

STAKEHOLDER CONTRIBUTION TO THE SECTORAL CASE STUDIES FOR THE  
COMMUNICATION ON BY-PRODUCTS AND WASTE – **FINAL-28 SEPTEMBER 2006**

**ORGANISATION:** Eurogypsum

**REPRESENTING:** The Gypsum industry (plaster and plasterboards manufacturers)

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**EXAMPLE OF A BY/PRODUCT: FGD gypsum (flue gas desulphurisation gypsum)**

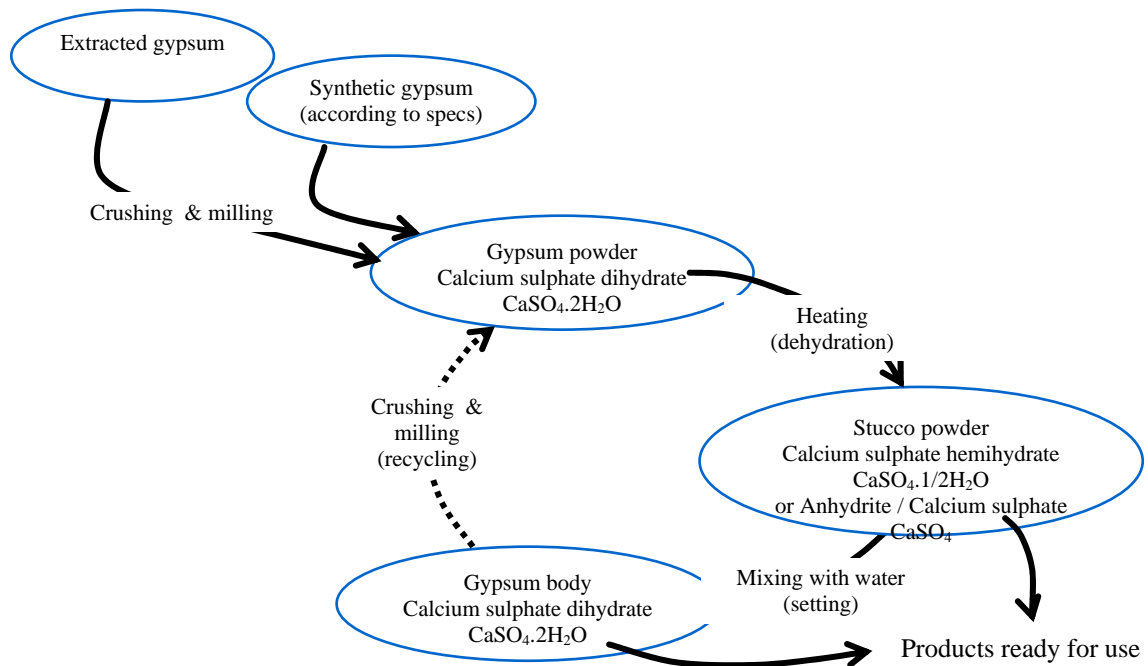
**Attached with this example:**

1. Quality Criteria and Analysis Methods for FGD Gypsum developed together with VGB (European Technical Association for Power and Heat Generation) and ECOBA (European Coal Combustion Products Association)-April 2005;
2. Letter to Marc Patton, OECD, 24 August 1992;
3. Letter from DG Environment - Ludwig Krämer dated 17 November 1999 to Kemira Agro Pernis BV applicable mutatis mutandi to the FGD gypsum
4. The Gypsum Products Development Association ( UK-GPDA) letter to the UK Environment Agency on 27 April 2006 on the classification of FGD gypsum as a by-product (see point C, 2);
5. Response from the UK Environment Agency to GPDA on the classification of FGD gypsum as a by-product on 4 September 2006.

