Outlook for Mining Industry

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What has been achieved since initiation of the mining industry?

Today Mining is the first step supply for many of the industries so it is the chief pillar of the global economy. Turkey is a rich country concerning the mines. Mining has been one of the major industrial activity since the Ottoman Empire time. The First attempt in Ottoman Empire was at 1858 by legislating the "Field Regulations" and the first legal document was written concerning the quarries and quarrying at the year 1869 called "Quarries Directorate". After that in the year 1906 "Mining Regulations" was released. These first attempts showed that, Ottoman Empire, realized there is an urgency to cover up the gap between Ottoman Empire and European countries; of those started industrialization by the early 1800s. For this reason at the years 1861, 1869, 1887 and 1906 as said above, Ottoman Empire released subsequent laws and regulations [1]. Between the years 1870-1899 local and foreign miners were awarded by 140 mining licenses and throughout 1900-1911 the production was doubled. However, during early 1920s the production in mining industry was very limited. Nevertheless, all those attempts were too late to secure the Empires industrialization activity.

With the establishment of Republic of Turkey, the Government decided to make an industrialization policy and started to develop the legal environment. At 1924 a mining school was established at Zonguldak for to perform the coal mining in accordance with the scientific methods. However, after graduation of 70 mining engineers from the school, it was decided that the number of engineers are more than enough for the country so the school was closed at 1932 [2]. Since then it was not revealed what had happened for closing the school. During 1933 the Geological Department of İstanbul University was established and after 20 years later, in 1953 İstanbul Technical University reestablished the Mining Engineering and few years later in 1960 Middle East Technical University launched Mining Engineering department and started education. Meanwhile, at 1935 MTA and Eti Maden was founded for to explore the mines and quarries of the country. After that at 1954 the Law no: 6309 Mining Law and later at 1985, Law no: 3213 Mining Law was legislated. Until than for about 25 years later Law no: 5995 Mining Law was put into force in 2010. And 4 years later the General Directorate of Mining Affairs put 150 mines into a bidding round in 2014. So to sum up for about 156 years starting from late 1800s to today, we put forward only 7 laws to regulate the mining activities as a nation and established only 6 operating bodies in the mining industry. Considering the importance of the mining industry in the development of our industrialization, the attempts are not sufficient enough.

Synopsis of Mining Sector in Turkey

Turkey is an important player in mining industry as she has important reserves and also geographically suitable for easy transportation of the products. Turkeys sustains 28th level concerning mining production and holds the 10th level in richness in mineral and mines [3]. Turkey holds 72% of the World's Boron reserves and 21% of Thorium reserves [3] [4]. These two minerals are the most critical ones.

The most important minerals in Turkey are, marble, and natural stone, boron, chromium, feldspar, pumice stone, bentonite, perlite, calcite and trona. The major export items are natural stones, boron,

chromium, feldspar and pumice stone. Turkey holds 2.5% of the industrial minerals, 20% of bentonite, nearly half of the perlite reserves of the world [5] (Table 1). Turkey has 3500 different metals and 2000 of these different mineral reserves are used in the industry and the excess of them are exported [6].

Mines and Minerals	Reserves and Estimated Resources (thousand tons)
Marble	3.800.000*
Bor	866.000
Chromium	25000
Feldspar	130000
Pumice Stone	3.000.000*
Gold	6,5
İron Ore	82500

Table 1: Reserves and Estimated Resources of Turkey's important mining items (* value is in m^3).

According to the MTA data, the export percentage of the minerals in the total export is about 2.64% in 2012 (Figure 1). Although, the mining industry is constantly increasing its export since 1996, from 432 million $ to 4.031 million $, the total export of the country increased nearly 6.5 times. In spite of this fact, the mining export percentage in the whole export is still below the 3% level.

