



**REPUBLIC OF TURKEY PRIME MINISTRY**  
Investment Support and Promotion Agency of Turkey

# **TURKISH MINING INDUSTRY REPORT**

**JULY 2010**

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## 1. Executive Summary

The Turkish mining sector achieved a remarkable CAGR of 32.1 percent between 2002 and 2008, with revenues that rose from USD 1.9 billion in 2002 to USD 10.2 billion in 2008. There was a modest decline to USD 9.2 billion in 2009. The sector's share in Turkey's GDP ranged between 1 and 1.5 percent, reaching a 4.2 – 4.9 percent<sup>1</sup> share in the total industry during the past five years. These figures are low compared with the sector's importance; however, with the recovering economy and the increasing capacity of the manufacturing industry, together with the implementation of advanced mining technologies, the sector is likely to grow further.

Turkey is an important player in the international market due to its wealth of reserves, considerable production capacity and geographical advantages for transportation and shipping. Ranking 28<sup>th</sup> in global mining production, Turkey also ranks 10<sup>th</sup> by variety of mines and minerals. The country holds considerable amounts of marble and natural stones, boron minerals, chrome, feldspar, pumice, bentonite, pearlite, calcite and trona reserves, and mainly exports these products.<sup>2</sup>

Turkey holds 2.5 percent of the global industrial minerals reserves, 72 percent of global boron reserves, 33 percent of global marble reserves, 20 percent of global bentonite reserves and more than half of the global pearlite reserves. Boron is the richest reserve found in Turkey: the 866 million tons of reserves of B<sub>2</sub>O<sub>3</sub> comprise approximately 72 percent of the total global reserves of 1,201 million tons in 2009. Apart from Turkey, boron reserves are mainly found in Russia and the US. Eti Maden supplied 37 percent of global boron demand in 2009, followed by RT Borax with 35 percent.<sup>3</sup> Boron reserves in Turkey are mainly found near Eskisehir, Balikesir and Kutahya<sup>1</sup>, all in Western Anatolia.

Another rich mineral reserve in Turkey is marble. Marble reserves in Turkey amount to 3.8 billion m<sup>3</sup> which constitute approximately 33 percent of the total global marble reserves.<sup>2</sup> The majority of the natural stone reserves including marble are found in the Western Anatolian provinces of Afyon, Balikesir, Mugla, Eskisehir and Bilecik. SME's are dominant in the marble sector in Turkey as opposed to large scale manufacturers and the sector is mainly composed of privately held companies.

Turkey's exports reached USD 3.24 billion in 2008. This figure declined to USD 2.45 billion in 2009 due to the global economic crisis and slow down in the manufacturing industry. Marble and natural stones have the largest share, accounting for 50 percent of Turkey's total mining exports. Copper and chromium also constitute an important part and are followed by feldspar and boron. China is the most significant importer of Turkish mining products: 39 percent of the total exports in 2009, followed by the US with 9 percent of the total.<sup>4</sup>

As part of the EU membership accession negotiations, the government started intense studies for liberalization and privatization in several industries, mining being one of them. With the regulatory changes, incentives offered, and reduced bureaucratic processes for obtaining mining licenses, both local and foreign investments have increased each passing year, reaching TRY 2.78 billion in 2008, and are expected to continue growing in the coming years.

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<sup>1</sup> Export Promotion Center (IGEME), Mines and Minerals Report 2010

<sup>2</sup> Ministry of Energy and Natural Resources (ETKB)

<sup>3</sup> Eti Maden, Boron Sector Report, 2009

<sup>4</sup> General Secretariat of Istanbul Mineral and Metals Exporters' Association (IMMIB)

## 2. Sector Overview

### 2.1 Global Sector

The mining sector is one of the main pillars of the global economy for it acts as the initial supplier to a wide range of industries. In addition, the sector also provides financial investors with attractive investment opportunities since its products are traded commodities. Many of the most significant mines are in the hands of very large, often publicly-listed corporations with strong government connections. The reason why small-scale companies do not play an important role in this sector is the high amount of initial capital costs required to operate mines. The top ten largest mining companies and their last twelve months (LTM) revenues are listed below. All of them are publicly traded; together they currently generate around USD 303 billion in annual revenues. Several of these companies – including Rio Tinto Ltd, BHP Billiton, and Anglo American among the top ten - are headquartered in London, the UK.<sup>5</sup>

Figure 1 – Global Main Players

Global Main Players			
Company Name	Headquarters	LTM Revenue (million USD)	LTM Date
Rio Tinto Ltd.	United Kingdom, Australia	106,360	Dec-31-2009
BHP Billiton Ltd.	United Kingdom, Australia	45,357	Dec-31-2009
Vale S.A.	Brazil	27,428	Mar-31-2010
Xstrata plc	Switzerland	22,732	Dec-31-2009
Anglo American plc	United Kingdom	20,858	Dec-31-2009
Alcoa, Inc.	United States	19,179	Mar-31-2010
Freeport-McMoRan Copper & Gold Inc.	United States	16,801	Mar-31-2010
Aluminum Corporation Of China Limited	China	12,606	Mar-31-2010
Norsk Hydro ASA	Norway	11,115	Mar-31-2010
Shenhua Group Corporation Limited	China	21,099	*
* Latest data found			
LTM: Last Twelve Months			
Source: Capital IQ			

Despite the sector's several attractions described above, it is important to note that the industry is highly sensitive to global macroeconomic trends. Consequently, the sector was badly hit by the global crisis which arose in 2008 and triggered rapid contraction in industrial production. As the demand from industrial organizations for mining products declined due to the recession, the prices of these products also fell. Copper and aluminium were among the commodities most drastically affected, their values dropping around 60-70 percent during the period July 2008-June 2009.<sup>6</sup>

Consequently, the recession caused – as it did for many other industries – the mining sector to experience substantial financial distress. However, as the global economy has been recovering from the recession, the mining industry is also starting to rebound.

<sup>5</sup> CapitalIQ

<sup>6</sup> London Metal Exchange (LME)

### Regional Overviews:

Antarctica is the only country which banned the exploitation and exploration of minerals in 1991.<sup>7</sup> The rest of the countries are active players in the global mineral industry, where the emphasis is with the United States, Canada, Australia and China, among other countries.

The table below summarizes some of the minerals produced and the countries where they are extracted from, including the principal Turkish products. Iron ore, which is by far the largest ore extraction in the industry, is largely controlled by China with a production share of around 37 percent.<sup>8</sup>

Figure 2 – Main Minerals and Their Countries of Extraction

Main Minerals and Their Countries of Extraction		
Mineral	Country	2008 Production Share
Aluminum	China, Russia, United States	33%, 9.7%, 6.8%
Boron	Turkey, Argentina, Chile	45%, 18%, 13%
Chromium	South Africa, India, Kazakhstan	40%, 16%, 15%
Copper	Chile, United States, Peru	34%, 8.5%, 8.2%
Gold	China, United States, Australia	12%, 10%, 9.5%
Silver	Peru, Mexico, China	17%, 15%, 13%
Zinc	China, Peru, Australia	27%, 13%, 12%
Feldspar	Turkey, Italy, China	29%, 21%, 9.1%
Pumice	Turkey, Italy, Greece	20%, 15%, 11%
Nickel	Russia, Canada, Australia	17%, 16%, 13%
Iron Ore	China, Brazil, Australia	37%, 16%, 15%

