are logically not doable. If you look carefully you see that all of these projects are flake graphite projects, as they explained that flake graphite will be very important for new uses like Lithium batteries, but currently we don't have that size of demand, and on the other hand, it is ▶

just because flake graphite prices actually high enough to show the investors a profitable project. We will see some price decreases in the market and they will significantly affect these projects and juniors. Almost all of these projects are financial investment/venture capital projects, and even a small price decrease will create a panic for financial investors. For this reason to develop low cost mining projects are very important.

GRAPHITE IN TURKEY:

In 8th Quinquennially Development Plan it was said that: "Graphite studies and works in Turkey was started in 1941 in Turkey according to MTA (General Directorate of Mining Exploration and Research of Turkey) and Mining Affairs records, and in over 22 region, economical graphite mineralization determined." Unfortunately we couldn't find too much detailed work on graphite mineralization in Turkey but at least we know where the mineralization is and what could be the quality of it. According to MTA all the determined mineralization is amorphous type, some of the important reserves and grades in Turkey are as follow:

Place/City	Reserve Quantity (metric Tonnes)	Average C %
Yozgat	< 100 000	45
Kastamonu	Unknown	60
Aydin	150 000	10
İzmir - Tire – Karamersin	150 000	8
İzmir - Tire – Çeşme	200 000	6
İzmir - Tire – Başköy	150 000	10
Istanbul	150 000	30
Mersin	Unknown	45
Adiyaman	Unknown	45
Mugla	30 000	10
Kutahya-Oysu	130 000	20

Table 4: Main Graphite Mineralization in Turkey[11]

In 1980 Turkey has two graphite miners, producing graphite from their underground graphite mines , These are Karabacak Mining (now Oysu Graphite) whose mines and flotation plant located in Kütahya - Altıntaş - Oysu and Bilginer Mining whose mine located in Muğla-Milas-Yayladere. Both of the companies carried out some flotation enrichment studies, and in 1991 Karabacak mining set up a 100 mt/day input capacity flotation plant in their mine, and Bilginer mining also set up a small pilot flotation plant in their mine in Muğla. But in 1992 China entered the graphite market with low prices, and market discovered petroleum coke as a subsidiary of graphite mainly in steel industries. These create a collapse in the market and not only in Turkey but also all over the world, lots of mine and producers stop their production.

Till 1999 grapihite production continue in Turkey but later stopped again, and in 2008-2009 flotation plant in Kutahya restart their operations and occasionally produce small quantities.

Year	Production (Metric Tonnes)	Consumption (Metrict Tonnes)
1985	-	4,100.00
1986	3,586.00	4.000.00
1987	8,900.00	3,400.00
1988	12,911.00	13,000.00
1989	11,000.00	12,000.00
1990	18,712.00	18,712.00
1991	26,763.00	26,763.00
1994	5,000.00	25,000*
1995	5,000.00	25,000*
1996	5,000.00	25,000*
1997	5,000.00	25,000*
1998	5,000.00	25,000*
1999	5,000.00	25,000*

Table 5: Turkey Graphite Production between 1985-1999[11]

Year	Production (tonnes)
2003	0.00
2004	28.00
2005	0.00
2006	0.00
2007	0.00
2008	3,236.00
2009	2,400.00

Table 6: Turkey Graphite production between 2003-2009[13]

Most important figure in these tables are production of 26,000 mt of graphite in 1991. If Turkey could hit the same production figures again, these means that Turkey could be one of the top five graphite producers in the world. With best of my knowledge and experience, I believe that Turkey could hit this pro-

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duction figures, because we have more than enough sources for this.

CASE STUDY: A SMALL AMORPHOUS GRAPHITE MINE IN TURKEY

People who read this article could ask several questions; Why invest in Amorphous Graphite in Turkey? And Is it really worth to consider to invest a small reserve? I want to analyze a small graphite deposit, and I think this will answer lots of questions. I couldn't give exact location, and information about the mine as it is a confidential project currently prepared for a company. But It is 230 km far from one of the main ports of Turkey, and very close to infrastructure. I will use one of the SGS reports and figures for cost and capital investment requirement, so that we will have internationally accepted costs. There is 4 geophysics anomalies determined and only 1 of them was tested with drill, and for this one anomaly MTA calculated following figures (data taken from MTA records);

Information About the Mine	
Possible Reserve	307,146 mt
Strip Ratio	6.14 mt/mt
Average Grade	26.45 % Fix C

With this reserve figures we are planning to produce roughly 21,000 mt of concentrate with 85% C content and with 95% efficiency. 21,000 mt won't have too much negative effect on supply side so that we could benefit with current high price level. For production of 21,000 mt concentrate annually, 250 mt/day input capacity flotation plant will be sufficient. And production figures will be as follow;

Yearly ore process and production	
Working days for a month	26
Effective working month/year	11
Working days for a Year	286
Overburden/waste excavation in a year (mt)	438,662.16
Ore excavation in a year (mt)	71,500.00
Concentrate Production in a year (mt)	21,136.66

With above estimation it means that we have 4 years 4 months of mine life. Again according to SGS report, for an investment of a flotation plant it must be considered 20,000 USD / per ton of plant input capacity. So for a plant with 250 mt/day input capacity we are talking about 5 million USD for flotation plant. We also consider some other investment cost, and some due diligence costs before investment as follow;

Flotation Plant Investment	$5,000,000.00
License Purchasing Cost	$100,000.00
Licensing and Permissions	$70,000.00
Settlement and Startup	$200,000.00
Drillings	$160,000.00
Analysis and Test Works	$30,000.00
Contingency 10%	$546,000.00
Total Investment	$6,106,000.00

For mining and processing cost, SGS advises following figures which we believe that reasonable also for Turkey (even it is a bit high);

Production Costs per tonne	
Overburden&Waste	$3.81
Mining Costs Ore	$4.11
Processing Cost (incl Administration costs)	$13.69

With Consideration of above cost we reach following annual cost table;

Annual Cost Calculation	
Overburden&Waste	$1,671,302.84
Mining Costs Ore	$293,865.00
Processing Cost	$978,835.00
Total	$2,944,002.84

And finally we reach below profit/lost table with 3 different price level.

