



RawMaterials Hub
Regional Center Greece



EIT Raw Materials: 2nd Greek Raw Materials Sector Dialogue

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GMEA: Challenges and opportunities of the Greek Raw Materials Industry

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Mineral resource centered activity

has traditionally been a key driver

of economic development (through trade and innovation), employment (in urban centers but mainly in the periphery), trade, and ultimately competitive advantage for the Greek economy

The Greek land houses a wide portfolio of minerals with countless uses in industry and daily life and many of them with leading position



Lignite
*2nd in the EU,
5th worldwide*



Magnesite
*Largest exporter
in Europe*



Perlite
1st worldwide



Laterite
*One of the largest producers
in Europe-key for the national
ferronickel metallurgy*



Bauxite
*Largest producer in Europe-
key for the national
aluminum industry*



Aggregates
*Key for the
cement industry and construction.*



Marble
*Global leader in quality,
acquiring market share*



Bentonite
*1st in Europe,
2nd worldwide*



Gypsum / Pozzolan
*Key for the
cement industry*



European Commission Spring Forecast

(EE, Economic Forecasts – Spring 2017, May 2017)

(% change or otherwise defined)	2016	2017	2018
Real GDP growth rate	0,0	2,1	2,5
Private consumption	1,4	1,4	1,4
Public consumption	-2,1	0,5	0,1
Gross capital expenditure investments	0,1	6,3	10,8
Product and service exports	-2,0	3,8	4,2
Product and service imports	-0,4	3	3,8
Employment	1,3	1,4	1,7
Unemployment rate (%)	23,6	22,8	21,6
Real unit cost of employment	2,0	-0,3	0,2
Consumer price index	0,0	1,2	1,1
Current account balance (% of GDP)	-0,5	-0,5	-0,3
General Government Deficit (% of GDP)	0,7	-1,2	0,6
General Government Debt (% of GDP)	179,0	178,8	174,6

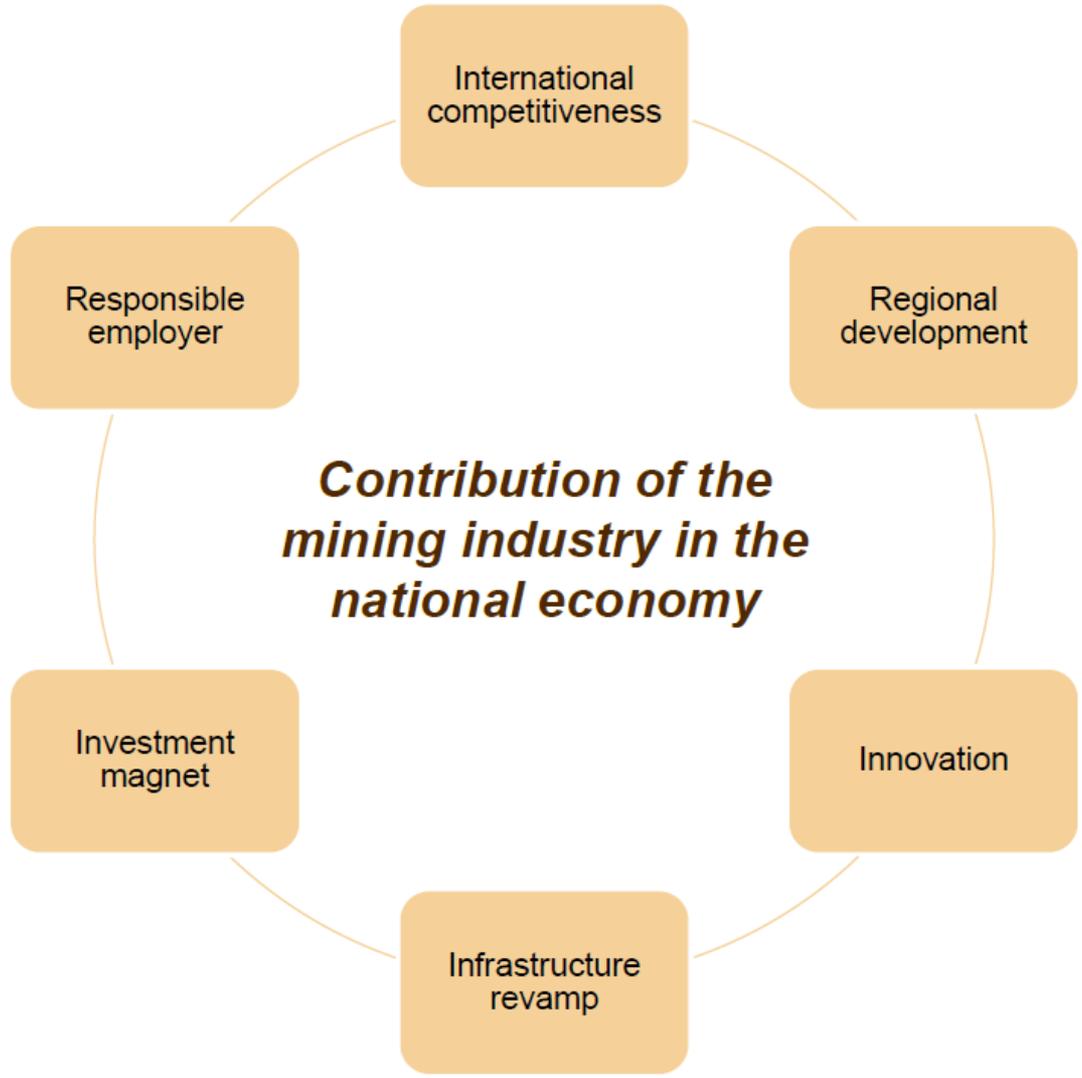
The Greek economy seems to be recovering at a slower rate than expected; recovery and return to growth is largely hindered by structural weaknesses