Source: Mineral Commodity Summaries 2010

### Major commodities:

The table below lists some major commodities and their production in thousand metric tons during 2008 and 2009. As seen in the table, iron ore constitutes the largest share in production, with 2.3 billion tons in 2009, followed by aluminium and chromium with 37 and 23 million tons, respectively. The reason behind the high demand for these minerals is their crucial role in the construction and manufacturing industries.<sup>7</sup>

Figure 3 – World Mineral Production

World Mineral Production in Thousand Tons		
	2008	2009e
Aluminum	39,000	36,900
Boron	4,350	4,500
Chromium	23,800	23,000
Copper	15,400	15,800
Gold	2	2
Silver	21	21
Zinc	11,600	11,100
Feldspar	21,900	18,900
Pumice	19,300	19,600
Nickel	1,750	1,430
Iron Ore	2,220,000	2,300,000

Source: Mineral Commodity Summaries 2010 USGS

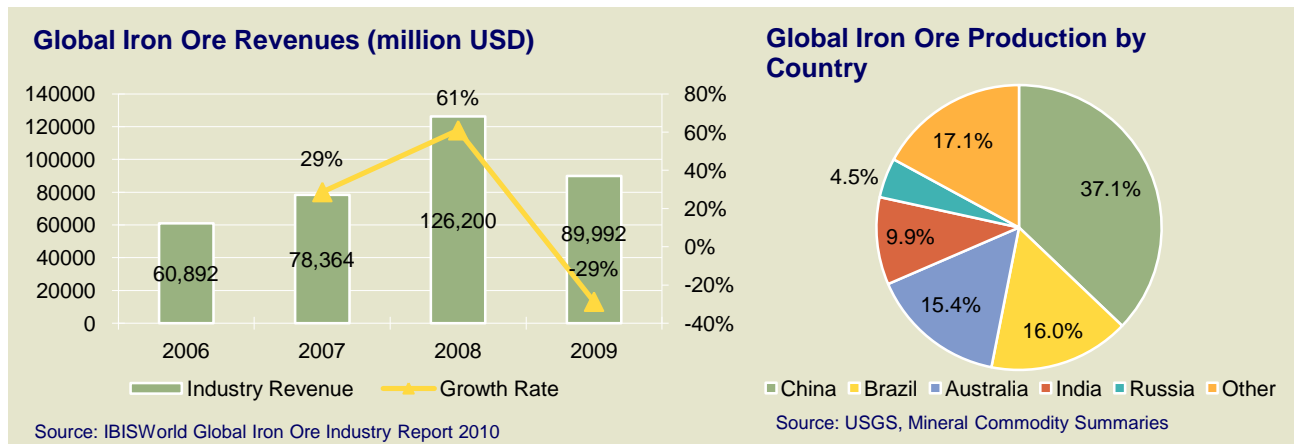
<sup>7</sup> Australian Antarctic Division

<sup>8</sup> U.S. Geological Survey (USGS)

## Iron Ore:

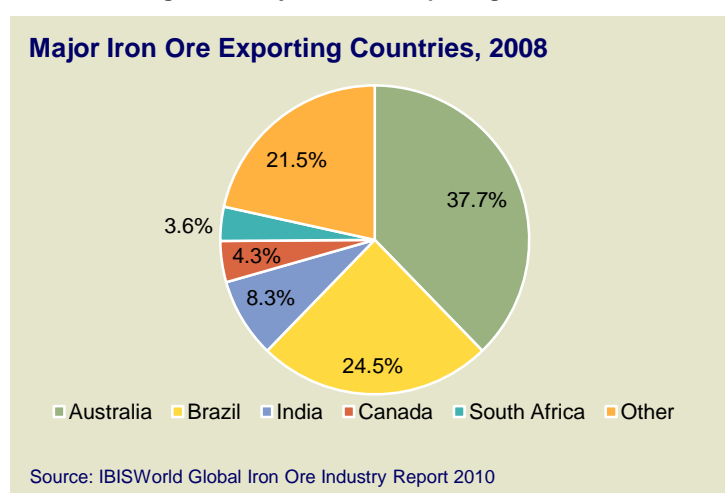
Global iron ore production had been showing an upward trend until it was hit by the recession in 2009. Due to the sharp decline in demand for steel products, iron ore prices dropped around 30 percent in 2009. However, this situation turned around in 2010, and the industry is expected to bring revenues of around USD 172 billion, up from USD 90 billion in 2009.<sup>9</sup>

Figure 4 – Global Iron Ore Revenues & Production by Country



According to an IBISWorld Iron Ore Mining Global Industry Report published on April 28, 2010, a large percentage of the market share for iron ore mining is divided among 100 enterprises employing around 110,000 people. Countries such as Australia, Brazil, India, Canada and South Africa are the major iron ore exporting countries: their exports in 2008 summed to USD 53 billion, out of the total global exports of USD 67 billion. China is by far the largest importer of iron ore with USD 59 billion imported in 2008, more than the amount exported by the five countries listed above. Japan, Germany, South Korea and Italy follow China as the next four largest importers of iron ore.<sup>9</sup>

Figure 5 – Major Iron Ore Exporting Countries



<sup>9</sup> IBISWorld Global Iron Ore Industry Report

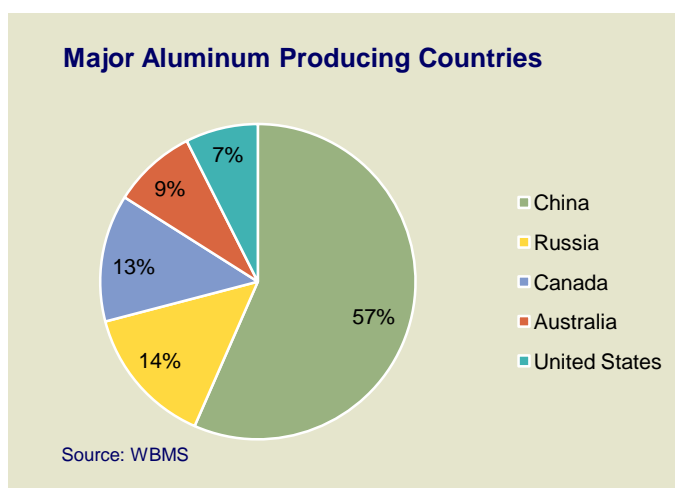


### Aluminium:

After iron ore, aluminium is the second most widely mined metal in the world with 37 million tons produced in 2009. Aluminium is widely used in transportation, packaging, and construction industries with industry consumption shares of 26 percent, 22 percent, and 22 percent, respectively.<sup>10</sup> The demand for aluminium, and consequently its price, declined in 2009 due to the global economic crisis.

