Production data and Sustainable Development Indicators (SDIs) for the Greek mining/metallurgical industry in the period 2007-2012

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MINISTRY OF ENVIRONMENT ENERGY & CLIMATE CHANGE

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This paper presents:

1) Production data for various mineral commodities produced in Greece in the period 2007-2012 . General performance of the Greek Mining/Metallurgical Industry.

Reported figures are combined data from (a) statistics provided by the Mineral Resources Division of the Ministry of Environment, Energy and Climate Change (YPEKA) and (b) annual statistics provided by GMEA.

2) Data from twelve groups of Sustainable Development Indicators (SDIs) provided by the Greek Mining Enterprises Association (GMEA) in the period 2007-2012.

Sustainability performance indicators include employment matters, environmental management and land stewardship, waste management, energy and water management, H&S issues and local community development. Results are discussed.

The Greek Mining/Metallurgical Industry (GMMI)

- The Greek Mining/Metallurgical Industry (GMMI) constitutes an important sector of the economic activity of our country as it supplies essential raw materials for primary industries and various downstream users.
- Although the sector's significance to Greek economy has been declined during the past 20 years, GMMI still contributes 3-5% of the Gross Domestic Product (GDP), with the inclusion of interrelated enterprises such as quarrying, concrete, processing and production of intermediate and final products.

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TABLE 1: Production of Mineral Commodities in Greece (metals, industrial minerals, mineral fuels and related materials) *

[quantities in metric tons unless otherwise specified]

	2007	2008	2009	2010	2011	2012
Bauxite	2,093,433	2,174,000	1,935,000	1,993,826	2,300,000	1,815,328
Aluminium, primary (Foundry Line)	167,937	162,339	134,7371	139,824	167,490	165,046
Alumina, calcined (Al_2O_3)	761,746	771,769	718,797	661,882	683,030	653,011
Alumina, hydrated (Al_2O_3)	789,000	807,500	795,500	785,100	809,700	784,400
Mixed sulphide ore	208,724	264,299	225,054	230,134	214,943	227,197
Galena, PbS (conc,)	22,407	23,314	17,027	17,674	16,592	18,062
Zinc blend , ZnS (conc,)	39,729	46,532	34,255	40,592	39,127	41,824
Nickeliferrous ores (laterites)	2,367,000	2,261,637	1,400,000	1,902,976	2,235,966	2,256,686
Ferronickel:	NA	87,664	42,423	69,596	93,905	96,435
Ni content of ferronickel	18,668	16,640	8,269	13,956	18,527	18,632
Slag by-product (coarse)	NA	85,345	62,022	57,156	69,674	86,776
Slag by-product (fine, -5mm)	NA	90,180	52,696	59,500	79,011	85,511

**Provided by (a) the Mineral Resources Division of YPEKA and (b) GMEA.*

TABLE 1: Production of various Mineral Commodities in Greece (continued)*

	2007	2008	2009	2010	2011	2012
Magnesite, crude	399,475	455,069	250,234	513,487	541,813	351,266
Dead-burned magnesia	41,961	48,719	22,370	31,594	38,343	26,832
Caustic-calcined magnesia	71,032	70,545	55,545	61,628	59,838	60,625
Basic monolithic refractories	31,042	35,617	31,634	36,031	45,202	44,821
Bentonite, crude	1,382,800	1,500,000	844,8045	1,384,118	1,188,442	1,235,105
Attapulgite clay	7,000	28,584	81,382	39,012	17,748	19,872
Huntite, crude	16,370	19,600	10,652	16,350	23,800	24,200
Pozzolan, earth	1,520,000	1,059,000	830,000	550,000	350,000*	270,000
Pozzolan, specific use (not cement industry)	NA	NA	21,532	79,600	49,733	0
Kaolin, crude	30,000	4,360	0	1,045	NA	0
Perlite, crude	1,100,000	1,000,000	862,9358	790,100	842,870	876,396
Perlite, treated	650,000	600,000	398,4519	440,000	507,235	450,000
Pumice	838,000	828,000	381,000	412,700	468,960	385,917
Silica (SiO_2)	125,000	64,521	37,905	5,742	1,671	0
Gypsum and anhydrite, crude	836,967	1,000,000	730,000	574,768	590,000	621,329
Olivine	40,000	37,150	48,050	35,300	55,325	20,285