Key challenges for National Economy



- ✓ **Growth:** Economic sentiment has not yet recovered to pre-crisis or end of 2014 levels while GDP growth rate is marginally negative
- ✓ **Employment:** The rate decrease of the unemployment rate from a record high is slowing down while youth and long-term unemployment rates remain persistently high
- ✓ **Competitiveness:** The structural reforms implemented during the past few years have contributed to the restoration of competitiveness of the national economy
- ✓ **Extroversion:** Imports are recovering and exports are growing

Looking forward, the industry has the potential to keep contributing to the national economy against all these challenges



In this environment Greek Extractive industry continues to thrive



- Accounts for **3.4% of the Greek GDP**
- Generated a total value of **€2.3 billion in 2014**
- Extracts more than **30 different minerals**, 10 of which in quantities larger than 300,000 tons per year



Growth

- **Half of total industry sales are out of Greece**- mainly to Europe
- Constitutes almost **5% of total Greek exports**



Extroversion

- Employs **directly 20,000 individuals and indirectly 80,000 individuals**
- **Top employer** – especially in the Greek periphery – **occupying 4% of the active population**



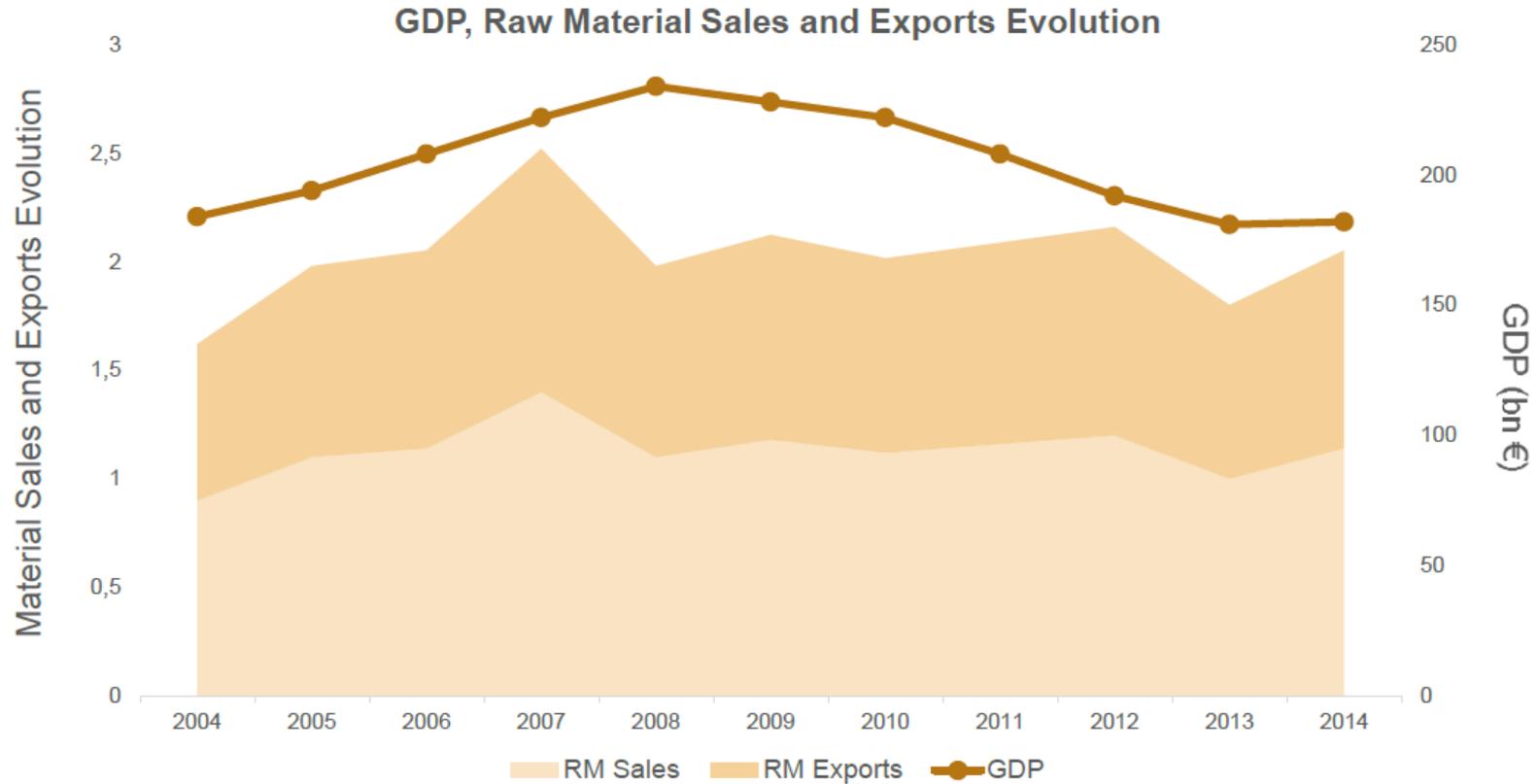
Employment

- **Investments lever** in fixed assets and a magnet for equity investors: **GMEA members are planning €1.7 worth of investments by 2019**



Investments

The Greek Mining Industry has weathered effectively the economic crisis



The Greek Mining Industry managed to show resilience during the crisis thanks to the following key four factors: sound risk management practices, extroversion, financial credibility, and responsible operations

The mining industry is a lever of sustainable development and growth



...and must be leveraged in the path to recovery and growth of the national economy