	Selling Price 1	Selling Price 2	Selling Price 3
	$500.00	$600.00	$800.00
Concentrate Production Per year (mt)	21,136.66	21,136.66	21,136.66
Sales Income	$10,568,330.88	$12,681,997.06	$16,909,329.41
Production Costs	$2,944,002.84	$2,944,002.84	$2,944,002.84
Transportation Costs Per tonne	$60.00	$60.00	$60.00
Annual Transportation Cost	$1,268,199.71	$1,268,199.71	$1,268,199.71
First Year Sales Profit (EBITD)	$6,356,128.34	$8,469,794.52	$12,697,126.87
Sales Profit Over Mine life	$27,304,382.31	$36,384,178.43	$54,543,770.65

As you see above table, in worst case scenario for 500 USD price for 85% Fix C content graphite, project will have 6,3 million USD net profit in the first year which even pay the investment cost in year 1.

CONCLUSION:

Graphite is a critical raw material with increasing importance. Even without considering new demand drivers, traditional markets such as Steel and refractories are very important industries for consumption. Especially because of China, industry faces an important supply gap, mainly traditional graphite consumers. But because of the current market and economic conditions low cost projects are very important, as prices could fluctuate in the short term.

Turkey has a graphite mining history for more than 30 years, and geographically it is very close to Europe which is the main importer of graphite. According to UN trade statistics EU importing roughly around 150,000 mt graphite annually and this demand is mainly met by China. So a very important market is just next to Turkey and when you consider the delivery time and logistic costs, Turkey has very important competitive advantages against China.

Our case study that we explain above shows us that even a very small reserve with high grade ore (when we consider this project with other 26% fix C content, it has the highest quality ore among other projects worldwide) offers very profitable mining business. And we know that some of the mine, which is not yet studied had over 60% C contended ore in Turkey.

We can't say Turkey is an important player, and have significant graphite reserves, but to have a profitable graphite mining, we don't need million tonnes of ore and to be number one in the world.

Even with some additional R&D for producing higher grade graphite concentrates, we will have better profit scenarios, because higher grades offer higher values. And we can say without doubt that, yes Turkey offers profitable, small scale, manageable, high profit, low cost graphite opportunities. ●

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Investment in Mining & Beneficiation in Turkey - A National Imperative

WELCOME TO THE CENTER OF THE WORLD

When arriving in Turkey one should feel welcome to the centre of the world, because geographically – It literally is! Clear evidence is everywhere depicting the more than 10,000 yrs of civilisations making it geo culturally the centre.

Ofcourse in recent times it has also become clear that its where East meets West and has become geopolitically potentially the most important centre.
And lastly with its top 3 fastest growing economy geo-economically – all must not only watch but be invested this space or get left behind.

ECONOMIC GROWTH VS. BALANCE OF PAYMENTS (BOP)?

Ofcourse with the very strongly expanding economy come some serious supporting requirements such as an unrestricted supply of energy and metals and minerals. And now as a result of a historic lack of focus on these elements of support for the economy, Turkey is and will remain for sometime in the grip of a serious negative balance of payments. Energy related natural resources and Metals imports in particular being the major contributors in this regard.

By way of an example the tables and graph below show the conservative estimated impact on the BoP by 2023 of imports of two main industrial commodities Copper & Zinc and the collective impact of 5 major imports for industrial use.

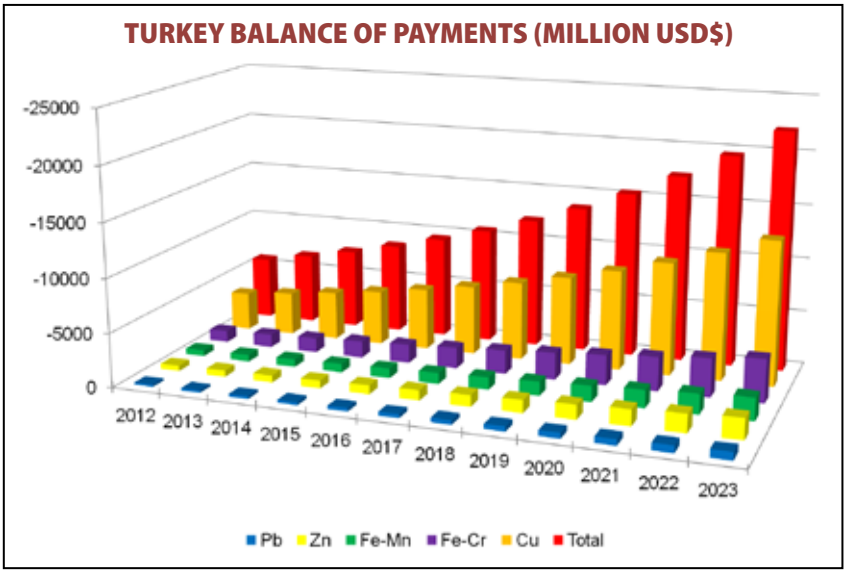
ECONOMIC GROWTH VS BALANCE OF PAYMENTS?

But this is Turkey!