**A. Background: history, process and natural reserves**

Plaster, plaster blocks and plasterboards-main gypsum products- are manufactured using gypsum rocks extracted from the earth crust. Gypsum is one of the oldest raw materials used in the production of building products. It is composed of calcium sulphate (calcium, sulphur, and oxygen) with two molecules of water,  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ . Gypsum is usually white, colourless or gray, but can also be shades of red, brown and yellow. When calcined, it is partially dehydrated and becomes a white fine powder - commonly known as plaster of Paris- which hardens when moistened and allowed to dry. This form is known as natural gypsum. The gypsum process is quite simple: when dihydrated calcium sulphate, also known as crude gypsum, is exposed to certain thermal processes, calcium sulphate phases with little or no water of crystallisation are formed, and these later combine with free water to form again rehydrated set gypsum. These reversible processes, known as dehydration or rehydratation form the basis of gypsum technology.

## Basic Principals of Gypsum Processing



Until the mid 1980s, most of the gypsum used in the EU was natural, i.e., extracted. About 5% of the gypsum production (natural and/or synthetic via FGD gypsum) is used in cement production as a retarding agent.

EU "output of natural gypsum is concentrated in France, Germany, Italy, Spain, and the UK. Rising demand for plasterboard and cement over the last twenty years has led to an increase in Western European natural gypsum production. Production varied between 20.7Mt in 1993 and 25.7Mt in 2001 but remained flat between 1998-2003. One reason for the very low growth in output was that much of the increase in demand for gypsum after 1998 was met by increasing use of synthetic material. Eastern European production of natural gypsum is concentrated in Poland, Russia and the Ukraine. Regional production declined from 4.3Mt in 1993 to less than 3.2Mt in 1998 before recovering to 4.3Mt by 2003.

World reserves of natural gypsum probably exceed trillions of tons, sufficient to meet demand in the immediate future. Identified reserves are capable of sustaining decades of output at current rates of extraction. The rise in consumption of synthetic material in Europe and North America is slowing the rate at which natural gypsum reserves are mined. Limited information is available on the size of gypsum and anhydrite deposits in Brazil, the CIS, India, Poland and the USA<sup>1</sup>.

### **B. FGD Gypsum Economics**

The combustion of sulphurous fossil fuels such as hard coal, lignite (and fuel oil) produces sulphur dioxide ( $\text{SO}_2$ ) which, if it is not removed in a flue gas desulphurisation plant, escapes into the atmosphere with the flue gases. In 1983, the German authorities enacted a law to protect the quality of the air making it compulsory for fossil-fuel power plants to be fitted with flue gas desulphurisation (FGD) facilities. From that year on, a

<sup>1</sup> The Economics of Gypsum and Anhydrite-Roskill Report (2004) pp 13 and 20

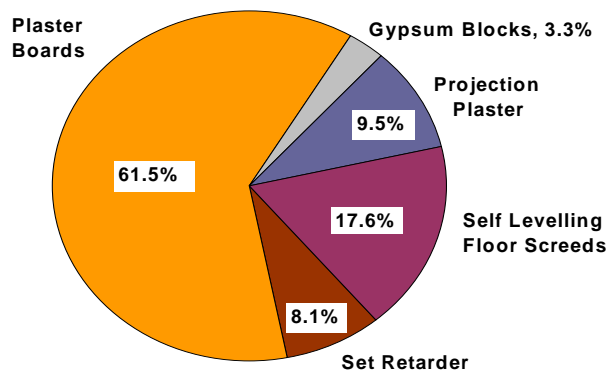
partnership between the Gypsum Industry and the Electricity Industry has been formed to develop the best available techniques to convert the sulphur dioxide present in the flue gases into gypsum (CaSO<sub>4</sub>) via the use of limestone (CaCO<sub>3</sub>). This form is called FGD gypsum. A fruit of this long term collaboration is the published "Eurogypsum quality criteria and analysis methods for FGD gypsum" which clearly classifies FGD gypsum as a by-product. You will find a copy attached in the email that we send with this case study.

For a summarised FGD desulphurisation process, please see attached a simplified desulfurisation process from [www.temple.com](http://www.temple.com).

According to an expert analysis and report<sup>2</sup>, there is no significant difference between natural and FGD gypsum in terms of their chemical composition and trace element content. So natural and FGD gypsum can be used without reservation on health grounds in the manufacture of building materials.