**Provided by (a) the Mineral Resources Division of YPEKA and (b) GMEA.*

TABLE 1: Production of Mineral Commodities in Greece (continued)*

	2007	2008	2009	2010	2011	2012
Amphibolite	57,367	57,500	25,902	23,453	23,263	10,398
Calcium Carbonate($CaCO_3$), [processed, all sources]	500,000	600,000	580,000	450,000	400,000	380,000
Feldspar	95,000	62,000	28,617	17,380	10,563	13,000
Quartz	15,000	16,201	10,909	30,794	11,241	0
CO_2 [liquid]	12,500	12,200	8,000	9,980	10,200	10,760
Lignite	66,100,000	64,521,000	61,800,000	56,366,202	58,400,000	62,334,803
Crude oil, in barrels	575,413	477,679	628,278	894,002	675,504	661,510
Natural gas , in Nm^3	21,221,053	14,058,056	11,123,714	6,124,844	5,927,401	6,401,717
Salt, sea salt	212,000	220,000	189,000	164,765	174,500	191,970
Mineral Aggregates (sand, gravel, crushed stones etc,) *	90,000,000	85,000,000	65,000,000	50,000,000	38,000,000	29,000,000
Marble, rough blocks plus slate stones (m^3)	350,000*	347,526	255,516	268,033	285,000	320,000
Marble, rough shapeless blocks	420,000*	451,505	254,491	358,963	390,000	244,000
Marble chips	NA	1,218,056	761,933	598,111	650,000	500,000
Emery	NA	NA	8,000	7,000	5,900	4,250

NA: not available, ***estimated**

**Provided by (a) the Mineral Resources Division of YPEKA and (b) GMEA.*

A sector with two faces….

A domestic…

- Recession, fall in demand and prices of raw materials in the construction, steel, cement and concrete industries.
- Severe economic problems in mining enterprises and lack of investment initiatives (e.g sector of construction aggregate materials)

An international …

- Exports continued and increased
- Demand and prices soon rallied largely to pre-crisis levels. (e.g the industrial minerals sector)

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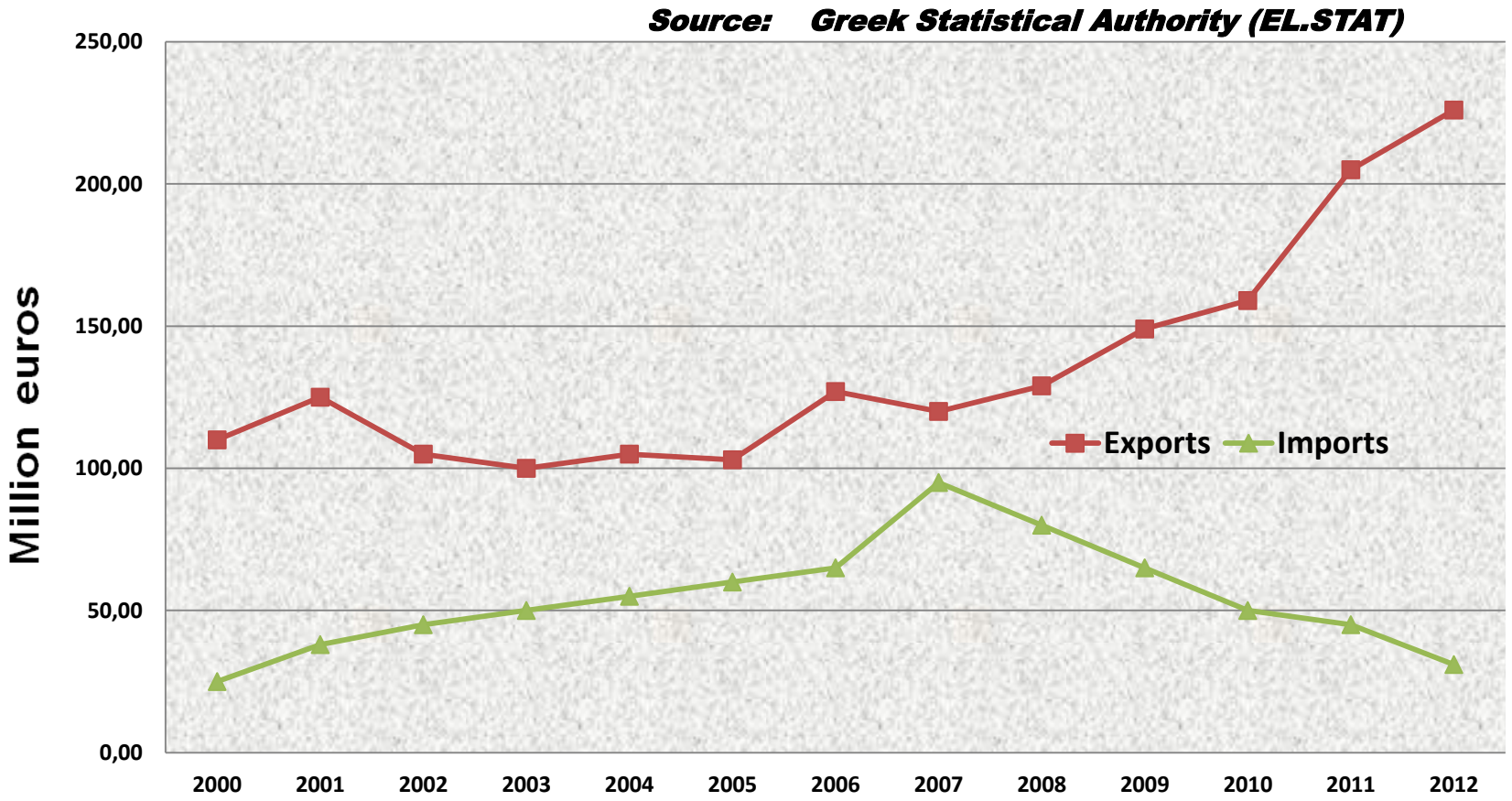
The industry of marble products