To sustain and further improve performance of the industry a number of key factors are required



- Implementation of a **National Mineral Resources Policy** – to be discussed in detail overleaf
- **Preparation of Special Land Plan for mineral resources** - dialogue with local communities is a prerequisite for implementation
- **Environmental licensing** at the central and regional level that is adequately staffed and equipped to estimate real impact
- Implementation of the **Electronic Project Registry** and establishment of certified assessors (possibly outsourced) as stipulated by N.4014
- Reinforcement of audit and approval agencies (Independent Mining Review Board)
- Activation of **resources and incentives for investments**
- Access to **infrastructure** (ports etc.)
- Stable and equitable **tax environment**
- Fast and consistent **judicial procedures and decisions**
- Access to funding for **research and innovation**
- **Revamp of all geosciences, software, and vocational education schools**



The important role of the industry is confirmed by its decisive participation in the shaping of industrial production and export performance in the country both in the current year.

Significant growth - for the eighth consecutive month - registered the turnover of the Greek industry in June compared to the corresponding month of 2016, due to the exports in the international market (ELSTAT)

This increase of 8.1% resulted in :

- **11.9% increase in the Mining Quarry Index and 8.1% of the Manufacturing Industries index and**
- **is due to the 17.2% increase in sales to the external market and just 2.3% on the domestic market.**

The increase in the turnover of the mining industry is mainly due to industrial minerals and marbles



With full and documented knowledge of our capabilities, our industry wants and can, help create a new sustainable production model in the country that will bring more exports, new investments and create or maintain high quality jobs that are also demanded by