In 1992, the production of FGD gypsum accounted for 3.2 million tonnes, in 1996, 4.9 million tonnes, in 2000: 6.3 million tonnes and in 2003: 15.2million tonnes. We have the following breakdown per country in thousands tonnes as of 2003<sup>3</sup>. The Diagram shows the fields of application of FGD gypsum in the EU 15 countries in 2003<sup>4</sup>.

Austria	70
Belgium	60
Bulgaria	220
Croatia	20
Czech Rep.	1.680
Denmark	280
Finland	75
France	60
Germany	7.500
Hungary	540
Italy	670
Netherlands	315
Poland	1.250
Spain	650
Sweden	15
Turkey	440
United Kingdom	1.330 <sup>3</sup>



FGD gypsum is produced in most Western European countries, but output is concentrated in Germany where around half of the production is located as you can see from the figures mentioned above. The large area of use for FGD gypsum is the production of plasterboards, gypsum blocks and floor screeds.

FGD Gypsum basically changed the scene in the European Gypsum Industry. The

<sup>2</sup> VGB technical Scientific reports: Comparison of Natural Gypsum and FGD Gypsum: studies for a comparative assessment of the health impact of natural gypsum and FGD gypsum from coal-fired power plants with a view to their use in the manufacture of building materials, 1990

<sup>3</sup> Rolf Hüller (2004) – 25 years experience gained in the European Gypsum Industry with the use of FGD gypsum. Eurogypsum XXV Congress

<sup>4</sup> ECOBA (European Coal Combustion Products Association): Statistics on the production and use of Coal Combustion Products (CCPs) in Europe (EU 15) in 2003

<sup>5</sup> Wolfgang vom Berg: Coal Combustion Products in Europe - Valuable Raw Materials for the Construction Industry, ECOBA Conference, Coal Combustion Products in Europe - Sustainable Materials for the Future, June 2005, Brussels

Electricity Industry became an important supplier of raw material and an essential partner in the technological development of the FGD production and establishment of quality criteria for FGD gypsum. Financial investment on both sides has been significant to bring this product -manufactured within the fence of the power plant stations- to its maturity.

In the past, plasterboards production facilities were located close to natural gypsum deposits and the market for building materials. An increasing number of production facilities are now being established across Europe in close proximity of large power plant stations. New gypsum markets also opened up. FGD gypsum can be more easily transported by barges and trains across Europe than natural gypsum. Belgium and the Netherlands, with no natural gypsum deposits, import FGD gypsum by inland waterways from the Coal Power Plant Stations in Germany.

Despite the environmental and health benefits of FGD gypsum production, the current EU and national political debates about sustainable energy ( (Kyoto protocol and the EU commitment to reduction of CO2 emissions); about secure energy supply (with the need to rebalance the energy mix); about the growing need to use alternative energy sources, and the existence of new efficient technologies of power stations- might change the scene for the production of FGD gypsum and also make it difficult for the Gypsum Industry to give a long term reliable prognosis on the sustainable production of future FGD gypsum. According to the Electricity Industry, the production of FGD gypsum is expected to increase in all the European countries<sup>5</sup>.

Because of this uncertainty, the Gypsum Industry keeps in mind that FGD gypsum is not an everlasting raw material source and that furthermore this by-product cannot satisfy all the industry needs. Therefore, it gives priority to ensure access to natural gypsum deposits and to obtaining new mining permits. Today, a reliable use of FGD gypsum is only possible if we can also at the same time secure a reliable supply of natural gypsum.

Long term storage of FGD gypsum need to be organised to ensure the durability of gypsum plants and match the use of the by-production.

### **C. Arguing the legal case of FGD Gypsum**

#### **1. OECD recognition of FGD Gypsum as a product**

Initially, FGD Gypsum was listed on the OECD Green list (waste with no hazardous contamination). However, because FGD Gypsum complies with the provision of the OECD for a product, Eurogypsum asked the OECD to delete FGD gypsum from the Green List, as it is a product and not a waste, and the OECD agreed to Eurogypsum's request (see letter attached to this email).