As observed from the figure below, China is by far the largest producer of aluminium with 13 million metric tons produced in 2009, followed by Russia and Canada. The two latter countries also constitute about 75 percent of the total global aluminium imports.<sup>10</sup>

Figure 6 – Global Aluminium Production – Geographic Spread



### Chromium:

Chromium, the third most widely produced metal in the world, is an important input for stainless steel production. The mining of this metal is mainly divided among three countries, South Africa, India and Kazakhstan, with production shares of 40 percent, 16 percent and 15 percent, respectively. The total world production of chromium in 2009 was 23 million tons and China was listed as the largest importer of the metal, in line with the increase in Chinese stainless steel production.<sup>11</sup>

<sup>10</sup> World Bureau of Metal Statistics

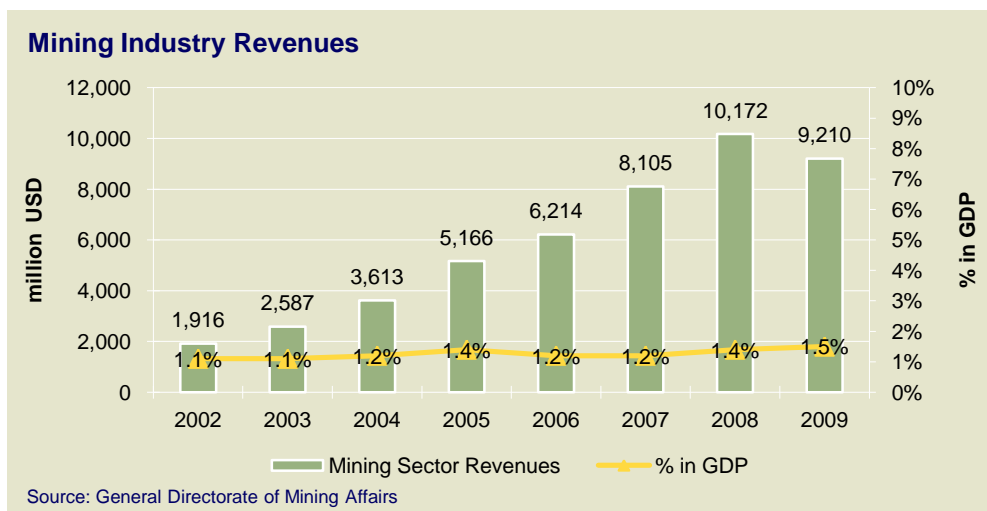
<sup>11</sup> USGS, Mineral Commodity Summaries 2010

## 2.2 Domestic Sector

### 2.2.1 Overview

Mining industry revenues increased with a CAGR of 32.1 percent between 2002 and 2008 and constituted approximately 1 - 1.5 percent of Turkey's GDP, reaching USD 10.2 billion in 2008, then falling slightly to USD 9.2 billion in 2009.<sup>12</sup>

Figure 7 – Turkey Mining Industry Revenues



Turkey maintains a wide spectrum of mines and minerals and has considerable reserves. Marble and natural stones, boron minerals, chrome, feldspar, pumice, bentonite, pearlite, calcite and trona reserves are the most significant. Among these, Turkey's main exports are marble and natural stones, boron, chrome, feldspar and pumice. In addition, there has been an important increase in the exploration and mining of metallic ores such as gold, silver, copper, chrome and manganese. Turkey holds 2.5 percent of the global industrial mineral reserves, 72 percent of global boron reserves, 33 percent of global marble reserves, 20 percent of global bentonite reserves and more than half of global pearlite reserves.<sup>13</sup> Turkey has 3,500 types of metallic and 2,000 types of mineral deposits. The minerals mined out of these deposits are used as raw materials in the manufacturing industry, while the surplus is exported.<sup>14</sup>

Figure 8 – Major Turkish Mining Products

Major Turkish Mining Products		
	2008 Production (000 tons)	Reserves (000 tons)
Marble	2,263*	3,800,000*
Boron	4,999	866,000
Chromium	5,100	25,000
Feldspar	6,800	130,000
Pumice	3,450	3,000,000*
Gold	0.01	6.5
Iron ore	4,700	82,500
* Values in 000 m <sup>3</sup>		

Source: Ministry of Energy and Natural Resources, Export Promotion Center

<sup>12</sup> General Directorate of Mining Affairs (MIGEM)

<sup>13</sup> Export Promotion Center (IGEME), Mines and Minerals Report 2010

<sup>14</sup> Ministry of Energy and Natural Resources (ETKB)



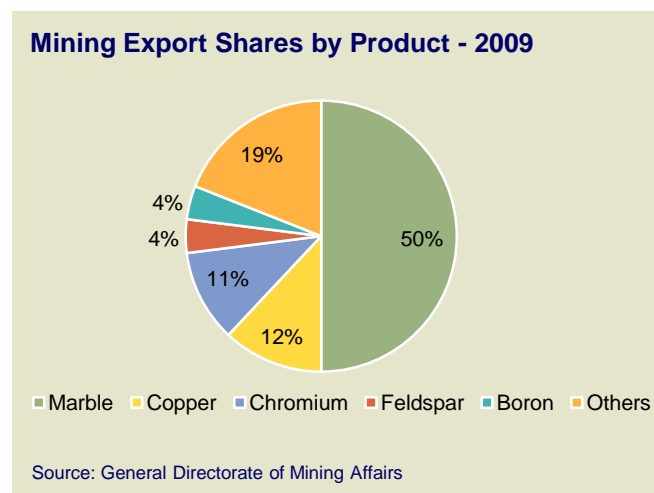
With the liberalization and privatization of the industry and the incentives granted by the government in recent years, both local and foreign investments increased, which triggered an upward trend in production.

Also the demand for raw materials and metals used in the manufacturing industry rose due to the recovery trend in the global economy. Besides the investments and changes in the economy, Turkey's geographical location allows the export of mining products at a relatively low cost.

Turkish mining exports achieved a CAGR of 28.6 percent from 2005 to 2008 and amounted to USD 3.24 billion in 2008.<sup>15</sup> In 2009, exports declined due to the global economic crisis and Turkey exported USD 2.45 billion worth of mining products.

Marble and natural stones are the largest export products by value, amounting to half of Turkey's total mining exports in 2009. Copper and chromium also constitute an important part of exports and are followed by feldspar and boron.<sup>16</sup>

Figure 9 – Turkish Mining Export Shares by Product - 2009



China, the USA, Italy, India, the UK, Saudi Arabia and Russia are the most important customers for Turkish mining products.<sup>15</sup>

Figure 10 – Country Based Exports in 2009

Country Based Exports in 2009	
Country	Amount (million USD)
China	954
USA	217
Italy	76
India	61
England	60
Saudi Arabia	47
Russia	45
Other	985
<b>Total</b>	<b>2,445</b>

Source: Export Promotion Center

<sup>15</sup> General Secretariat of Istanbul Mineral and Metals Exporters' Association (IMMIB)

<sup>16</sup> General Directorate of Mining Affairs (MIGEM)

## 2.2.2 Major Mining Commodities

### Natural Stones

Natural stones are widely used in construction (furnishing & coating), sculpture and the glass industries. Turkey has an estimated 5.2 billion m<sup>3</sup> of natural stone reserves, of which, 3.8 billion m<sup>3</sup> is marble. Turkey holds approximately 33 percent of global marble reserves. Most of the reserves are located in the provinces of Afyon, Balıkesir, Mugla, Eskisehir, Denizli, Tokat, Canakkale, Konya, Bilecik, Kirsehir and Elazig.<sup>17</sup>

There are about 1,500 natural stone quarries in Turkey, supplying 2,000 factories, 9,000 workshops and employing around 300,000 people. About 75 – 80 percent of the stones are processed. The sector is mainly driven by private companies.<sup>17</sup>

Natural stone production in Turkey is now about 4 million m<sup>3</sup> per year and the total capacity of plaque production is approximately 6.5 million m<sup>2</sup>.<sup>18</sup> Due to the high export potential and domestic consumption, marble, travertine and granite are the main commodities among all the natural stones in terms of both production quantity and value.