Healthy workplaces are essential to mining companies

- ❑ Zero accidents, zero occupational diseases must be the immediate and unique goal of mining industry
- ❑ Confronting hazardous substances in the working environment, the extractive industry has to set and implement a consistent set of standards, preventing occupational diseases
- ❑ Techniques range from epidemiological studies in health related aspects, to applications of modern methods of production, which reduce exposure to risks. The control of hazards is a pro-active aspect of mining which has always been at the forefront of development in the industry, as can be illustrated by the safety record of mining compared to many other industries which by nature should be far less hazardous



The control of hazards is previewed by the two mainly directives :

- The directive 98/24/EC on the protection workers from the risks related to chemical agents at work (Chemical Agents Directive (CAD))
- The Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Carcinogens or Mutagens Directive (CMD))

New limitations and restrictions are set by both directives, which affect extractive industry and have serious consequences for the future of the sector



The most fundamental characteristic of both directives, is the determination of Occupational Exposure Limits (OELs) of hazardous substances in the working environment.

There are two different types of OELs set at EU level:

- Indicative Occupational Exposure Limit Values (IOELVs) established in accordance with the Chemical Agents Directive and,
- Binding Occupational Exposure Limit Values (BOELVs) established in accordance with the Chemical Agents Directive and also the Carcinogens or Mutagens Directive. A BOELV for asbestos is set in the Exposure to Asbestos at Work Directive (2009/148/EC).



Member States set national OELs according to their own legislation. Obligations for compliance with national OELs differ in the various Member States.

National OELs have to be complied with even if the DNEL derived for REACH registration purposes for the same substance is higher.

Where an OEL established in a Member State has been exceeded, the employer is required under the Chemical Agents Directive (Article 6 (5)) to take immediate steps to remedy the situation, taking into account the nature of the limit.



Under the Carcinogens or Mutagens Directive, exposure must not exceed the limit value of a carcinogen as set out in that Directive (Article 5 (4)), and even in presence of such a limit value, the employer is required to ensure that the level of exposure of workers is reduced to as low a level as technically possible (Article 5 (4)).



New Exposure Limits for NO₂, NO and CO, according to the proposed CAD amendment

After extensive negotiations between Commission and extractive industry, we have final proposals for limit values of NO_x and CO:

NO₂: 0,5 ppm for 8 h exposure
1 ppm for 15 min exposure

NO: 2 ppm for 8 h exposure

CO: 20 ppm for 8 h exposure
100 ppm for 15 min

For new OELs, the Commission gave a transitional period of 5 years



NO, NO2, CO – Controlling Technologies

➤ Sound Engine Maintenance

Engine maintenance is an important part of a mine's overall strategy for ensuring safety and the longevity of the machinery and reducing workers' exposure to diesel emissions.

- An important factor in maintaining a cleanburning engine is regular maintenance of the intake air cleaners. A blocked air filter results in an increase in fuel/air ratio, hence an increase in tailpipe diesel particulate concentration.



➤ Advanced Diesel Engines

Today's diesel engines are becoming more and more effective compared to their predecessors. However, there is a need for technological development to further reduction of diesel exhaust. It is in the best interests of mining companies to use advanced diesel engine technologies and more efficient systems for exhaust after-treatment.

Nevertheless, the potential for reducing emissions from machinery with diesel engines is limited. In consideration that diesel exhaust will be included in the new lists of carcinogens with serious consequences for the industry.



The industry faces several challenges connected to the replacement of the diesel engines:

ECONOMIC

- In July 2016 the European Parliament has adopted with a very strong majority a Stage V for exhaust emissions from non-road mobile machinery (NRMM) engines. The replacement of mobile equipment technology requires high investments, which is not to justify given the strong global competition in the mining industry.

TECHNICAL

- Concerning the lead time for introduction of modern diesel engines (only STAGE IV currently available), those with power range of 75 – 560 kW are available, but engines <75 kW are still under development;



➤ Increased use of electrical vehicles

Limited performance in conditions that flexibility is required, limited capacity of occurent state of battery technology

➤ Explosives

The significant reduction of exposure to Nitrogen Oxides resulting from blasting, is associated with higher emissions of CO, due to the chemistry of explosives