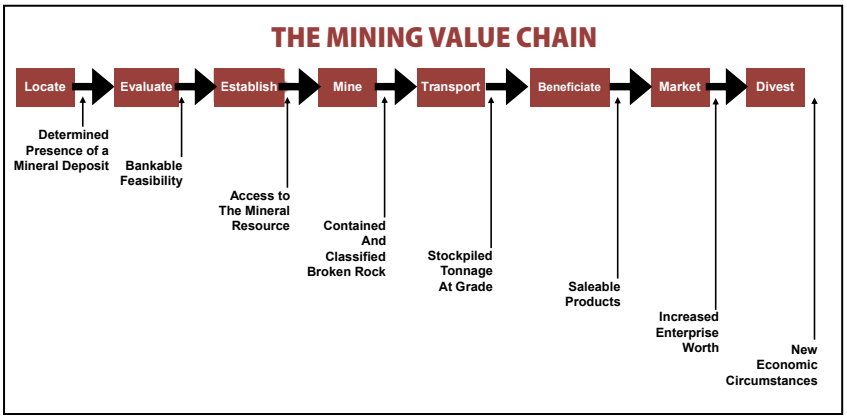
ZN METAL (ESTIMATED IMPACT ON BOP)					
Year	Export (Tons)	Import (Tons)	Export (USD)	Import (USD)	Balance (USD)
2012	16,464	383,099	158,127,527	3,679,413,982	- 3,521,286,454
2013	17,699	411,831	178,486,447	4,153,138,532	- 3,974,652,085
2014	19,026	442,718	201,466,577	4,687,855,118	- 4,486,388,541
2015	20,453	475,922	227,405,398	5,291,416,464	- 5,064,011,066
2016	21,987	511,616	256,683,843	5,972,686,334	- 5,716,002,490
2017	23,636	549,988	289,731,888	6,741,669,699	- 6,451,937,811
2018	25,409	591,237	327,034,869	7,609,659,673	- 7,282,624,804
2019	27,315	635,580	369,140,608	8,589,403,356	- 8,220,262,748
2020	29,363	683,248	416,667,462	9,695,289,038	- 9,278,621,576
2021	31,566	734,492	470,313,397	10,943,557,502	- 10,473,244,104
2022	33,933	789,579	530,866,247	12,352,540,530	- 11,821,674,283
2023	36,478	848,797	599,215,276	13,942,930,123	- 13,343,714,847

CU METAL (ESTIMATED IMPACT ON BOP)						
Year	Zn	Pb	Cu	Fe-Mn	Fe-Cr	Total
2012	-509,58	-195,47	-3,521,29	-555,27	-1,063,30	-5844,92
2013	-575,19	-220,64	-3,974,65	-626,77	-1,200,20	-6597,45
2014	-649,25	-249,05	-4,486,39	-707,46	-1,354,73	-7446,87
2015	-732,84	-281,11	-5,064,01	-798,55	-1,529,15	-8405,66
2016	-827,19	-317,30	-5,716,00	-901,36	-1,726,02	-9487,88
2017	-933,69	-358,16	-6,451,94	-1,017,41	-1,948,25	-10709,45
2018	-1,053,91	-404,27	-7,282,62	-1,148,40	-2,199,09	-12088,29
2019	-1,189,60	-456,32	-8,220,26	-1,296,26	-2,482,22	-13644,66
2020	-1,342,76	-515,07	-9,278,62	-1,463,15	-2,801,80	-15401,41
2021	-1,515,64	-581,39	-10,473,24	-1,651,53	-3,162,54	-17384,34
2022	-1,710,78	-656,24	-11,821,67	-1,864,17	-3,569,71	-19622,57
2023	-1,931,04	-740,73	-13,343,71	-2,104,18	-4,029,31	-22148,98

Its fundamental geological prospectivity and proliferation of infrastructure (Copper, Zinc, Lead, Iron Ore, Chrome, etc), industrial mineral and precious metal commodities, when mated with its highly educated, strong work ethic population, it is only a matter of time and ironing out of bureaucracy in industry related government departments, with some business culture factor modifications and this will be turned around significantly.



MINING POTENTIAL IN TURKEY	
Deposits & Sufficiency Potential (%)	Gold (100%), Silver (100%) Copper (100%), Zinc (100%), Lead (100%), Chrome (100%), Manganese (75%), Iron Ore (40%), Coal (75%), Ind Minerals (100%), REE's (100%)
Metals & Minerals Commodities Markets	Future Market: 100% Domestic for 100% of production capacity: Growing demand



The mining potential in Turkey and its ability to generate future self sufficiency is illustrated in the table below.

AN ECONOMIC ACHILLES HEEL? - MINING

But is Mining an economic Achilles heel? Mining historically has shown a clear lack of focus on sustainability with a 'Find it, Dig it, Sell it' basic approach borne out of the trading culture embedded in the populations gene pool.

And with first, a fundamental lack of understanding of the Mining Value Chain and second, a historic lack of focus on professionalism in mining companies established and lack of adherences to any acceptable standards in terms of

- Policies & procedures, Safety
- Management & Reporting with Regulation and Inspection

While any beneficiation being seen as necessary evil with export of un-beneficiated materials prevalent across the sector in search of short term profit.

SO WHAT ARE THE MISSING LINKS?

There are a number of clear missing links or elements currently available for investors in the sector as follows;

- Easily accessible, publicly available, clear information on potential projects by commodity;
- Data and/or information which is compliant with recognizable mining and mineral project definitions, standards and codes;
- On all prospective or mineable geographical areas and properties across all regions of Turkey;
- Ranked and prioritized with stated available local provincial and state incentives for investment;
- Availability of proximal skills, infrastructure & services;
- Pre-prepared developmental road map to facilitate immediate economic impact,

CONTINUED

The missing links or elements currently unavailable as mentioned in detail above are the cause of a significantly measureable slow pace of investment growth and more importantly project execution at feasibility, construction and production stages in the required commodities

to deal with the BoP issue fast enough to stop the economy running out of steam and the country running out of funds to support further growth.

So what should the government be doing to rectify this when the incentives alone are just not enough to accelerate real development to sustainable economically contributing production?

It should have a clear economic focus on the independent contracted professional delivery of the following;

THE ECONOMIC FOCUS

- Creation of an attractive "Credible & executable" visible Mining & Beneficiation investment plan;
- With focus on investment support of broader & deeper exploration using all available technologies for resource ID & classification;
- With focus on mining value chain positioning for investment definition and development selection with investment support for all beneficiation in particular; and
- With focus on closure of the entire value chain, Exploration, Mining, Beneficiation, Smelting & Refining, for optimal resource utilization within the economy.