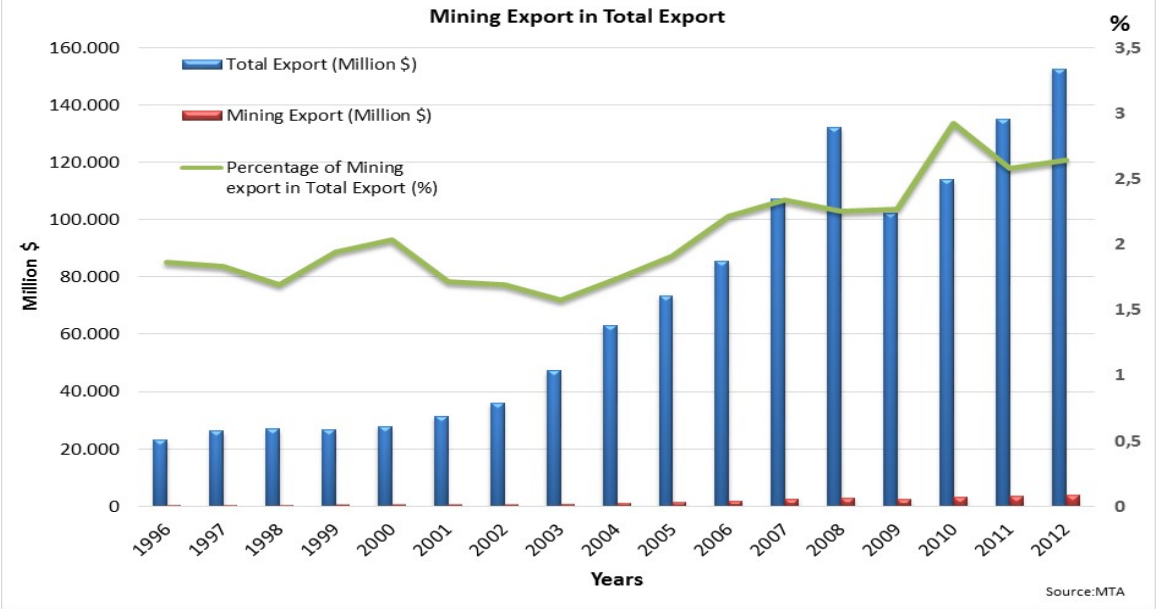

Figure 1: Percentage of Mining Export in Total Export

The total percentage of mining import among the total import is around 2%, where only in 2009 the percentage exceeded 3% (Figure 2). These two tables show that import export ratio is nearly in equilibrium concerning the mining industry but still at a low point in the total export.

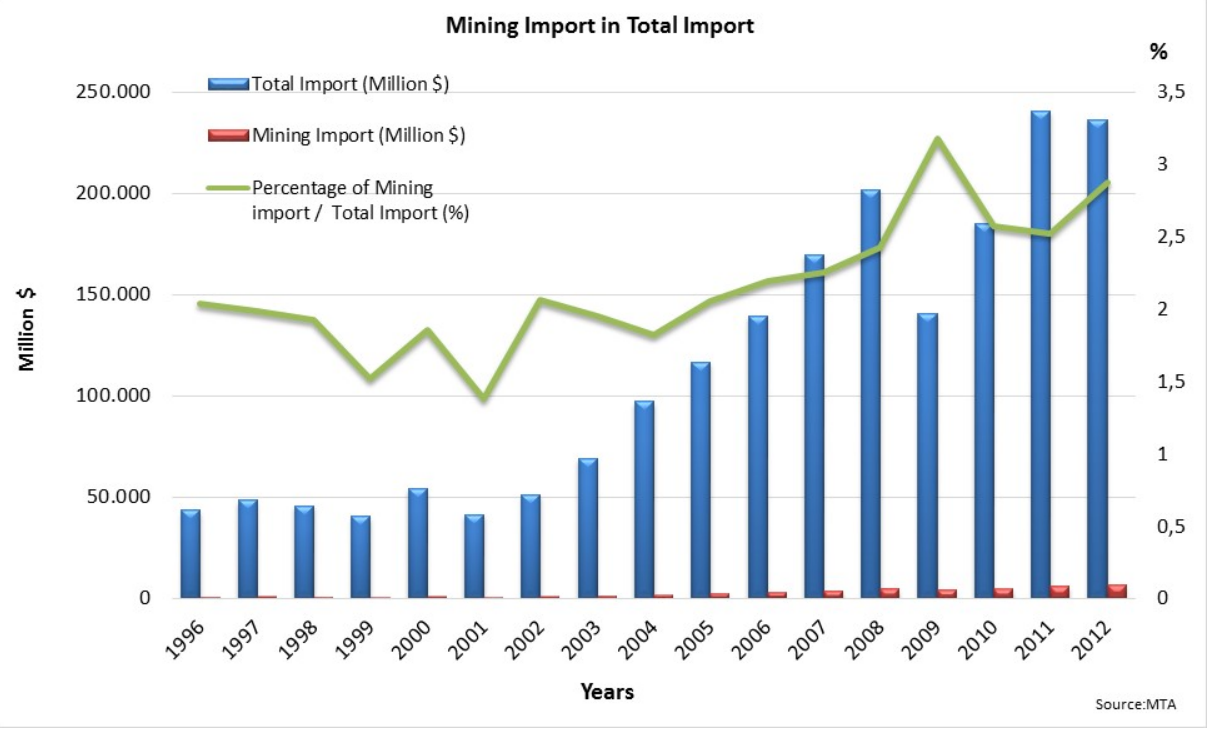

Figure 2: Percentage of Mining Import in Total Import

The mining export has been growing steadily since 2003 and highest increase occurred in natural stones (Figure 3). The metallic mines fallows the natural stones and the industrial minerals takes the third grade in export growth (Figure 3). The energy mines export is negligible as seen from the figure 3; where as they are the major imported mineral as foreseeable (Figure 4).