➤ Ventilation

- ❖ Adequate ventilation to face the new limits

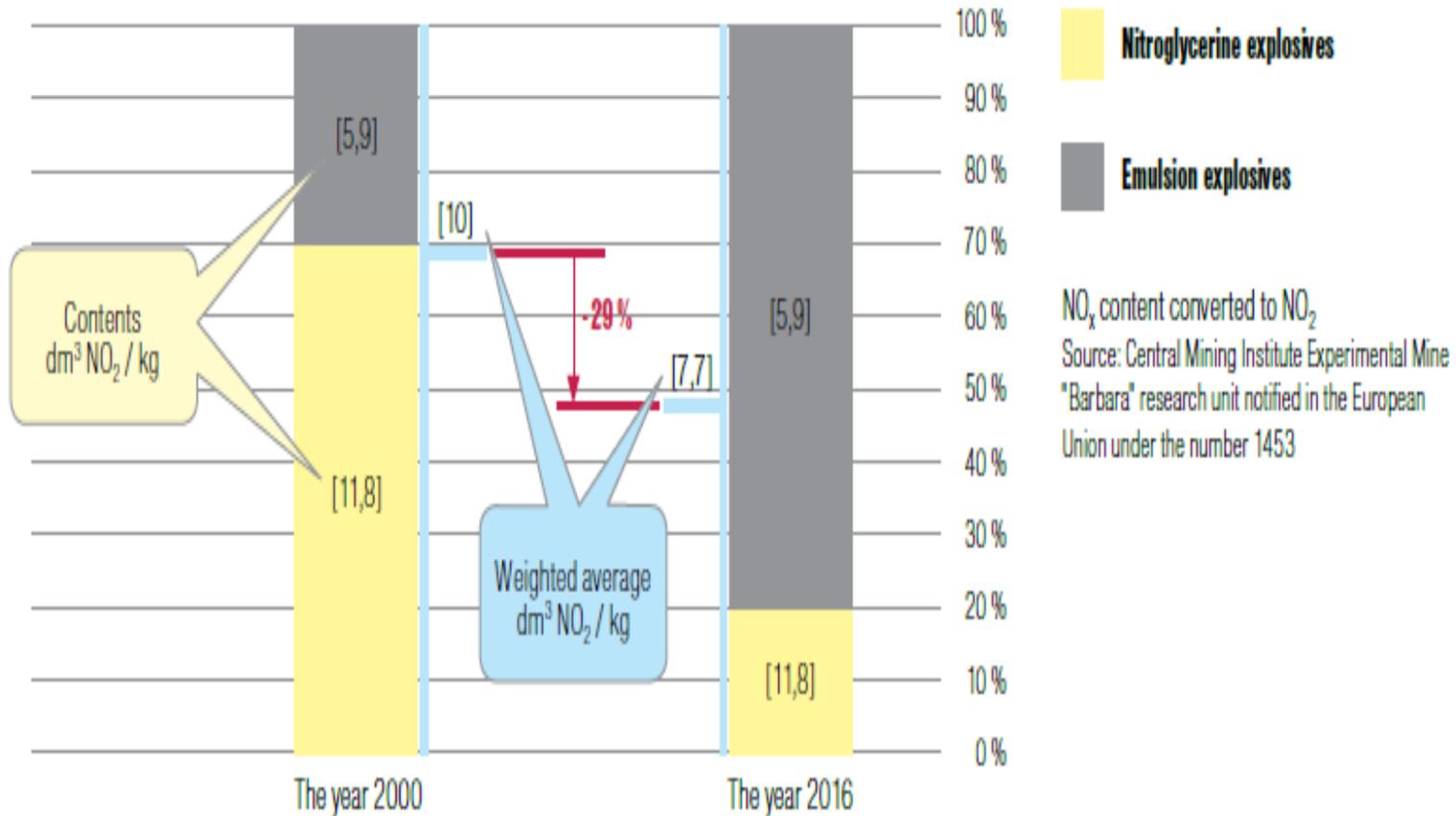
- ❖ Challenges

- ❖ In order to achieve the new OELs, the ventilation has to be increased 10 times compared to present levels. Infeasible, adverse impact to the worker's health



New exposure limits for NO₂, NO and CO

Measures and actions to reduce NO_x emissions Explosives - nitrogen oxides in post-blasting gases





➤ Respirable Crystalline Silica

0,1 mg/m³ (final decision)

➤ Diesel Engine Exhaust

New restrictions proposed in Annex I of CMD for Diesel Exhaust Particulate Matters (DPPM) with a limitation of **100 µg/ m³** for free carbon



THANK YOU

FOR

YOUR ATTENTION