MINING BUSINESS IMPERATIVES

The clear imperatives within the generated plan for immediate execution thereafter must;

- Ensure exploration programmes meet internationally accepted norms & standards;
- Ensure Mineral Resources and/or Reserves are defined to verifiable and auditable limits within accepted codes for reporting on Mineral Resources, e.g.: NI43-101 or JORC;
- Undertake Valuation of all Mineral Resources and/or Reserves defined for exploitation according to accepted and recognised codes, e.g.: VALMIN or SAMVAL in order to attract positive investment for project development

PROJECT COMMUNICATION PLAN

And the plan must ofcourse have a clearly specified objective to;

- Develop a Communication plan for the project to be seen in a positive way, aligned with "Equator Principles" ("EQP") for the attraction of mining/beneficiation investment in Turkey;
- To eradicate the negative perception created by environmentalists and other activists against mining & mineral exploitation; and
- Through engagement with communities proximal to likely mining/beneficiation development sites for participation and broader social development for all stakeholders.

REGIONAL INCENTIVES

Another clear objective will be to properly contextualize the regional incentives offered by the Turkish Government to give focus to;

- High Value, easily accessed, focus under-developed areas like Region V Eastern Anatolia and Region VI SE Turkey;
- Create opportunity to continue grow at an accelerated rate into a major investment hub for Mining/Beneficiation in Eastern Europe/Asia minor with massive spin offs in Financial, Industrial consumable, Industrial equipment, Technology and Human Resource development; and
- Enable realization of many extensional benefits in terms of economies of scale and economic support of citizens in all sectors of the economy both local and regional.

The main key deliverables will be as follows for such a plan.

PROJECT KEY DELIVERABLES

1. Compliance, Governance, Transparency and Sustainability reporting are key in the establishment of Credibility – "Essentially Investor Relationship Management"
2. Creating a reputation of delivery through delivering on the full value of the projects by completing the Value Chain – "Essentially Reputation Management"
3. Selection of the investments and local investment partners – "Essentially Sustainable Development Management"
4. Project Economic Delivery (management of expectation) – "Essentially Prioritization for Realistic Deliverables"

CONCLUSION

Well after all of the above it should be a no-brainer to execute this plan, shouldn't it!? Unfortunately this plan has existed, architected by myself originally in 2005 for the incumbent Minister at the time Dr. Hilmi Guler. To his considerable credit Dr. Guler tried to get things started before he was replaced by the current incumbent.

Since then bureaucratic blockage by parties claiming ownership, looking to steal the idea for credit award have served to sterilize the systems ability to deliver. No government or bureaucracy can deliver this or any plan for immediate impact without independent qualified outside contracted consultants to drive and deliver the required results.

I continually live in hope that someone somewhere is listening because we/Turkey/our country needs this now! ●

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Investing in Turkish Mining Industry

The history of civilization would have been very different without the discovery of stones and metals. Since the existence of humankind on Earth, the pursuit of a better life has been an intrinsic objective. During the industrial revolution, coal, a key element, powered steam engines for a long time. The importance of minerals and metals arose with development. Even in today's world, different metals and minerals are driving the information age.

In the last decades, the need for mineral commodities has been increasing mainly due to demands from developing countries such as China, Brazil, India, Mexico, Russia and Turkey. What these countries have in common is a young urban population in need of jobs and economic prosperity. Mineral commodities are extensively used in construction and manufacturing industries. The global demand for metals has only decreased in 2009 because of the economic downturn. However, the consumption and economic wealth of developing countries will continue to rise.

Turkey, with its large territory and central location, has much diversity in minerals. Over 50 different metals and mineral commodities are produced in the Anatolian peninsula. In particular, Turkey is the global leader in boron, feldspar, perlite, and pumice production. Turkey's share of these minerals to world production in 2011 is shown in Figure 1. In addition to industrial minerals, there has been an interest from foreign "junior companies" and new founded local mining companies for precious and base metals. Beginning from almost no ounces back in late 90s in 2011, more than 850 thousand ounces were produced by several mid and small sized operations. Turkey has become one of the main destinations for foreign investments in Eurasia. It has been experiencing its gold rush in last 10 years. Many junior foreign companies and local companies from different industries have been showing great interest in mining. Despite having a huge potential for minerals, the country has it is own strengths and weaknesses in the field.

M. MUSTAFA KAHRAMAN is pursuing his Ph.D. in Mining Engineering and Systems and Industrial Engineering at the University of Arizona. He received his B.Sc. in Mining Engineering from Istanbul Technical University, in 2007 and his MS degree in Mining Engineering, from University of Arizona, in 2011. He works as a Research Associate and Project Manager in the Mine Intelligence Research Group (MIRG) where he applies business intelligence tools and integrates different IT systems for large mine operations. MIRG Lab consists of experienced researchers from different disciplines, including researchers from Mining, MIS, and Systems and Industrial Engineering. His areas of interest are business intelligence applications in mining, integrated control centers,Project Management, strategical mine management, process optimization, and cost reduction strategies.

DR. SEAN DESSUREAULT is an Associate Professor in the Mining and Geological Engineering department at the University of Arizona. He received a B. Eng. in Mining Engineering from McGill University from Montreal, Canada, and his M.Sc. and Ph.D. from the University of British Columbia, Vancouver, Canada. Dr. Dessureault has worked at mines throughout Canada during his education whilst engaging in part-time consulting. His appointment to the University of Arizona began in January 2002.

In 2004, Dr. Dessureault formally established a consulting firm, Mining Information Systems and Operations Management (MISOM) Consulting Services Inc. MISOM provides a variety of high-tech services to the mining industry (www.misomcs.com). Its core competencies are in technology strategy, mine automation, data warehouse development, business process alignment, and technology selection and implementation. Dr. Dessureault has been a consultant for numerous large mining companies including the United Nations, where he focused on how developing nations should use technology to expand the benefits of their resource sector. While on sabbatical from 2008 to 2009, he worked for Freeport-McMoRan Copper & Gold's Autonomous Mining Group MISOM CS developed and implemented a corporate strategy for IT in mining operations for Peabody Energy. In 2010, MISOM CS established a sustainable development listening tool called Stakeholder Listening and Analysis (www.stakeholderla.com), which uses the vast quantity of data in social media to better understand and communicate with communities. Dr. Dessureault is the director of MIRG Laboratory (www.mirg.arizona.edu), where he manages several research programs.