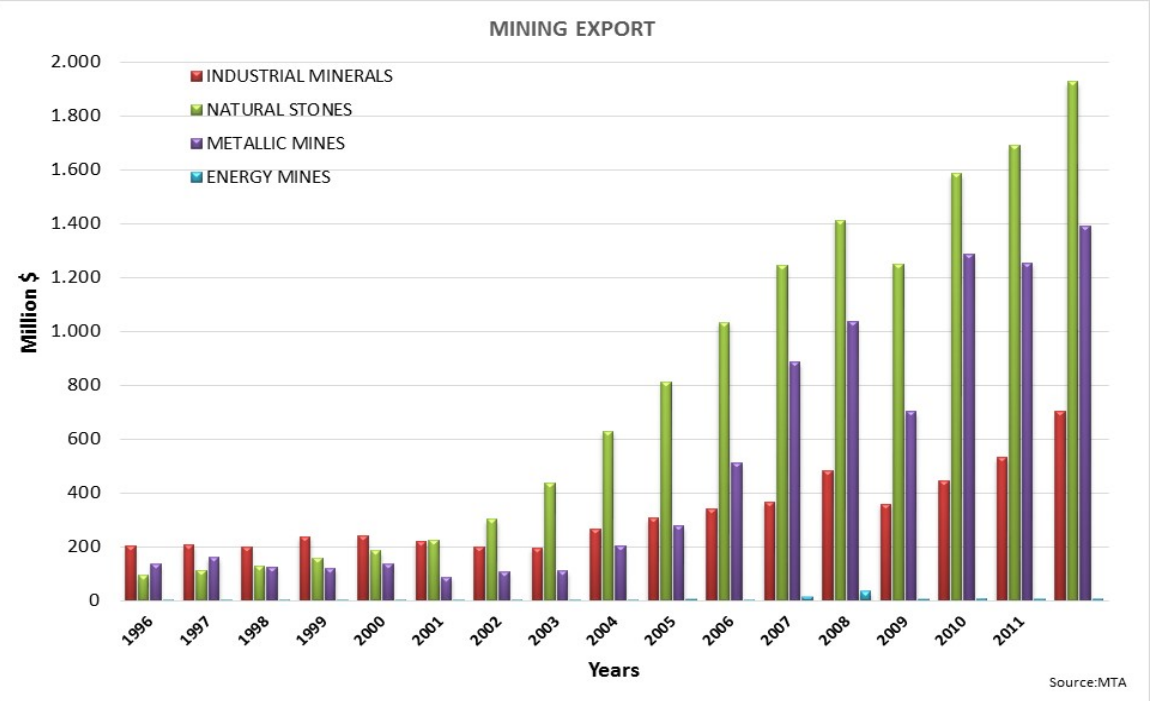

Figure 3: Mining Export according to different groups

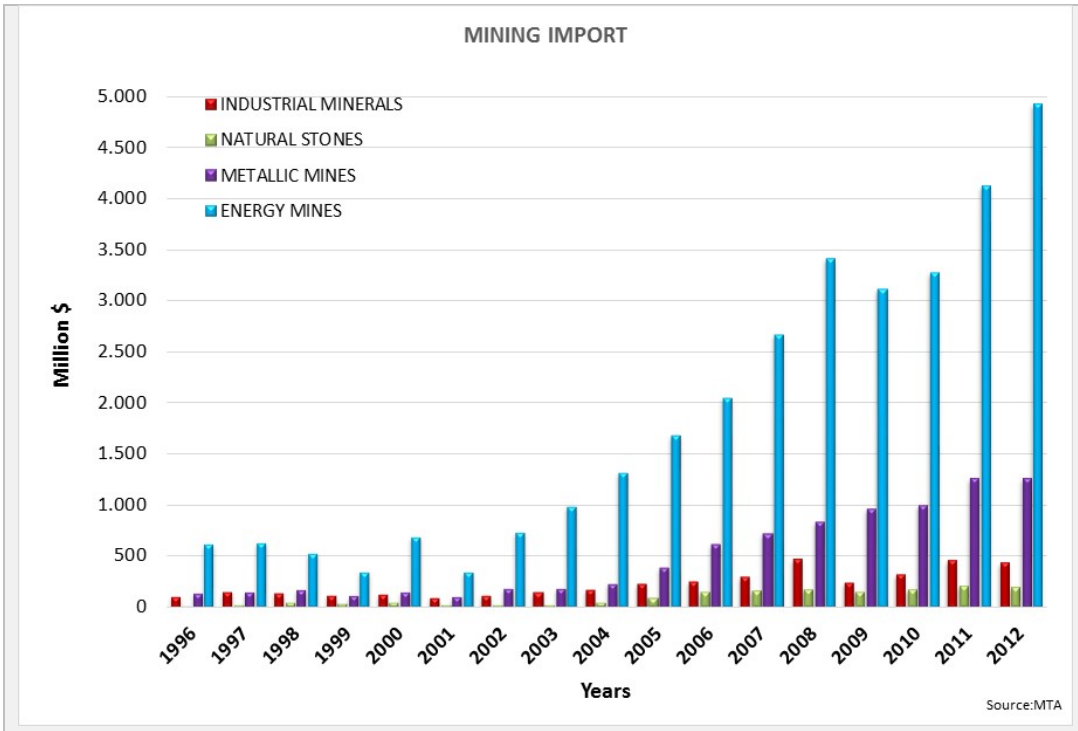

Figure 4: Mining Import according to different groups.

The natural stones have a very low import value as they contribute to the maximum portion of the exported groups in mining industry. Besides, industrial minerals are not imported in significant volumes as they are the primary input of many different industries. In our country only iron holds the highest amount of imported industrial minerals as steel industry is exceptionally developed.

We have a good reserve position in major industrial raw materials such as boron, trona and their usage in industry is innumerable. Its always talked about boron that it is a strategic mineral where its property is resistance to heat and where it finds usage from glass to nuclear industry. As everybody is aware that we hold the 72% of the boron reserves on the world and nowadays we are at the edge of another industry era. We are trying to establish the nuclear power plant where it will bring nuclear industry capability. We have to learn how to make use of boron in our nuclear and other industries.

Concerning the nuclear energy industry, Thorium is one of the most strategic minerals in energy sector. Turkey is on the road to have nuclear energy and the first plant is going to be constructed on Uranium. However, Turkey is one of the richest countries in Thorium, which will be the next generation of raw material for nuclear. Still it needs more technology to use Thorium in nuclear power generation and Turkey needs to be careful on this issue. According to the MTAs report, Sivrihisar, Kızılcaören and Eskişehir holds about 380.000 ton of Thorium reserves. It has been concluded in the Thorium Workshop hosted by ETKB that; for to run 57 GW nuclear power plant (1GW NPP needs 1 ton of Thorium and 7.300 ton Uranium) we have for about 13.000 years sustainable Thorium reserves [4] (Table 6).

The most important mines in the Country belong to the companies which have big capital and strong relationship with the government. The small companies cannot lead the sector as the first investment for production is very high. The biggest 10 mining companies of the world are traded in the London stock exchange where with their annual gross revenue is over 303 billion USD [3]. The mining industry is so sensible to the macroeconomic trends, so it was one of the first industries affected during the 2008 global economic crisis.

Country	Percentage (%)
Brazil	31,8
Trukey	21,4
Eygpt	7,2
Total Europe	16,9
TOTAL	**77,3**

