Reducing the environmental footprint in the industrial minerals sector: Case studies & Innovation

A. Shtiza, R. Doome, M. Wyart

6th SDIMI conference

IMA-Europe members & mission

Industrial Minerals Association (IMA-Europe) is **an umbrella organization** which brings together nine European and one international association specific to individual minerals:

CCA-Europe - European **Calcium Carbonate** Association
EBA - European **Borates** Association
ESMA - European **Specialty Minerals** Association
i.e. **andalusite, mica, vermiculite & sepiolite**
EUBA - European **Bentonite** Association
EULA - European **Lime** Association
EUROFEL - European Association of **Feldspar** Producers
EUROSIL - European Association of **Silica** Producers
i.e. Quartz & cristobalite
EUROTALC - Scientific Association of the European **Talc** Industry
IDPA - International **Diatomite** Producers Association
KPC-Europe - European **Kaolin** & **Plastic Clays** Association

Promote the interests of the European industrial minerals industry in all non commercial issues

Representative membership

In most of its member association (sections)
IMA Europe represents 95-99% of the European producers

28 European Countries
i.e. 23 EU Member States + Croatia,
Norway, Switzerland, Turkey and Ukraine

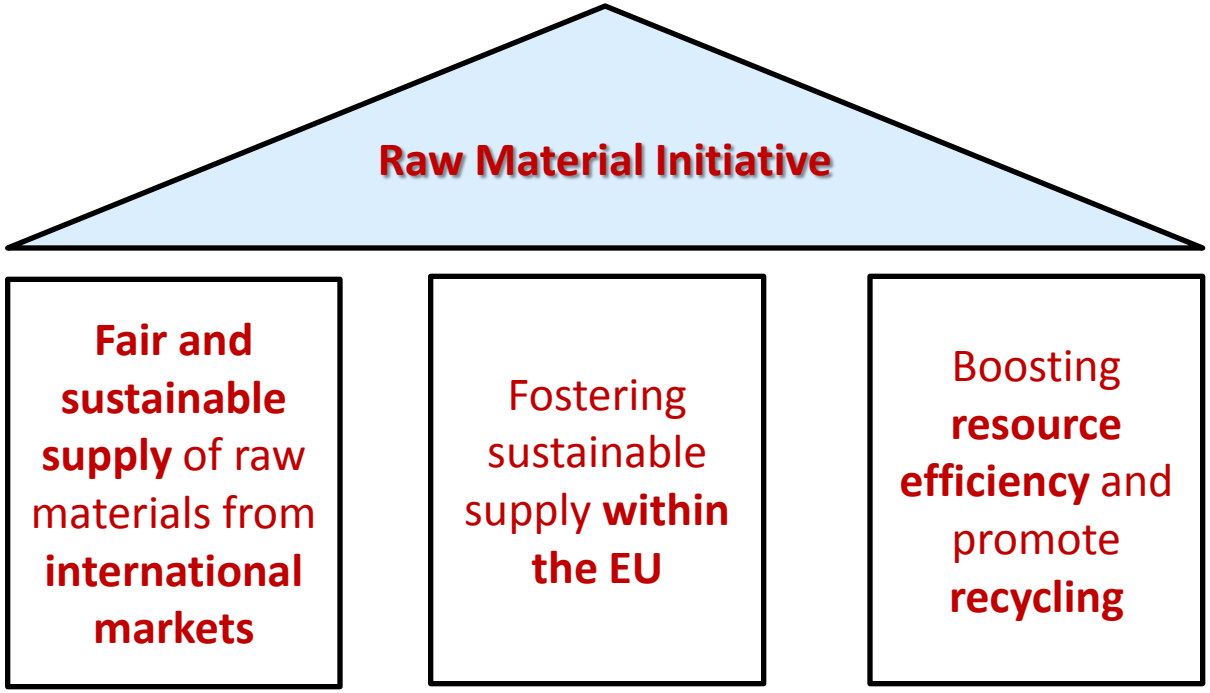
500 companies
(685 mines & quarries, 750 plants)
42,500 employees
180 million tpa,
EUR 10 billion turnover

EU policy context

Europe 2020 Strategy - Flagships Resource Efficiency Europe COM(2010) 2020 (03.03.2010):