COUNTRY PROFILE: TURKEY

Going two decades back, almost 90% of the mining operations were owned and operated by government. Currently, the government still owns significant amounts of ventures. However, the state of the mining industry has changed in the last ten years. Since 2004, in an effort to encourage local and foreign investors, changes to the mining regulations have been put into place.

In 2004, the new regulation divided minerals different groups and different liabilities such as royalty and licensing for each group. These groups include: construction materials (group 1), dimensional stones such as marble (group 2), salts (group 3), industrial minerals, coal, precious and base metals (group 4); and semi-precious stones (group 2). These amendments to mining laws relieved the vast bureaucratic red tape for investors to get permits. In conclusion, amendments to the mining law in 2004 encouraged foreign and local investors to invest in mining. However, this resulted in many investors obtaining and holding mining licenses for trading purposes. In 2010, new amendments were implemented with the purpose of preventing speculative license holders and requiring production or exploration from license holders.

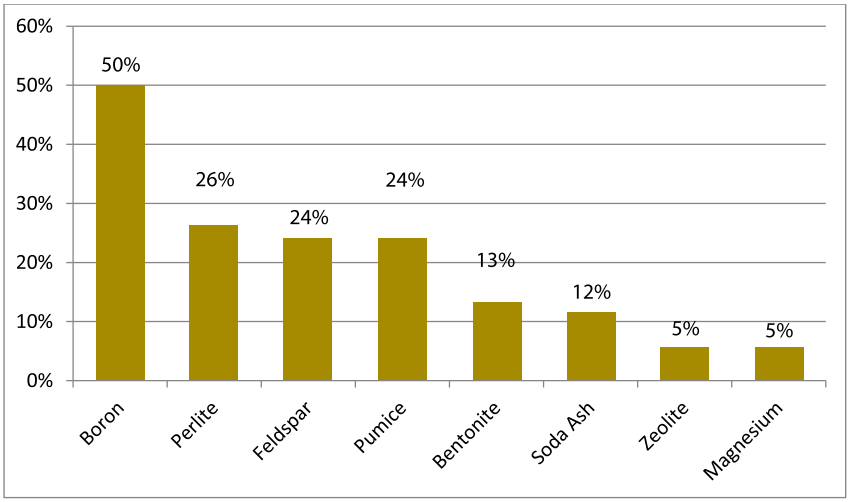

Figure 1 Turkey's shares in world mineral production (source: USGS Mineral Commodity Summary 2012)

THINGS TO CONSIDER BEFORE INVESTING IN TURKEY

Investment in an emerging country has it is advantages and risks. An in-depth analysis of the country is a requirement to understand the many risk factors related to the country's economy and its cultural and sociopolitical climate.

ECONOMY AND CURRENCY

Historically, Turkey's economy has been sensitive to downturns. In the last 20 years, there have been four years with negative growth rates. However, in the last decade, the Turkish economy has recovered from a triple digit inflation rate. Consequently, it has become one of the fastest growing economies in both Europe and the world. Particularly, after the mortgage crisis in 2009, Turkey rapidly recovered from a negative growth rate and averaged 8.8% growth rate in 2010 and 2011-only 1% less than China. In fact, Turkey is one of the main contenders of BRIC (Brazil, Russia, ▶

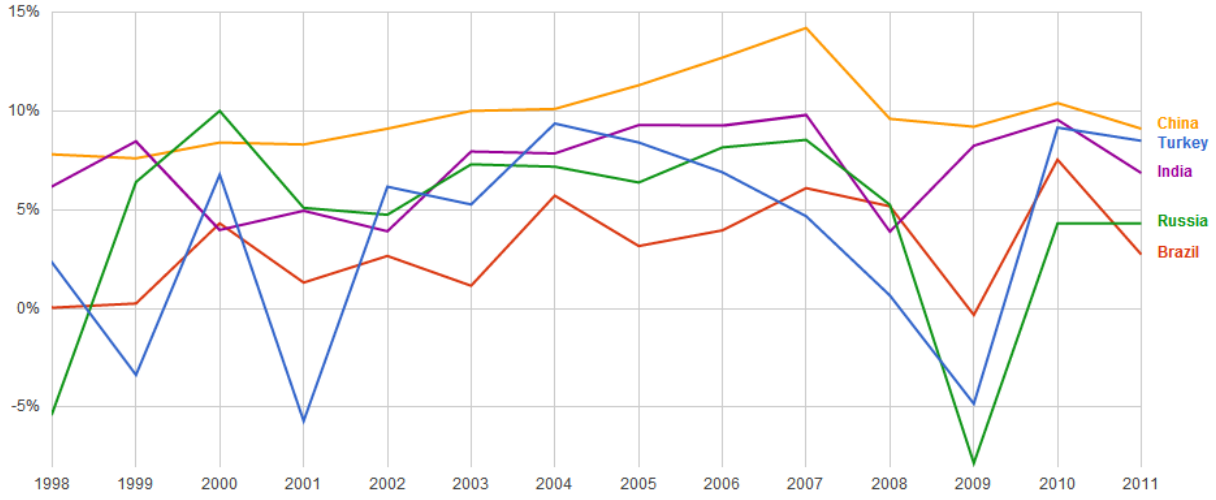

Figure 2 Turkey's GDP Growth Rate Comparison with BRIC (source World Bank)

India and China) which symbolizes the economic shift from a G7 developed country to developing country (See figure 2).