Figure 11 – Marble, Travertine and Granite Production

Marble & Travertine & Granite Production in Turkey						
000 m <sup>3</sup>	2003	2004	2005	2006	2007	2008
Marble	1,301	1,208	1,579	1,856	2,802	2,263
Travertine	199	601	697	1,018	995	759
000 tons	2003	2004	2005	2006	2007	2008
Granite	106	125	161	320	252	368

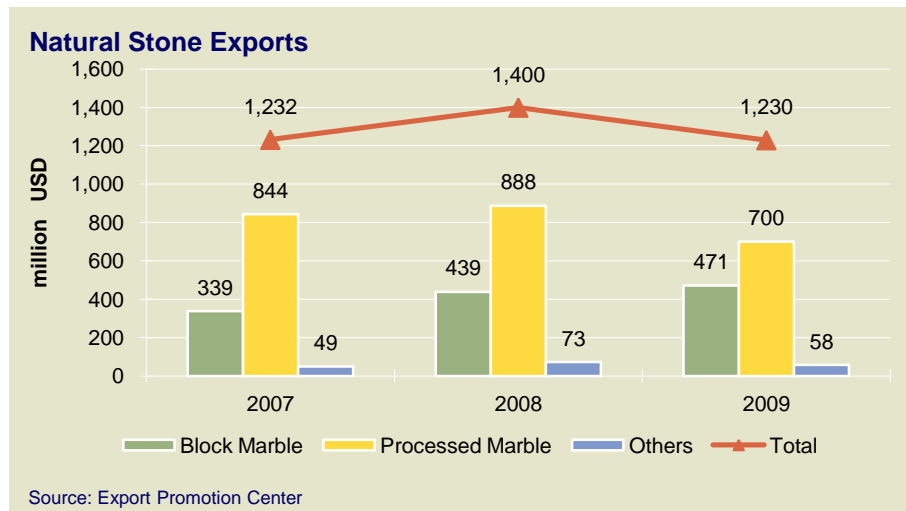
Source: Ministry of Energy and Natural Resources

Besides holding a major share of the reserves, Turkey is a major global player thanks to its experience, qualified labor force, shipping and transportation advantages, and a wide range of natural stone types and colors. Turkey ranks in the top ten natural stone producers following China, India, Italy, Spain and Iran. Natural stone production and exports increased steadily each year and now ranks first among Turkey's mining exports. Exports reached USD 1.4 billion in 2008; however, due to the global economic crisis which caused a serious shrinkage in the construction industry, natural stone exports declined and fell to USD 1.23 billion in 2009, 57 percent of which was processed goods with higher added-value compared with block natural stones.<sup>17</sup>

<sup>17</sup> Export Promotion Center (IGEME), Natural Stones Report 2010

<sup>18</sup> Ministry of Energy and Natural Resources (ETKB)

Figure 12 – Natural Stone Exports



China and the US are the largest natural stone importers from Turkey, followed by the UK, Saudi Arabia, Libya and India.<sup>19</sup>

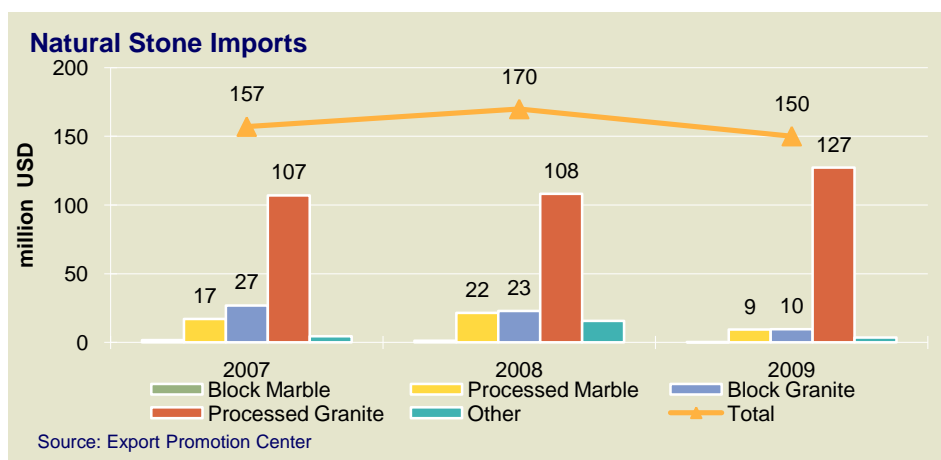
Figure 13 – Natural Stone Exports in 2009

Natural Stone Exports in 2009	
Country	Amount (million USD)
China	353
USA	208
England	51
Saudi Arabia	43
Libya	37
India	35
Others	503
<b>Total</b>	<b>1,230</b>

Source: Export Promotion Center

Compared with its exports, Turkey's natural stone imports are lower and the most important suppliers are China, India, Spain and Italy. Processed granite has the major portion in imports with around 85 percent.<sup>19</sup>

Figure 14- Natural Stone Imports of Turkey



<sup>19</sup> Export Promotion Center (IGEME), Natural Stones Report 2010

## Boron Minerals

Boron minerals are mainly used in the glass, agriculture and chemicals industries, as well as many others such as telecommunications, automotive, construction, electronics, nuclear industry etc. There are approximately 230 different boron minerals on earth containing different concentrations of boric oxide ( $B_2O_3$ ) in their structure and Turkey holds the wealthiest reserves both in terms of amount and boric oxide concentration. The total amount of reserves in Turkey are estimated to be equivalent to 866,000 thousand tons of  $B_2O_3$  which constitutes 72 percent of global reserves.<sup>20</sup> Boric oxide reserves are mainly found in the provinces of Eskisehir, Kutahya, Bursa and Balikesir.<sup>21</sup>

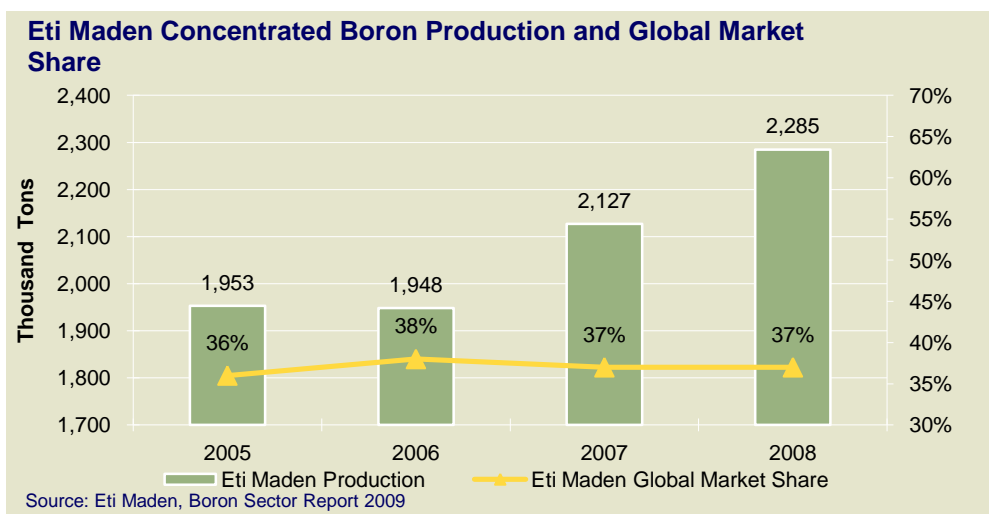
Figure 15- Global Boron Reserves

Global Boron Reserves			
Country	Reserves (thousand tons of $B_2O_3$ )	Share	
Turkey	866,000	72.1%	
Russia	100,000	8.3%	
USA	80,000	6.7%	
China	47,000	3.9%	
Chile	41,000	3.4%	
Peru	22,000	1.8%	
Bolivia	19,000	1.6%	
Serbia	16,200	1.3%	
Argentina	9,000	0.7%	
Iran	1,000	0.1%	
<b>Total</b>	<b>1,201,200</b>	<b>100.0%</b>	