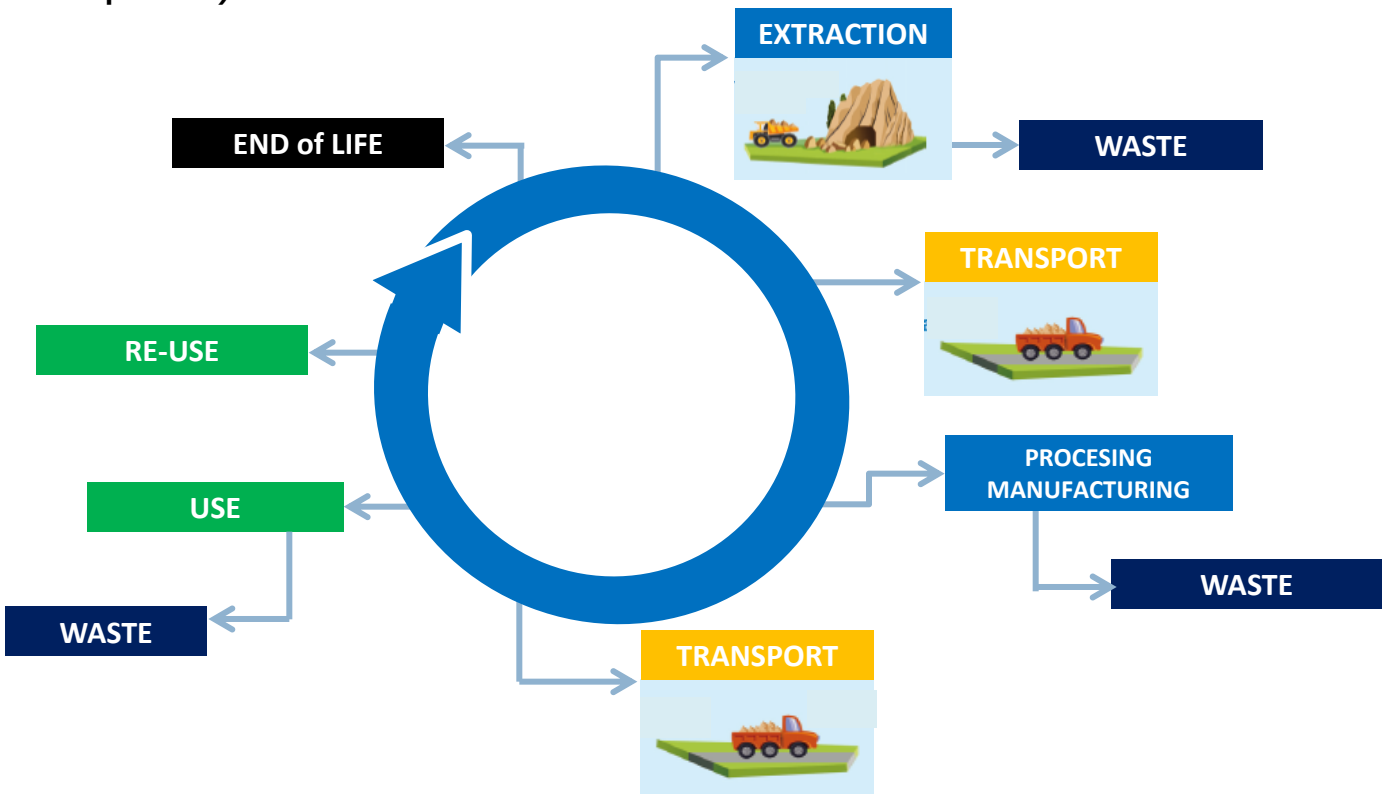
Objective: Resource efficient Europe; Sustainable growth; Greener and more competitive economy; Decoupling; Boost use of renewable energy.

- **A Resource Efficient Europe COM (2011) 21**;
- **Communication on Challenges in Commodity Markets and Raw Materials** (02.02.11);
- **Roadmap for a resource-efficient Europe** (20.09.11);



Life Cycle Assessment (LCA)

Life cycle thinking is an approach which evaluates the **environmental impacts** in a **holistic approach** (the raw material extraction, material processing, transportation, distribution, consumption, reuse/recycling, and disposal).



LCA helps to **identify hot spots** in the life cycle of a product, therefore **driving management decisions** and action to **minimize** the **environmental impact** for **industrial minerals manufacturing**.