Within the past few decades, Turkey had been battling with currency devaluations and a banking crisis. After the economic crisis in 2001, amendments to the banking system were made. One such amendment focused on transparency, which aligned the Turkish banking system in compliance with international standards. As a result, the Turkish currency, "Lira", has become arguably more stable than in the 90s)Similar to most emerging economies, the Turkish lira is also offering higher interest rates, which has led to attracting many investors around the world. (See Figure 3)

POLITICAL STABILITY AND POLITICAL RISK

One of the key factors when investing in an emerging economy is political stability. Globally, there have been many examples of nationalized countries where foreign investors were unwelcome and were consequently expelled. Normally, investors prefer democratic countries, where stability of government and execution of the rule of law are not causes for concern. In contrast, weak regimes and unstable leaders or frequently changing governments create a lack of consistency in implementation and enforcement of the policies. After a long term of a coalition run government in Turkey, the AK party (AKP) described by it is leader as "conservative democrats"- has taken charge of running the country for the past 10 years. It increased its votes in the last two elections; moreover, polls and surveys indicate that this trend will continue. The AKP is expected to continue their governing for at least one more term. Mining investors could benefit from this result for two reasons. First, the current government has been pro-mining and has invited foreign financiers to invest in the Turkish mining industry. Additionally, the existing laws and regulations for mining investments were undertaken by AKP government.

SOCIAL ISSUES

Social acceptance is very crucial in every stage of mining. Today even in mining dependent economies, (i.e. Peru) there have been social protests and

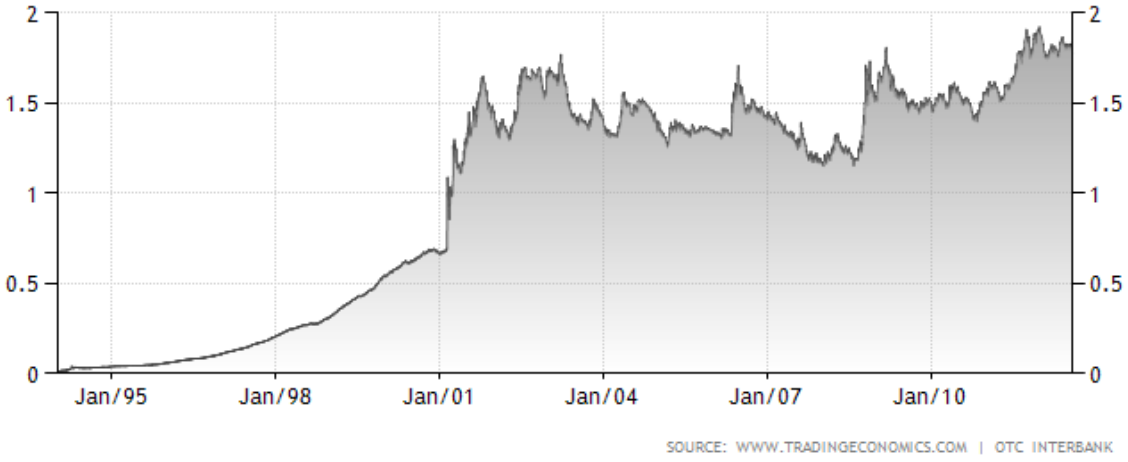

Figure 3 Turkish Lira's Exchange Rate to US Dollars

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opposition to mining projects. In Turkey, in the early 2000s, some environmental groups had voiced their opposition to the first gold mine in Bergama, owned by Normandy (subsidiary of Newmont). There had been a campaign of disinformation about the use of cyanide in gold processing and exploration. However, the Turkish mining industry responded to this by forming new associations to promote mining. New mining laws were initiated, which has had a positive influence on public opinion about mining. Half of the payments for mining operations are t used to bring services to rural villages. Additionally, 25% of the revenues from mining operations are utilized for infrastructure development of the region.

PERMITTING

The permitting process has been a struggle for mining companies in various countries. Mineral prices could change significantly in the future. Consequently, delays in the permitting phase could result in huge profit losses for investors. In some situations, the mine is unable to get the permits required to move ahead. Before the 2004 mining law was initiated, a new mining project needed to have permission from over 28 different departments and ministries. The law in 2004 facilitated the permitting process from the endless bureaucratic stream of forms and applications in Turkey. Despite the recent positive changes, there is still a need for more amendments to reduce bureaucracy and expedite the permitting process.

INFRASTRUCTURE AND WORKFORCE

Mining has it is uniqueness when it comes to infrastructure. It is common to have mining companies providing the basic infrastructure like water, electricity, roads, and phone lines to the location. Another factor that is critical for the companies is skilled workforce. Due to the mining law in 2010, half of the royalty paid by operations will be used for bringing in services in rural villages, where 25% of license payments will be used for infrastructure.

Availability of labor/skill could be problematic in any country. This issue arises in Africa, Asia, and even in Australia. Turkey has a young population, with an average age of fewer than 30 with an available skilled workforce. Furthermore, Turkey has one of the longest working hours per week-more than 50 hours/week, in Europe. Turkey is also a country with a central location and access to sea transport facilities.

INVESTOR FRIENDLY POLICIES

Nationalization and hostility against foreign investors could be faced in many countries. The Turkish government has encouraged foreign investors and has also been inviting foreign companies in the last decade to bring in capital. For instance, the Turkish government has established a webpage "Invest in Turkey", to inform, notify, and update potential investors. As mentioned above, the recent reforms have reduced the traditional bureaucracy load. One example of this is the establishment of a foreign company within 6 days. Moreover, there are incentives such as tax reduction, value added tax (VAT) exemption, and customs duty exemption for different industries, including mining.