The reasons advanced were as follows:

- A. FGD gypsum is a product;
- B. FGD Gypsum does fulfil defined quality standards and is a secondary raw material;
- C. FGD Gypsum is especially prepared for specific uses and meets commercial product specifications;
- D. FGD Gypsum is used directly as a raw material, e.g. in the European Gypsum Industry without the necessity for additional treating and converting measures;
- E. FGD Gypsum is used like natural gypsum;
- F. FGD Gypsum is never destined for recovery operations;
- G. FGD Gypsum is not a waste at all within the meaning of the OECD decision (C(2001)107 (final) establishing a number of conditions that apply to the transboundary movements of wastes).

Other inorganic residues, including gypsum or gypsum containing residues

All other inorganic residues from thermal processes including partially refined or waste gypsum are listed in the Green list or in the Amber list (waste contaminated with material, which prevents the recovery in an environmentally sound manner), as follows (July 1993).

**A. Green list**

*PART I – Wastes listed in Annex IX of the Basel Convention*

B2040 partially refined calcium sulphate produced from flue gas desulphurisation (FGD)

Waste gypsum wallboard or plasterboard arising from the demolition of buildings.

B2080- Waste arising from chemical industry processes not included in list A

*PART II- Wastes listed in Council decision C (92)39*

There are no entries in this decision relating to FGD Gypsum

**B. Amber list**

*PART I-Wastes listed in Annexes II and VIII of the Basel Convention*

A2040-Waste gypsum arising from chemical industry processes, when containing Annex I constituents to the extent that it exhibits on Annex III hazardous characteristic.

*PART II: Wastes listed in Council Decision C (92)39*

AB150- unrefined calcium sulphate and calcium sulphate from FGD.

To summarise the effect of the above categories –to the extent that gypsum-related waste are referred to, they are not the refined product and do not qualify as FGD gypsum.

**2. Consideration of ProGips by the European Commission**

Further to a discussion about the classification of ProGips (a brand name for a product from a recovery operation integrated in the phosphoric acid and fertiliser production at the Kemira plant at Pernis (NL)) and whether this was to be treated as a waste, Ludwig Krämer (Head of Unit for the Waste legislation at that time in DG Environment) provided a letter dated 17 November 1999 to Kemira Agro Pernis BV.

Although ProGips is a different product to FGD Gypsum, the principles considered in answering the question of whether this is waste are highly relevant for the consideration of FGD Gypsum.

As mentioned in the letter from the European Commission attached in this email, there has been substantial discussion within the Commission about the definition of waste and certain criteria have been used within the EU and the OECD in deciding whether materials qualify as waste. The criteria include amongst other things:

- The equivalence of the material in question to comparable raw material;
- The possibility of using the material for a certain purpose without the need for further treatment and without environmental pollution exceeding environmental pollution from the equivalent raw material; and

- Whether the materials have an economic value reflecting an existing market demand.

Ludwig Krämer from DG Environment at the European Commission concluded that as the ProGips complied with the technical criteria, and sufficient market demand for this material existed, the European Commission believed that ProGips had to be considered as a product under EC waste management law.

### **3. EINECS Number for FGD Gypsum and REACH**

FGD Gypsum has an EINECS number, namely EINECS 302-652-4 in respect of "residues, calcium sulphate-containing, and flue gas wet desulphurisation neutralisation".

In order for any substance like FGD gypsum to have an EINECS number, it means that it meets one of the following definitions specified in Directive 67/548/EEC:

- a. Substances –"chemicals elements and their compounds as they occur in their natural state or as produced by industry".
- b. Preparations-"mixtures or solutions composed of two or more substances".

The fact that FGD gypsum has an EINECS number means that it was placed on the market for genuine commercial purposes between 1 January 1971 and 18 September 1981 inclusive. The EINECS number indicates that this chemical substance is treated as a product and not as a waste.

As FGD Gypsum has an EINECS number, this will be treated as a phase-in substance for the purposes of the REACH Regulation as agreed by the Competitiveness Council at its meeting on 13 December 2005.