Imports and Exports of marble and other natural stones [2000-2012]

State Initiatives

❖The state (Ministry of Environment, YPEKA) completed the new reformed **Regulation on Mining and Quarrying Activities** (KMLE, MD2223/11).

Strategic goal: to enhance health and safety in the mining sector.

❖The state (Ministry of Environment, YPEKA) adopted the **National Policy for the Strategic Planning and Exploitation of Mineral Resources.**

Strategic goal: to ensure the supply of MRM to the society in a sustainable way and in compliance with other national sectoral development policies

TABLE 2 : SDIs for the Greek Mining/Metallurgical Industry in the period 2007-2012

SD Indicators for the Greek Mining/Metallurgical Industry	2007	2008	2009	2010	2011	2012
1. Employment						
a. Average number of people directly employed	10,392	10,920	10,305	10,166	9,729	9,208
b. Average number of people indirectly employed (including contractors)	4,193	5,203	5,151	4,769	5,446	11,427
c. Total number of hours worked (including a and b) *[hours]*	26,569	32,106	29,915	28,906	30,493	28,003
d. Number of hours worked per ton of marketable product *[hours/t product]*	0.27	0.31	0.31	0.34	0.38	0.34
2. Development of Skills						
a. Total number of training hours *[hours]*	118,743	106,967	89,117	124,154	129,906	117,742
b. Training hours per employee	8.32	6.69	5.78	8.31	8.56	5,74

TABLE 2 : SDIs for the Greek Mining/Metallurgical Industry in the period 2007-2012 (continued)

	2007	2008	2009	2010	2011	2012
3. Health and Safety						
a. Number of working hours lost due to accidents	34,504	29,495	32,643	23,050	24,585	22,746
b. Total number of hours in H & S training	43,810	47,004	41,779	54,625	66,481	59,044
c. Number of hours in H & S training per employee	3.07	2.93	2.71	3.66	4.38	2.88
d. Number of fatalities	3	5	7	0	3	2
e. Number of fatalities per 10,000 employees	2	3	4.5	0	2	2
f. Accident frequency indicator for all the employees (direct and indirect) *(x10^6)*	5.8	4.05	5.01	5	4.39	3.07
g. Accident seriousness indicator for all the employees *(x10^6)*	165.7	114.8	136.4	99.5	100.8	69.8
h. Employees that are periodically under medical supervision *[% of total employees]*	40	74	68	85	80	85
4. Total turnover & production						
a. Total turnover *[million €]*	2,109,97	2,031,74	1,786,78	1,973,58	2,123,11	2,081,71
b. Production of marketable products *[million tons]*	96.8	104.5	96.9	85.9	80.2	81,1
5. Exploration – R&D costs						
a. Total exploration costs *[million €]*	7.8	8.9	8.4	12.3	6.6	9.7
b. R&D costs per ton of marketable product (5a/4b) *[€/t product]*	0.08	0.087	0.086	0.14	0.082	0.119

TABLE 2 : SDIs for the Greek Mining/Metallurgical Industry in the period 2007-2012 (continued)