Source: Eti Maden

Eti Maden Isletmeleri is the only company in Turkey that is involved in the production of concentrated boron, boron chemicals and equivalents. The concentrated boron production capacity of Eti Maden is about 2.45 million tons per year. A major part of the concentrated boron is used as raw material in the production of boron chemicals for higher quality products. Therefore, the main sales of the company are boron chemicals rather than concentrated boron.<sup>22</sup> The concentrated boron production of Eti Maden amounted to 2,285 thousand tons which represented 37 percent of the global boron market in 2008.

Figure 16 – Concentrated Boron Production (Eti Maden)



<sup>20</sup> Eti Maden Isletmeleri, Boron Sector Report 2009

<sup>21</sup> Ministry of Energy and Natural Resources (ETKB)

The main global competitor of Eti Maden is US Borax owned by Rio Tinto. Eti Maden together with US Borax constitute 70 – 75 percent of global boron production, with the exception that US Borax does not sell concentrated boron but only boron chemicals.<sup>22</sup>

Concentrated boron constitutes 4 percent of Turkey's mining exports amounting to USD 105 million in 2009. China is the leading importer, followed by Taiwan and the Netherlands.<sup>23</sup>

Figure 17 – Concentrated Boron Exports in 2009

Concentrated Boron Exports in 2009	
Country	Amount (million USD)
China	42.45
Taiwan	11.72
Holland	9.51
USA	6.80
Spain	5.85
Belgium	4.48
South Korea	4.17
Japan	3.95
India	3.01
Slovakia	2.79
Others	9.86
<b>Total</b>	<b><u>104.58</u></b>
Source: General Secretariat of Istanbul Mineral and Metals Exporters' Association	

### Chromium – Ferrochrome

Chromium and ferrochrome are used in the chemicals, refractory, metallurgical, and casting industries. Although the chromium reserves in Turkey are not as plentiful as those in other countries, they are considered to be among the finest around the world due to their high mineral quality. The regions around the provinces of Elazığ, Erzincan, Muğla, Eskişehir, Adana, Bursa and Kayseri hold the majority of these chrome reserves.<sup>24</sup>

Turkey, ranking 6<sup>th</sup> in chromium production globally, reached 5.1 million tons of chromium production in 2008 achieving a 47 percent of CAGR since 2005.<sup>25</sup>

In 2008, Turkey ranked 2<sup>nd</sup> among chromium exporting countries, amounting to USD 496.3 million. Due to the crisis, this amount decreased to USD 262.6 million in 2009, constituting an 11 percent share in Turkey's total mining exports, China (88 percent) being the largest customer. Turkey also exported USD 63.4 million worth of ferrochrome in 2009.<sup>26</sup>

<sup>22</sup> Eti Maden İşletmeleri, Boron Sector Report 2009

<sup>23</sup> General Directorate of Mining Affairs (MİGEM)

<sup>24</sup> Export Promotion Center (İGEME), Mines and Minerals Report 2010

<sup>25</sup> General Directorate of Mining Affairs (MİGEM)

<sup>26</sup> General Secretariat of Istanbul Mineral and Metals Exporters' Association (İMMİB)

Figure 18 – Chromium Exports in 2009

Chromium Exports in 2009	
Country	Amount (million USD)
China	230.81
Russia	9.71
Sweden	9.52
Belgium	4.29
USA	1.95
Others	6.31
<b>Total</b>	<b>262.59</b>

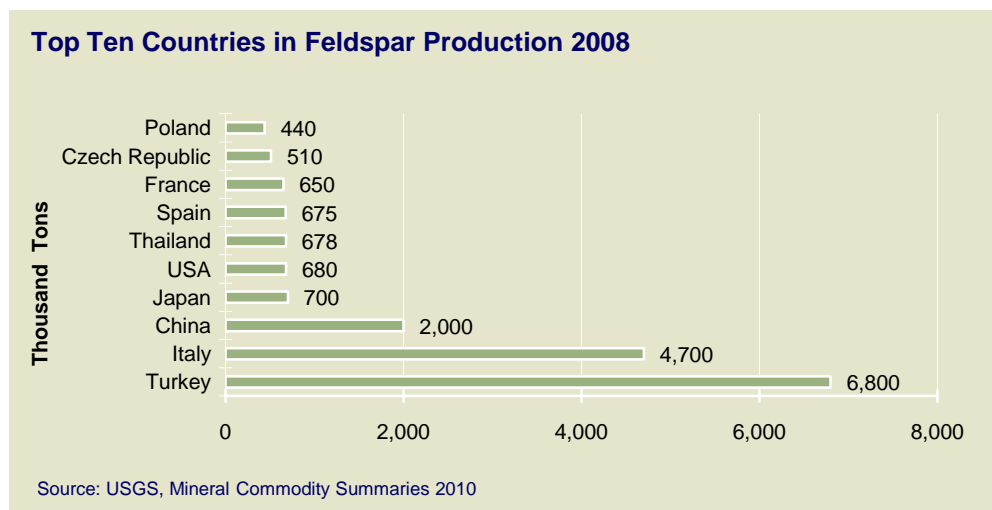
Source: General Secretariat of Istanbul Mineral and Metals Exporters' Association

### Feldspar

Feldspar is an industrial raw material and is widely used in the glass, ceramics and paint industries. Having reserves of 130 million tons, Turkey holds 10 percent of the global feldspar reserves, most of which are located around Manisa, Kutahya, Aydin and Mugla.<sup>27</sup>

Turkey ranks first in global feldspar production. 6.8 million tons of feldspar were produced in 2008 which represents a CAGR of 14 percent starting from 2005. The production constituted approximately 30 percent of the global production in 2008.<sup>28</sup>

Figure 19 – Top Ten Countries in Feldspar Production - 2008



Italy (22 percent) and China (9.1 percent) are the other important countries in feldspar production.<sup>29</sup>

Most of the active companies in this specific sector are private companies and 90 percent of the production is being exported. In 2009, Turkey exported USD 89 million worth of feldspar and Italy (44 percent) was the leading buyer.<sup>30</sup>

<sup>27</sup> Export Promotion Center (IGEME), Mines and Minerals Report 2010

<sup>28</sup> General Directorate of Mining Affairs (MIGEM)

<sup>29</sup> U.S. Geological Survey (USGS)

<sup>30</sup> General Secretariat of Istanbul Mineral and Metals Exporters' Association (IMMIB)

Figure 20 – Feldspar Exports in 2009

Feldspar Exports in 2009	
Country	Amount (million USD)
Italy	39.34
Spain	13.17
Russia	5.96
UAE	4.06
Others	26.54
<b>Total</b>	<b>89.07</b>