Furthermore, we understand that the Commission, the Council and the European Parliament are discussing a possible exemption from registration under REACH for natural gypsum and whether FGD gypsum should be exempted from the requirements for registration (current thinking is that it should not). Again, the consideration of FGD gypsum in this context indicates that it is being treated as a chemical substance and not as waste.

### **4. Summary**

Eurogypsum considers that FGD Gypsum is a by product -that the power plants do not wish to "discard", within the meaning set out in Article 1(a) of Directive 75/442/EEC- and not a waste of the power plant process as:

- a. the production of FGD gypsum is a technical and commercial choice;
- b. power plants are specifically designed or re-designed, built and operated to produce this product;
- c. it is primarily intended for use by the Gypsum Industry in the production of gypsum-based products;
- d. it meets quality standards and product specifications;
- e. the FGD gypsum supplied to the Gypsum Industry is certain of being used for the production of gypsum-based products;
- f. FGD gypsum is used as a direct substitute for natural gypsum, a material which has been in use in construction for thousands of years;
- g. FGD gypsum is directly used for the production of gypsum-based products, with less further processing than is actually required for natural gypsum;
- h. FGD Gypsum is not classified as waste within the OECD Decision;
- i. FGD gypsum has an EINECS number and is expected to be treated as a phase-in substance under REACH and will be regulated under that legislation.

## E. Analysis of the recent cases of the Court of Justice and application to the case of FGD Gypsum

### a. Have the materials been discarded

#### (i) Palin Granit Oy Case

The ECJ delivered its judgment on Case – 9/00 on 18 April 2002 ("*Palin Grantit Oy and Vehmassalon kansanterveystyön kuntayhtymän halitus*").

In this case the ECJ considered whether leftover stone resulting from stone quarrying, which was stored for an indefinite length of time to await possible use, must be classified as waste if the holder discards or intends to discard that leftover stone.

In considering the question of whether the stone was discarded, the ECJ stated that the Commission considered that the operations of disposal and recovery of a substance or an object, manifest an intention to "discard" it within the meaning of Article 1(a) of Directive 75/442 (paragraph 26 of this case).

In this case, the storage of leftover stone at the place of extraction or at a storage site was held by the ECJ to constitute either a disposal or a recovery operation.

The Palin Granit case details the disposal and recovery operations as set out in Directive 75/442/EEC. In contrast to the position with leftover stone, FGD Gypsum is paid for by the Gypsum Industry and transported from coal fired power stations to gypsum sites for use in the production of gypsum-based products.

### b. Intentional Production of By-Product

#### (i) Mario Antonio Saetti and Andrea Frediani

The ECJ delivered its judgment on Case C-235/02 (*Mario Antonio Saetti and Andrea Frediani*) on 14 January 2004. This case looked at the regulation of the use of petroleum coke in combustion plants. One of the questions for the ECJ was whether petroleum coke fell within the meaning of "waste" as provided in Article 1 of Directive 75/442/EEC.

The ECJ stated that certain circumstances may constitute evidence that the holder has discarded a substance or object, or intends or is required to discard it within the meaning of Article 1(a) of Directive 75/442 (paragraph 34).

The ECJ concluded (at paragraph 35) that one possible analysis which could be accepted is that goods, materials or raw materials resulting from a manufacturing or extraction process which is not primarily intended to produce that item, may be regarded as a by-product<sup>6</sup> rather than a residue. The ECJ reached this conclusion as it said the undertaking did not wish to discard the by-product as waste, but intended to exploit or market it on favourable terms in a subsequent process, without prior processing.

The ECJ referred to paragraphs 34 and 35 of the Palin Granit case mentioned above, which states that such an interpretation is not incompatible with the aims of the Waste Framework Directive, as that Directive is not intended to apply to goods, materials or raw materials which have an economic value as products, regardless of processing, and which as such are subject to the legislation applicable to those products.

As mentioned in above, FGD plants must be appropriately designed, built and operated to produce FGD Gypsum. As a result, it is clear that FGD Gypsum is intended to be produced by this process and is a by-product which the undertaking carrying out that process has no intention of discarding. Furthermore, the generator can be said to intend to exploit or market the FGD Gypsum on terms which are advantageous to it, for use in making gypsum-based products, without prior processing.