	2007	2008	2009	2010	2011	2012
6. Communication with the community						
a. Number of public events - "open days"	82	58	40	36	56	53
b. Number of visits (schools, universities)	236	231	178	161	153	130
c. Number of trained students	332	330	505	454	223	246
d. Resources available to the local community (infrastructure, unions, support, awards etc) *[million €]*	25.5	27.7	27.3	25.9	10.9	11.2
e. Resources available to the wider community (same as d) *[€]*	1,449,100	1,670,975	764,419	706,076	497,430	668,798
7. Energy Demand						
a. Total energy consumption *[MJ]x10^6*	28,520	27,987	20,155	24,330	30,965	31,335
b. Energy consumption per ton of final product (7a/4b) *[MJ/t product]*	294.7	267.8	207.8	283.23	386.18	386.24
8.Water Demand						
a. Total net water consumption *[m^3]*	11,896,545	17,435,018	16,980,791	17,809,519	16,936,337	17,235,543
b. Total consumption of recycled water *[m^3]*	5,843,221	6,948,150	5,118,120	8,667,330	9,494,971	9,665,820
c. Water consumption during production *[m^3]*	12,890,396	18,013,768	15,894,993	10,745,469	18,119,550	17,087,140
d. Total net water consumption per ton of final product *[m3/t product]*	0.12	0.17	0.17	0.21	0.23	0.21
e. Water consumption in rehabilitation / restoration activities *[m3]*	325,774	982,331	907,765	582,814	311,054	341,111
9. Land Demand – Environmental Rehabilitation						
a. Total land in use for deposit exploitation at the end of the calendar year (rehabilitated surface is excluded) *[acres]*	154,742	154,868	157,675	154,779	164,001	175,469
b. Total land surface under rehabilitation *[acres]*	3,540	3,556	3,729	1,682	3,688	5,547

TABLE 2 : SDIs for the Greek Mining/Metallurgical Industry in the period 2007-2012 (continued)

	2007	2008	2009	2010	2011	2012
c. Total land surface returned to beneficial use or rehabilitated by planting trees *[acres]*	55,350	55,938	59,996	63,520	63,550	63,550
d. Number of planted trees at the end of the calendar year	156,048	622,367	588,468	506,193	169,024	212,348
e. Cost for rehabilitation of mines and protection of the environment *[€]*	11,280,096	11,675,475	9,376,164	16,151,915	8,732,448	10,130,178
f. Cost for rehabilitation per ton of final product (9e/4b) *[€/t product]*	0.11	0.11	0.11	0.19	0.11	0.12
10. Waste Management						
a. Wastes from mining activities the current year *[thousand tons]*	562,660	555,889	543,087	532,206	600,478	513,027
b. Wastes from mining activities per ton of final product (10a/4b) *[tons/t product]*	5.81	5.32	5.6	6.19	7.4	6.3
c. Wastes from mining activities used for backfilling *[thousand tons]*	450,475	405,576	462,059	439,480	440,882	417,851
d. Wastes recycled or/and used for the production of secondary materials *[thousand tons]*	1,120	1,328	1,153	797	508	854,7
e. Other not mining wastes recycled *[thousand kg]*	4,150	4,908	9,923	13,678	14,641	11,333
11. Use of dangerous substances						
a. Quantity of classified dangerous substances used during production (lubricants are excluded) according to the Directive 67/548/EEC *[tons]*	6,600	6,286	2,287	3,966	38,432	40,625
12. Company Certification						
a. ISO 9001/2 *(GMEA members [%])*	48	50	59	66	65	68
b. ISO 14001 (*GMEA members [%]*)	30	32	32	33	36	36
c. OHSAS 18001 *(GMEA members [%])*	10	14	20	24	27	27

CONCLUSION

- ***Despite economic recession*** and the collapse in the domestic materials market, the perspectives of the ***Greek mineral industry appear to be positive***, **relying mainly to its export orientation**. However, the industry has to identify and exploit the trends and opportunities of the international business environment in order to overcome crisis, remain competitive and further improve its position and perspectives.
- Results from the list of key performance sustainability indicators (SDI's)) demonstrate ***the significant strides the industry has made in regards to sustainability***. There is still a need for improvement in environmental performance and good practice has far to go before it spreads to all parts of the mining industry, especially for the ***small-scale mining***. Also, questions remain as to whether current assessment and reporting can be translated into valuable knowledge on the ground, providing sufficient tools for companies and for communities.
- ***Finally***, we need a new agenda focused on good practice guidance that is built around society's demands and the realistic aspirations of a much more capable industry sector.

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