Presentation layout

Case study 1: **ExPerl** research and demonstration FP7 Project along the value chain of **Perlite**

Case study 2: **STOICISM** research and demonstration FP7 Project along the value chain of **Diatomaceous earth, perlite and clay**

Case study 3: Reduce energy and improve resource efficiency of **Bentonite**

Case study 4: Recycling of **seven industrial minerals**

ExPerl (1)

➢ IM concerned

Perlite

➢ Scope

Develop sustainable and innovative solutions for the extraction, processing, use and re-use of minerals, **along the entire value chain**;

The development of **micro-sized closed structure perlite** (CSP) and similar micronized perlite based particles

Development of **breakthrough perlite expansion technologies** with special insulating and mechanical properties highly exceeding those of conventional perlite;

Improve functionality of perlite: durability; weight

Lower: Cost

➢ Applications of concern

Construction products (panels, boards and bricks), mortars and functional fillers, **Manufacturing** and **Chemical** industry.

ExPerl (2)

ExPerl Consortium

Leader: **S&B Industrial Minerals**

12 consortium members: Universities; Applied technology; Research institutes; Specialized companies & SME; End user companies (3);

EU coverage: **Five EU countries + Israel**

Budget:

Project Cost: **8.1 Mill EURO**
Project Funding: **5 Mill EURO (FP7)**

Timeline:

Launched: 1.05.2009

Finalized: 30.4.2013

Weblink: http://www.experl.eu/

http://www.experl.eu/

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STOICISM (1)

- **IM concerned:** Diatomaceous earth, perlite and clay
- **Scope**

STOICISM

Sustainable Technologies for Calcined Industrial Minerals in Europe

Develop sustainable and **innovative solutions** for the **extraction, processing**, **use** and reuse of minerals, use of **waste for energy along the entire value chain**.

Reduce the **carbon footprint** of several calcined industrial minerals

Test for the **beneficiation, drying, and calcination** of industrial minerals

Evaluate new technologies for **energy efficiency in processing**

Transfer and/or implement the knowledge acquired to other industrial minerals

Resource efficient: Use less use better

- **Applications of concern**

Paints; Brewery

STOICISM (2)

STOICISM Consortium

Leader: **IMERYS**

17 consortium members: Universities; Applied technology; Research institutes; Specialized companies & SME; End user companies (2); Industry association (1)

EU coverage: **Eight EU countries**

Budget:

Project Cost: **8.6 Mill EURO**
Project Funding: **5.8 Mill EURO (FP7)**

Timeline:

Launched: 1.01.2013

Finalized: 31.12.2016

Weblink: http://www.stoicism.eu

http://www.stoicism.eu

STOICISM

Sustainable Technologies for Calcined Industrial Minerals in Europe

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STOICISM: a FP7 research & innovation project

Major innovative research project (STOICISM) launched under FP7 for the "New environmentally friendly approaches to mineral processing"

In mid 2011, as a response to the shortage of some minerals in global markets and the sky rocketing of commodity prices, the European Seventh Framework Programme for Research (FP7) launched its bids for large projects under the umbrella of Nanosciences,

SEVENTH FRAMEWORK PROGRAMME

Co-funded by the European Union

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IMA Award: S&B industrial minerals

➢ Scope

Natural drying of bentonite in open fields in Milos: Reduce energy consumption; resource efficiency; reduce CO_2

In comparison to industrial drying, the natual /mild drying results in

1. **35% energy savings**,
2. **Reduce CO_2 emissions by 24,000 t/a,**
3. **Resource efficiency since does not destroy the crystalline structure of bentonite and allows blending of variable qualities**

IMA 2012 Award: S&B Minerals

➢ IMA-Europe 2012 Resource Efficiency Award:

Independent Award Jury:

- Prof. Panayotov MEP (European Parliament)
- Prof. Martens (RWTH Aachen - Academia)
- T. Pataridze (IUCN – NGOs & Towns)
- B. Johnson (Parliament Magazine - EU media)

"Simplicity of natural drying of bentonite in S&B project results in significant and measurable results" which assist to meet the sustainable development goals and set the vision for the industry.

➢ Award Ceremony

European Parliament

November 2012

http://conferenceandaward2012.ima-europe.eu/award

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IMA recycling sheets

Scope

Calculate the recycling rate of various industrial minerals via different end use applications.