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09.30 - 10.40 : Panel 1 Funding Mining & International Law	Panel 1 : 09.00 - 10.00 Value Beyond Minerals for 21st Century
10.40 - 11.00 : Coffee Break	Coffee Break : 10.00 - 10.20
11.00 - 12.20 : Panel 2 New Technologies & Exploration Techniques	Panel 2 : 10.20 - 11.30 Rare Earth & Strategic Metals Investment Tungsten - Nickel – Antimony - Boron Panel 3 : 11.30 - 12.30 Steel Making Raw Materials Iron Ore – Chrome – Manganese
12.20 - 13.45 : Lunch	Lunch : 12.30 - 13.45
13.45 - 14.45 : Panel 3 Emerging Mining Opportunities in Turkey & Region Gold – Copper Mining	Panel 4 : 13.45 - 14.45 The Future of Energy ? Coal – Lithium – Toryum
14.45 - 15.15 : Coffee Break	Coffee Break : 14.45 - 15.30
15.15 - 19.30 : Round Table Meeting Session	Round Table Meeting Session : 15.15 - 17.30

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TOPIC RANKINGS	DB 2012 Rank	DB 2011 Rank	Change in Rank
Starting a Business	61	63	▲ 2
Dealing with Construction Permits	155	153	▼ -2
Getting Electricity	72	73	▲ 1
Registering Property	44	39	▼ -5
Getting Credit	78	75	▼ -3
Protecting Investors	65	60	▼ -5
Paying Taxes	79	83	▲ 4
Trading Across Borders	80	79	▼ -1
Enforcing Contracts	51	51	No change
Resolving Insolvency	120	122	▲ 2

Figure 4 Summary of Turkey's ranking among 183 countries "Ease of Doing Business" (source: doingbusiness.org)

TAX LIABILITY

Investors need to know how much they have to pay in taxes in advance. Many countries are imposing extra taxes for foreign investors. Recent regulations in the Turkish mining industry include different royalty shares for different mineral groups. As of 2012, Turkey will have the new investment incentive system. The key point in this incentive system is local and foreign investors have equal rights and access. There are four types of investment incentive schemes: General, Regional, Large-Scale and Strategic investment incentive schemes. In the regional investment incentive the state is divided into six groups. Region 6, the least industrialized region of all due to its rural nature, is given the most priority, i.e, there is substantial governmental financial support and aid. Right behind it is the mining industry prioritized the most, where regardless of the investment region mining will be supported as if the mining activity is in group 5 region. In addition to regional incentive system, large scale investments in selected 12 areas of investment are be supported. Mining investments over 50 million Liras (~28 million USD) will be supported. The support includes VAT and customs duty exemption for at least 7 years. With the recent corporate income tax amendment, the tax burden was reduced from 33 to 20 percent.

CONCLUSION

Turkey has come a long way in terms of attracting foreign investment As of 2012, there are over 30 gold exploration companies, operating in Turkey, and this number is growing. With a young and energetic population, Turkey has an enormous potential in mining. Economic and political stability have been successful enough to bring new investors in the last decade. However, there is room for improvement in some areas. For instance, construction permits still require a long sequence of procedures and is very costly compared to the Organization for Economic Cooperation and Development OECD average. As well, there is a need for secure regulations to protect the investors. According to the World Bank, Turkey ranks 71th among 183 countries in "ease of doing business". Figure 4 shows the summary of it is ranking for 2011 and 2012. For Turkey to be in the top 10 largest economies by 2023 there is an urgent need for facilitating the business challenges caused by bureaucracy. ●

CONTACTS

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Effects of Price Volatility on Mining Companies' Financials and Ever-Increasing Importance of Corporate Governance and Operational Excellence

Commodities' price trend is the most important factor affecting mining companies. Not only the revenue is directly affected but also the costs are directly related to the commodity prices. Therefore, volatility in the prices may cause dramatically drops in profit margins, even if the eventual price is not changed. It is urgent for investors to understand the impact of price trends on companies' financials. Moreover, in order to have sustainable profits, mining companies must invest on corporate governance and operational excellence and eliminate unnecessary bottlenecks of workflows.

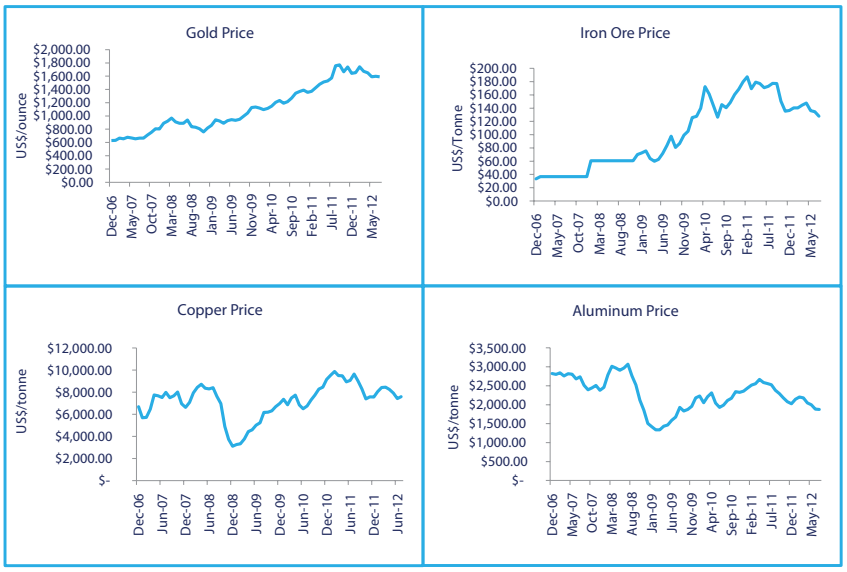

Figure 1: Gold, Copper, Aluminum, and Iron Prices[1]

COMMODITY PRICES AND TRENDS

Due to global financial crisis, at the second half of year 2008, uptrend in commodity prices started to give way to sharp fall. At the mid-2009, loss in commodity prices reached 50%. The precious metals, like gold and silver, are seen as safe haven investments, therefore, economic crisis does not have a negative effect on their prices, and on the other hand, industrial metals like nickel, aluminum experienced the biggest losses in price.

Despite the long-term effects of the global financial crisis, markets seemed to gather strength and started to rise again, as a result of demand in developing countries like China and India and the governments' incentives[2]. However, recently Euro Crisis and uncertainty have started to dominate the markets, pulling the prices down.