Source: General Secretariat of Istanbul Mineral and Metals Exporters' Association

### Pumice

Pumice is used as a raw material in the textile and insulation industries. According to the relevant research, Turkey carries 3 billion m<sup>3</sup> of pumice reserves, most of which are located around Nevsehir, Kayseri, Ankara, Bitlis, Van, Agri, Kars, Isparta and Mugla.<sup>31</sup>

Turkey produced 3.45 million tons of pumice in 2008, according to USGS studies, ranking first in global production, followed by Italy and Greece. In 2009, Turkey exported USD 14 million worth of pumice, a jump of 16.6 percent compared with the previous year. China (16 percent), the Netherlands (11 percent) and the UK (7 percent) are the most important customers.<sup>31</sup>

### Iron ore

Turkey carries an estimated 82.5 million tons of iron ore reserves most of which are found in the provinces of Balikesir, Sakarya, Kirsehir, Adana, Hatay, Kayseri, Sivas, Erzincan, Malatya and Bingol.<sup>32</sup>

The production of iron ore in Turkey has not changed significantly throughout the years due to the insufficient level of reserves. Turkey produced 4.7 million tons of iron ore in 2008, while this figure was 4.6 million in 2005.<sup>33</sup>

Due to the low iron ore production, Turkey is dependent on iron ore imports. Since Turkey has a very substantial steel industry, the iron ore imports are considerable. In 2009, Turkey imported USD 902 million worth of iron ore, Brazil being the most important supplier.<sup>34</sup>

Figure 21 – Iron Ore Imports in 2009

Iron Ore Imports in 2009	
Country	Amount (million USD)
Brazil	385.50
Sweden	288.66
Ukraine	99.71
Russia	84.56
Canada	43.87
<b>Total</b>	<b>902.30</b>

Source: Trade Map

### Gold

Widely used in the jewellery industry, gold is also used in the electronics, medicine, dentistry, aerospace and aviation industries due to its high conductivity and durability, and is also traded as a medium of exchange.<sup>35</sup>

<sup>31</sup> Export Promotion Center (IGEME), Mines and Minerals Report 2010

<sup>32</sup> General Directorate of Mineral Research and Exploration (MTA)

<sup>33</sup> General Directorate of Mining Affairs (MIGEM)

<sup>34</sup> Trade Map

Turkey has approximately 6,500 tons of potential gold reserves, 700 tons of which are ready for processing. Most of the reserves are found around Erzincan, Gumushane, Usak and Izmir. Total global reserves are believed to be around 49,000 tons.<sup>35</sup>

The amount of gold production in Turkey increased each year with a CAGR of 38.7 percent starting from 2005 and 11.12 tons of gold was produced in 2008.<sup>35</sup>

This amount is not enough for Turkey since it ranks as the 5<sup>th</sup> largest country in terms of global gold demand. More than 200 tons of gold are imported each year and Turkey is the 2<sup>nd</sup> largest producer of gold jewellery.<sup>31</sup>

With the rise in FDI, gold exploration and excavation projects gained pace in Turkey. Some major players are Canada-based Frontier Development Group, Odyssey Resources, Anatolia Minerals Group, and Eldorado Gold.<sup>36</sup>

Figure 22 – Gold Exploration and Excavation in Turkey - FDI

Gold Exploration and Excavation - FDI	
Company	District
Frontier Development Group Inc.	Canakkale
Odyssey Resources Ltd.	Samsun
Eldorado Gold Corp.	Balıkesir, İzmir, Usak
Anatolia Minerals Development Ltd.	Nigde, Erzincan

Source: BMI

### 2.2.3 Main Players in Turkey

Major players in the Turkish mining industry, selected from the list of the first 500 manufacturers in Turkey prepared by the Istanbul Chamber of Industry, are listed in the following table.

Figure 23 – Major Mining Companies in Turkey

Major Mining Companies in Turkey				
ISO 500 2009 Ranking	Company Name	Sector	Location	Production Based Sales 2009 (TRY million)
56	Eti Maden İşletmeleri Genel Müdürlüğü	Boron Mining	Ankara	695
107	Soda Sanayii A.Ş.	Soda products and chromium chemicals	İstanbul	459
124	Park Teknik Elektrik Madencilik Turizm San. ve Tic. A.Ş.	Copper Mining	Ankara	395
137	Tuprag Metal Madencilik San. ve Tic. A.Ş.	Gold Mining	Ankara	359
188	Eti Alüminyum A.Ş.	Bauxite and aluminium production	Konya	265
243	Erdemir Madencilik Sanayi ve Ticaret A.Ş.	Iron, bentonite mining	Sivas	214
265	Eti Bakır A.Ş.	Copper Mining	Kastamonu	182
404	KCS Kahramanmaraş Çimento Beton Sanayi ve Madencilik İşletmeleri	Mining	Kahramanmaraş	122
434	Eti Krom A.Ş.	Chromium mining	Elazığ	115

Source: ISO (Istanbul Chamber of Industry)

<sup>35</sup> Ministry of Energy and Natural Resources (ETKB)

<sup>36</sup> Business Monitor International (BMI)



## 2.3 Positioning Map



## 2.4 SWOT Analysis

### S

- The country holds rich reserves in specific mines and minerals, in terms of both quantity and quality.
- Geographical advantages help exporting the products at lower costs.
- The country has a highly qualified labor force.
- Increasing investments also speed up production. Investments in the mining industry showed a CAGR of 16.6 percent since 2005 and reached TRY 2,783 million in 2008.

### W

- Low R&D in the Turkish mining industry leaves Turkey behind in technological innovations.
- Turkey is import-dependent in some major commodities such as iron ore due to the lack of local reserves.
- Relatively high energy costs reduce the viability of some ore processing.

### O

- Liberalization and privatization of the mining industry and the incentives granted by the government will help the country develop a competitive and strong industry with major global players.
- With the increasing FDI and entry of new foreign companies, the latest advanced mining technologies will be introduced and exploration investments will rise.

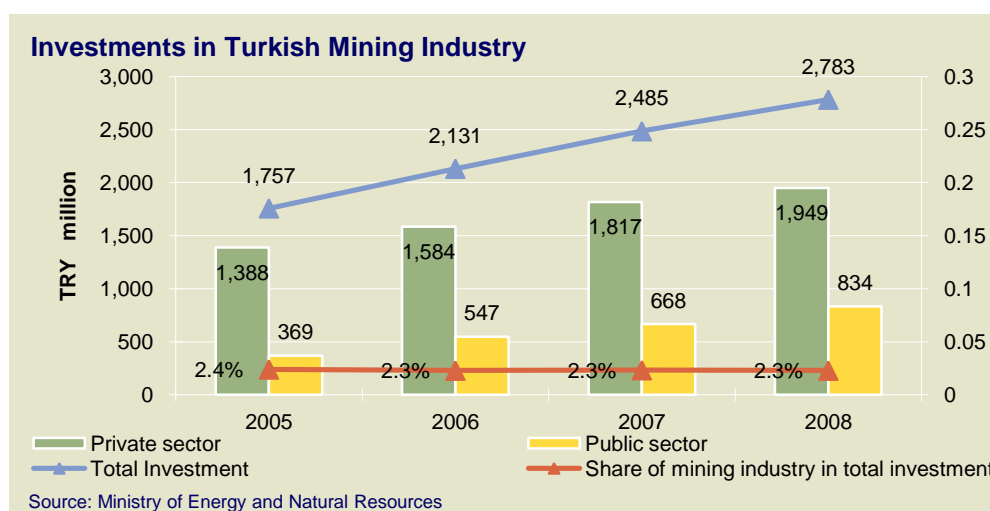
### T

- High start-up costs are required to enter the mining industry.