Table 6: Thorium rich Countries.

The New Era

This new law legislated in 2010 put forward that the companies are able to take the right for exploration of mining for about defined time durations, with paying an amount of guaranty and submitting a minimum work programme which is defined by the regulations. The companies also should report their activities by the end of each period defined in the regulations. As within the previous law the regulatory body is the General Directorate of Mining Affairs who is responsible for giving the exploration and production licenses. Also the candidate companies who are willing to apply for the exploration license should submit a "pre exploration report" to General Directorate of Mining Affairs. The general exploration period is set as 1year+2 year+ 4year durations where at the end of each period there should be a financial control. This is to control the companies whether they are performing the investment programme in the same way as they submitted within the minimum work programme to the GDMA. There is a new definition of the recently assembled group of minerals defined as Group VI; which consists of radioactive elements such as Uranium and Thorium.

One of the most important issues is about the nuclear energy that will help the industry to step up to a different level of production capacity. As Turkey is very rich in thorium, which is the new competitor for uranium run nuclear power plant. In 2013, thorium workshop has been done and the advantages of thorium in generating energy were described in the upper section. The technology of thorium run power plants are not commercialized yet, but it is expected to be in force by 2020s. This will change the conjuncture that Turkey will decrease energy mines import, on the contrary Turkey be able to become an energy exporter.

Today, it has been understood that the mining sector, especially the industrial and energy mines are too important for a countries development. Turkey is at the edge of a new era that high qualification industrial activities will grow in the new economic environment. Also the new technology in producing energy will put Turkey into an important position as energy exporter. Nevertheless this new era will be centralized at the Middle East that the new generation nuclear power generation will be using thorium which is very rich in Turkey.

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[6] Enerji ve Tabii Kaynaklar Bakanlığı

ABBREVIATIONS

MTA: Maden Tetkik Arama

ETKB: Enerji ve Tabii Kaynaklar Bakanlığı

GDMA: General Directorate of Mineral Affairs

GW: Giga Watt

NPP: Nuclear Power Plant