Industrial Minerals can be and are recycled

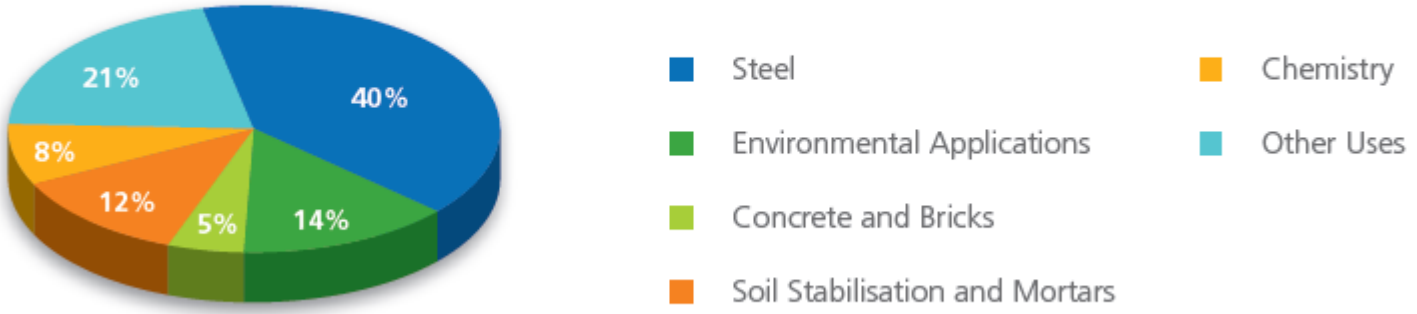
- ✓ **Bentonite (50%);**
- ✓ **Calcium Carbonate (58%);**
- ✓ **Feldspar (67%);**
- ✓ **Kaolin & Clay (49%);**
- ✓ **Lime (68%);**
- ✓ **Silica (73%);**
- ✓ **Talc (60%).**

Weblink:

http://www.ima-europe.eu/sites/ima-europe.eu/files/publications

IMA recycling sheets: Lime

EUROPEAN LIME CONSUMPTION BY MARKET



Lime market by use category [Industry estimate]

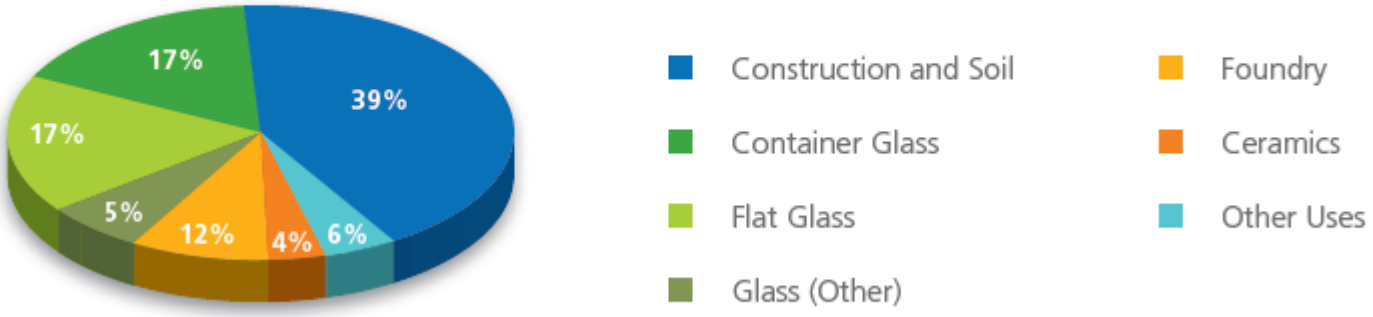
LIME RECYCLING RATE

The overall recyclability rate of lime can be evaluated as follows:

	Lime Markets	Application Recycling Rate	Lime Recycling Rate
Steel	40%	95%	38%
Environmental Applications	14%	90%	13%
Concrete and Bricks	5%	65%	3%
Soil Stabilisation and Mortars	12%	75%	9%
Chemistry	8%	70%	6%
Other Uses	21%		
Total	100%		68%

IMA recycling sheets: Silica

EUROPEAN SILICA CONSUMPTION BY MARKET



Silica market by use category [Industry estimate]

SILICA RECYCLING RATE

The overall recyclability rate of silica can be evaluated as follows:

	Silica Markets	Application Recycling Rate	Silica Recycling Rate
Construction and Soil	39%	85%	33%
Container Glass	17%	75%	13%
Flat Glass	17%	80%	14%
Glass (Other)	5%	25%	1%
Foundry	12%	80%	10%
Ceramics	4%	60%	2%
Other Uses	6%		
Total	100%		73%

Thank you for your attention

Thanks to:
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(IMERYS)

Michalis Stefanakis; Karalis Thanasis
(S&B Industrial Minerals)

Various IMA-Europe sections

Dr. Aurela SHTIZA

Scientific Adviser
Environment & Sustainability
a.shtiza@ima-europe.eu

Questions ?