## 2.5 Investment Opportunities

In connection with the EU accession negotiations, the Turkish government speeded up liberalization and privatization in almost every industry, mining being one of them. There are two types of licenses in the mining industry, both of them issued by the state. Due to the time-intensive procedure for getting a mining permission and license, as well as the high fees paid by the investors for these licenses, entries to the industry were limited. To overcome these obstacles, various departments involved in the licensing process were reorganized under the Mining Affairs General Directorate of the Ministry of Energy and Natural Resources and the fees were reduced. Moreover, in March 2009, the government introduced new tax advantages.<sup>37</sup> As a result of these changes, investments in the mining sector increased with a CAGR of 16.6 percent between 2005 and 2008, constituting about 2.3 – 2.4 percent of all the investments.

Figure 24 – Investments in Turkish Mining Industry



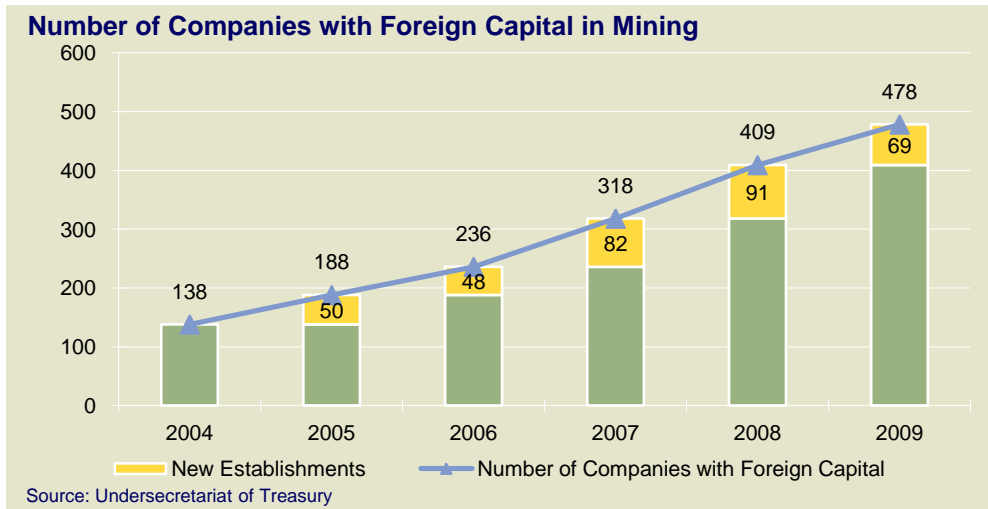
### Foreign Direct Investments:

FDIs in the Turkish mining industry were around USD 193 million in 2009, equaling 3.3 percent of the total FDI. The number of companies with foreign capital in the mining industry increased every single year and reached 478 in 2009.<sup>38</sup>

<sup>37</sup> Business Monitor International (BMI)

<sup>38</sup> Undersecretariat of Treasury General Directorate of Foreign Investment

Figure 25 – Number of Companies with Foreign Capital



Below is a list of recent M&A transactions in Turkey. Even though overall M&A activity slowed down in 2009, mining was one of the top sectors for M&A.<sup>39</sup>

Figure 26 – Recent M&A Transactions

#	Acquirer	Origin	Target	Target subsector	Date	Stake %	Deal Value (million USD)
1	Koza Altın	Turkey	Ovacık Gold Reserve	mining	03/04/2010	na	na
2	Taiyuan Iron & Steel Group Company Ltd	China	Güney Krom, Köp Krom, Krom Maden	chrome mining	27/10/2009	50% (each)	305
3	Park Elektrik Madencilik Tekstil San. ve Tic. AS	Turkey	Ceytas Madencilik Tekstil San. ve Tic. AS	mining	22/01/2009	37.5%	9
4	Alamos Gold	Canada	Ağı Dağı and Kirazlı Gold Projects	mining	09/12/2009	na	40
5	Çalık Holding	Turkey	Çöpler Gold Project	mining	13/08/2009	5.0%	13
6	Metro Maden	Turkey	BYS Metal Madencilik	mining	01/04/2009	78.0%	2
7	İhlas Madencilik A.S.	Turkey	Pomzaexport Madencilik Mines	mining	10/06/2008	100.0%	22
8	Halcor	Greece	Sega Bakır	mining	25/01/2008	50.1%	na
9	Odien Asset Management	USA	İhlas Madencilik	mining	22/07/2008	18.0%	90
10	FEM Consortium (Turkish Finans Enerji Maden Metalurji Sanayi)	Turkey	Tekel Ayyalık Tuzlası	mining	23/09/2008	na	6
11	İhlas Madencilik	Turkey	Mir Madencilik	mining	15/01/2008	99.0%	5
12	SCR Sibelo NV	Belgium	Cine Akmaden Madencilik Ticaret A S	mining	31/07/2007	100.0%	42
13	Amcol International Corporation	UK	Bensan Aktifleştirilmiş Bentonit	mining	01/06/2007	100.0%	12
14	Kolin İnşaat Turizm Sanayi Ve Ticaret A S	Turkey	Deveci iron ore field	iron ore mining	22/12/2006	100.0%	21
15	Eti Bakır A.S	Turkey	Karadeniz Bakır İşletmeleri (KBI)	copper exploration	01/04/2006	100.0%	38
16	Koza Madencilik	Turkey	New mont Mining (Ovacık Mine in western Turkey)	gold mine	01/03/2005	100.0%	45
17	Sogutsen Seramik	Turkey	KSS Madencilik	mining	09/02/2005	50.0%	11
18	ATP İnşaat ve Ticaret A.S.; Koza-İpek Holding	Turkey	Normandy Madencilik AS (NMAS)	mining	09/02/2005	100.0%	45

Source: Mergermarket & ISI

<sup>39</sup> Undersecretariat of Treasury General Directorate of Foreign Investment

## 2.6 Sector Establishments and Institutions

Figure 27 – Sector Establishments and Institutions

Establishments and Institutions	Code	Description	Website
General Secretariat of Istanbul Mineral and Metals Exporters' Association	İMMİB	Established to help its members increase national exports, and maintaining competition power for the products to be exported.	<a href="http://www.immib.org.tr/">http://www.immib.org.tr/</a>
General Directorate of Mining Affairs	MİGEM	Established to ensure that the mining activities are done in line with the country's needs and development, keeping up with the newest technology. MİGEM also takes precautions and creates incentives for exploration and mining activities as well as giving licences and authorization for mining.	<a href="http://www.migem.gov.tr/">http://www.migem.gov.tr/</a>
Ministry of Energy and Natural Resources	ETKB	ETKB works for maintaining safe, effective and environment friendly use of energy and natural resources that would decrease the country's external dependency and contributing to country's welfare.	<a href="http://www.enerji.gov.tr/">http://www.enerji.gov.tr/</a>
General Directorate of Mineral Research and Exploration	MTA	Established for conducting scientific and technological research on mineral exploration and geology.	<a href="http://www.mta.gov.tr/">http://www.mta.gov.tr/</a>
Eti Mine Works General Management	ETİ MADEN	Established for mining, processing and marketing boron resources of Turkey.	<a href="http://www.etimaden.gov.tr/">http://www.etimaden.gov.tr/</a>
National Boron Research Institute of Turkey	BOREN	The aim of the establishment is to increase the use of boron mineral, and help with the invention of new boron products by providing the scientific research environment needed.	<a href="http://www.boren.gov.tr/">http://www.boren.gov.tr/</a>
Mining Workers' Union of Turkey	MADENİŞ	Established to protect and defend the employees' rights.	<a href="http://www.madenis.org.tr/">http://www.madenis.org.tr/</a>
Chamber of Mining Engineers of Turkey	TMMOB	The aim of the establishment is to find and protect natural resources, for social, economical, cultural and technological development of Turkey.	<a href="http://www.maden.org.tr/">http://www.maden.org.tr/</a>