PRICE VOLATILITY CHANGE THE RULES OF THE MARKET

During the periods of high commodity prices, higher profits are expected from mining companies. However, due to natural hedge phenomenon, high commodity price does not automatically enhance the financial indicators of mining companies. Countries where the mining industry constitute high portion of GDP, is affected from increasing commodity prices and the local currency is appreciated with appreciation of commodities. In other words, when commodity prices increase, exchange rate versus US Dollar increases also. That's why when translated into local currency; the escalation in commodity prices eventually disappears.

On the other hand, in such countries, mining sector profits constitutes one of the governments' main income sources. While mining companies' profitability rising; governments, especially in the nations where they are struggling to repay their debts, push the companies to contribute more to the national economies with new tax policies. Governments impose new duties such as super-profit taxes, discovery bonuses, resource rents, license fees, indigenization quotas, environmental levies and reconstruction tolls. As a result, high profits coming from high commodity prices are somewhat negated due to governmental restrictions.

Moreover, increases in commodity prices, increasing demand, decreasing deduction limits with technological developments attract attention of other parties; new players start to enter to the industry. While growing interest of investors boosting the competition in this rapidly growing market, gap between supply and demand expended further.

This phenomenon drives shortages in equipment, labor, and other key inputs and increases their prices. By mid-2011, the price of haul truck tires alone had tripled, touching $100,000 on the spot market[3]. Energy and power prices are also on the rise – Brent crude prices rose 45%year-over-year as of June 2011[4]. On the other hand, bumper profits that high commodity prices brought have fuelled labor unrest, driving unions to demand higher wages. All these occurrences led to rapid escalation of costs.

In this unstable environment where prices fluctuating all the time, a lot of companies have failed to get costs under control and capital costs have reached unsustainable levels. As a result of all these factors, rising profit margins with appreciation of commodities start to close former levels with slightly higher revenues and higher costs.

When we look at the financial statements of leader companies in the industry, we can see the positive effect of the high commodity prices. While the prices surging up all the time, the profit margins of these companies increase considerably. For example, Xstrata's profit margins increased from 2.91% to 16.89% in 2010[5]. Likewise, Rio Tinto increased its profitability from 11.65% to 25.81%. After a huge increase, volatile market prices fell again, especially in 2011, and this led to profit margins of the mining companies to fall more and more. For instance, Rio Tinto's profit margin fell from 25.81% to 9.62% in 2011[6]. Similarly, Profit margins of other big companies, who have huge profits in the past, decrease incredibly at these times.

CORPORATE GOVERNANCE, OPERATIONAL EXCELLENCE AND KEEPING THE PROFIT

To exacerbate the situation, global political uncertainty and ongoing currency volatility are causing significant and unpredictable foreign exchange gyrations, making it exceptionally difficult to contain costs in dollar terms.

In this highly volatile, unpredictable environment, operational excellence is becoming extremely important. Without understanding cost drivers that increase loses in processes, it is inevitable for capital costs to reach

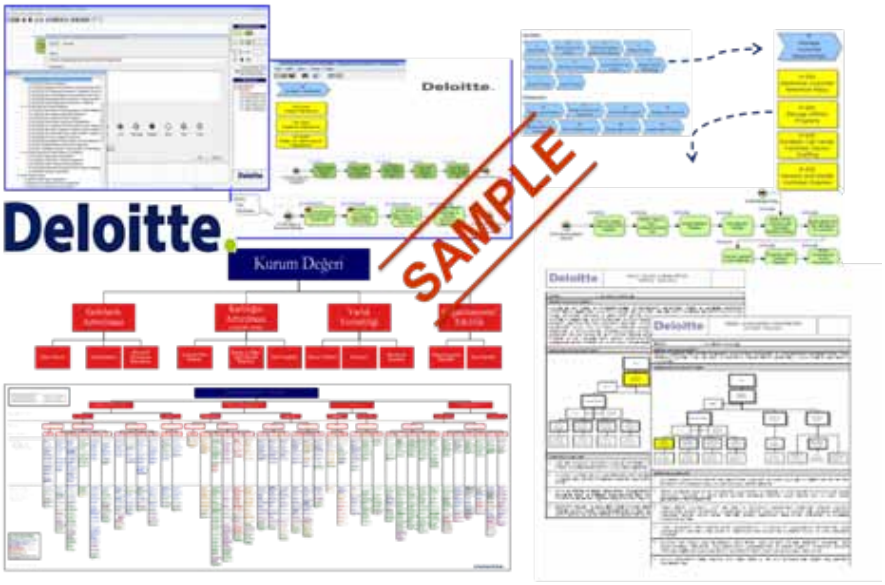

Figure 2: Sample Corporate Governance Tools

unsustainable levels. Corporate strategies can achieve its purposes in the condition of productive and effective processes. With the help of improved workflows and standardization in processes, it is easier to increase productivity and maintain corporate sustainability. Therefore, it is essential to analyze details related to processes and their outcomes to assess where the problems are occurring and what are the effects on your organization's performance. In order to survive in such an unstable market, companies need to redesign their business processes and in order to implement these new processes, organizational structures should be reconstituted. Trough successful transformation methods and corporate sustainability, quality infrastructure and effective organizational structures will be continuous. Today's economy shows that, in this high complexity, growing organizations must constantly evaluate their processes and they should be aware of the fact that professional process optimization and strong risk management are the key requirements of the competitive advantage. However, a lot of companies in the sector are not capable of planning for the unforeseeable.

Especially, in Turkey mining sector, family businesses are the backbone of the production; they are strong, successful and delighted with high profits, until now. Considering the rapid interest of the international capital in Turkey Mining Sector and mining companies; local businesses have to take immediate measures. Increasing globalization and sector growth will bring new challenges to the family businesses. In order to manage growth, keep the profits up, and be tough in the competition; family businesses have to take immediate steps towards corporate governance and operational excellence otherwise they will be vulnerable in such uncertain environment.

To sum up, as these global forces converge, mining executives must look beyond the traditional scenarios they have used in their planning. They should incorporate even highly-unlikely occurrences into their risk planning and they must always be ready for every unanticipated surprise. ●

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