## 2.7 Appendix

Mining production amounts declared to the General Directorate of Mining Affairs by the mining license owners.<sup>40</sup>

PRODUCTION OF NATURAL STONES						
Quantity of Production (m <sup>3</sup> )						
Type	2003	2004	2005	2006	2007	2008
Diabase	622	790	458	0	2,071	1,276
Ignimbrite	7,705	39,820	5,282	20,174	18,486	26,313
Marble	1,300,637	1,207,584	1,578,730	1,855,740	2,801,757	2,262,537
Onyx	176	57	451	2,578	5,663	2,145
Travertine	198,730	601,068	696,545	1,017,672	995,065	759,118
Quantity of Production (tons)						
Andesite	80,605	81,900	517,831	2,485,956	4,115,184	3,307,107
Basalt	42,401	28,555	749,589	2,909,031	4,914,124	8,448,618
Decorative Stones + Mosaic + Slate	0	17,592	31,506	382,377	1,111,024	161,166
Granite	106,169	125,030	160,930	320,069	252,354	367,959

PRODUCTION OF METALLIC MINERALS						
Quantity of Production (tons)						
Type	2003	2004	2005	2006	2007	2008
Antimony	650	8,711	28,377	25,316	28,111	50,357
Bauxite	333,574	1,176,929	453,765	879,214	1,264,933	818,928
Cadmium	0	0	0	141	12650	2,291
Chrome	504,803	1,168,336	1,620,386	1,849,864	3,639,752	5,100,482
Copper	2,919,579	1,616,432	2,952,850	4,293,530	4,806,198	6,166,035
Gold	5.39	3.26	4.17	8.04	9.92	11.02
Iron	4,208,156	4,208,156	4,598,230	3,785,121	4,849,397	4,696,950
Lead	173,910	253,590	366,305	279,727	684,931	565,374
Manganese	25,202	21,204	52,273	32,144	42,033	51,703
Molybdenum	0	0	0	0	185	25
Nickel	0	0	52,988	20,000	107,000	51,250
Platinum	0	0	0	0	10,000	0
Pyrite	0	0	640	63,674	109,100	116,091
Silver	96	97	138	167	198	294
Zink	371,504	495,191	485,236	554,425	464,690	1,641,748

PRODUCTION OF INDUSTRIAL MATERIALS						
Quantity of Production (tons)						
Type	2003	2004	2005	2006	2007	2008
Alunite	622	0	0	6,683	2,511	15,324
Barite	113,254	113,775	157,179	161,993	184,041	482,740
Bentonite	945,925	1,281,468	501,142	1,134,251	1,742,487	1,553,588
Boron	2,424,185	2,261,977	3,478,784	3,955,574	4,406,970	4,998,826
Calcite	1,077,476	2,534,016	3,177,661	5,875,732	7,171,456	6,176,997
Ceramic Clay (+ Halloysite)	2,387,371	3,626,625	1,962,072	3,034,560	2,871,145	3,261,379
Chalcedony	2,941	3,945	4,716	4,706	5,461	4,370
Chert	0	0	0	34,606	12,532	5,134
Chert (Flint)	19,029	9,938	0	7,228	12,325	7,818
Diatomite	36,303	1,324	44,122	45,420	33,135	62,685
Dolomite	523,954	214,421	388,165	469,029	598,646	436,223
Emery+Diasporite	5,458	11,953	9,378	13,899	19,108	57,722
Feldspar	3,396,326	3,936,742	4,560,226	5,771,892	6,548,796	6,767,500
Fluorite	4,375	0	0	0	0	2,931
Graphite	0	28	0	0	0	3,236
Gypsum	2,354,234	2,300,703	3,500,864	4,369,771	5,546,496	7,338,127
Illite	0	0	0	27,898	57,774	61,577
Kaolin	581,479	734,473	908,862	1,064,107	914,117	792,044
Magnesite (+ Hydromagnesite)	558,432	2,218,236	571,142	466,193	802,406	677,784
Mercury	0	0	0	0	65	0
Mica	4,772	321	3,584	0	3,313	8,392
Montmorillonite	520,000	0	260,000	428,756	530,879	125,000
Nepheline Syenite	51	205	0	0	400	0
Obsidian	0	32	0	0	226	0
Olivine+Dunite	20,464	71,396	94,439	191,298	145,839	170,631
Peat	20,352	62,108	71,749	185,944	145,403	113,112
Perlite	330,184	366,489	333,400	474,966	478,579	551,266
Phosphate	0	0	900	1,300	1,300	1,000
Pumice	2,167,277	2,426,037	1,860,037	3,515,644	3,995,423	3,449,733
Quartz	377,805	395,248	503,715	408,725	343,299	555,841
Quartz sand	3,098,668	2,073,725	1,769,515	2,608,260	4,997,694	2,422,587
Quartzite	1,456,376	1,279,929	962,818	1,463,162	1,803,670	1,207,131
Rhyolite	0	0	0	7,056	62,040	82,363
Rutile	2,000	4,900	12	0	20	20
Salts	2,313,818	2,246,542	2,154,028	2,223,173	2,363,632	2,489,826
Sepiolite (+ Meerschaum + Palygorskite)	31,885	19,554	10,478	19,242	36,402	3,824
Sodium Chloride	281,525	1,364,362	1,307,006	1,341,677	1,464,782	1,515,479
Sodium Sulfate (Soda)	920,074	890,354	766,636	826,206	1,120,968	961,295
Stalagmite	0	0	3,100	0	0	80
Strontium Salt	159,923	127,957	30,100	0	0	0
Sulfur	0	0	0	0	0	300
Talc	17,099	8,233	8,775	4,969	12,722	3,364
Trona	204	6,000	12	2,184	1,716	23,673
Zeolite	156,887	192,240	249,572	121,014	104,138	107,951
Zircon	0	0	0	0	0	75

<sup>40</sup> General Directorate of Mining Affairs (MIGEM)

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**ABBREVIATIONS**

CAGR	Compound Annual Growth Rate
EU	European Union
GDP	Gross Domestic Product
FDI	Foreign Direct Investment
ISO	Istanbul Chamber of Industry
ISPAT	Republic of Turkey Prime Ministry Investment Support and Promotion Agency
SME	Small and Medium Enterprises
USA	United States of America
USD	US Dollars
WBMS	World Bureau of Metal Statistics



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