As mentioned above, FGD gypsum does not require further treatment or processing before it is used (in the same way as mined gypsum) as part of the process to produce gypsum-based products.

According to the statistics on production and use of CCPs produced by ECOBA (European Coal Combustion Products Association) in 2003, production of FGD gypsum amounted to 11,276 kt and its utilisation to 8,543 kt with a temporary stockpile of 1,581 kt and reclamation, restoration of 1,645 kt. The disposal shown is only 84 kt. It has to be noted that most of the FGD gypsum is stockpiled in Germany. Licensed "depots" were installed nearby newly constructed wallboard production site to serve the plant with raw material when the gypsum producing power plant is shut down.

c. Certainty of Use of FGD Gypsum

(i) Palin Granit Case

In the Palin Granit case mentioned above, the ECJ stated (at paragraph 36) that having regard to the obligation to interpret the concept of waste widely in order to limit its inherent risks and pollution, the conclusion that substances are by-products (set out at paragraph 23) should be confined to situations in which:

- (A) the reuse of the goods, materials or raw materials is not a mere possibility but a certainty; and
- (B) Where the reuse will take place without any further processing and as an integral part of the production process.

The ECJ stated (at paragraph 37) that in such circumstances, the substance in question must no longer be regarded as a burden which its holder seeks to "discard", but as a genuine product.

(ii) Saetti and Frediani Case

In this case already referred to above, the petroleum coke in question was used as the main component in the fuel used to power the integrated combined heat and power station which supplied the refinery's steam and electricity needs. Since the electricity generated was greater than the refinery's consumption, given the

volume of vapour produced at the same time, the surplus was sold to other industries or to an electricity company.

The ECJ stated (at paragraph 44) of this judgment that if these conditions of production and use are established, the classification as waste within the meaning of Article 1(a) of Directive 75/442/EEC can be excluded.

The ECJ based its reasoning on the fact that in the circumstances, petroleum coke could not be classified as a production residue as:

- (A) the production of coke is the result of a technical choice (since petroleum coke is not necessarily produced during refinery operations); and
- (B) The petroleum coke is specifically intended for use as a fuel, whose production costs are probably lower than the costs of other fuels that could be used to generate the steam and electricity which meets the needs of the refinery (paragraph 45).

The ECJ stated (at paragraph 45) that even if the petroleum coke automatically resulted from a technique which at the same time generated other petroleum substances which are the main results sought by the refinery's management, if it is certain that coke production in its entirety will be used, that petroleum coke is a petroleum product, manufactured as such, and not a production residue.

As mentioned above, during the design, build and operation of coal fired power stations, or re-engineering of such plants, they are specifically designed, or re-designed, to include limestone or lime based FGD plant. Therefore, it can be said that a technical choice is made to produce FGD Gypsum.

Furthermore, FGD Gypsum supplied to the Gypsum industry is certain of being used in the production of gypsum-based products as shown in the diagram in point B The FGD Gypsum economics.

On the basis of this reasoning, Eurogypsum has concluded that FGD Gypsum is a product, manufactured as such, and not a production residue or a waste.

**EXAMPLE(S) AND ASSESSMENT OF A WASTE: on site construction waste (plasterboards off cuts) and demolition waste (scraps of plasterboards from demolition sites)**

**Key message**

Eurogypsum considers that the above-mentioned waste should be classified as secondary products after they have been processed. In these circumstances, the construction and demolition materials have been a waste but have ceased to be a waste once they have been recovered. Eurogypsum thinks that the reuse of the C&D materials should be encouraged and that any unnecessary restrictions (regulatory or non-regulatory) on the reuse of the C&D materials should be avoided.

## **A. Background**

The product of the future will:

- be manufactured using by-products and recycled materials;
- be manufactured with minimal harmful emissions;
- have recycled packaging, or better still, no packaging;
- be effective in use;
- have a longer life;
- be recycled at the end of its life.

Plasterboard is potentially a fully sustainable product and typically answering all these points:

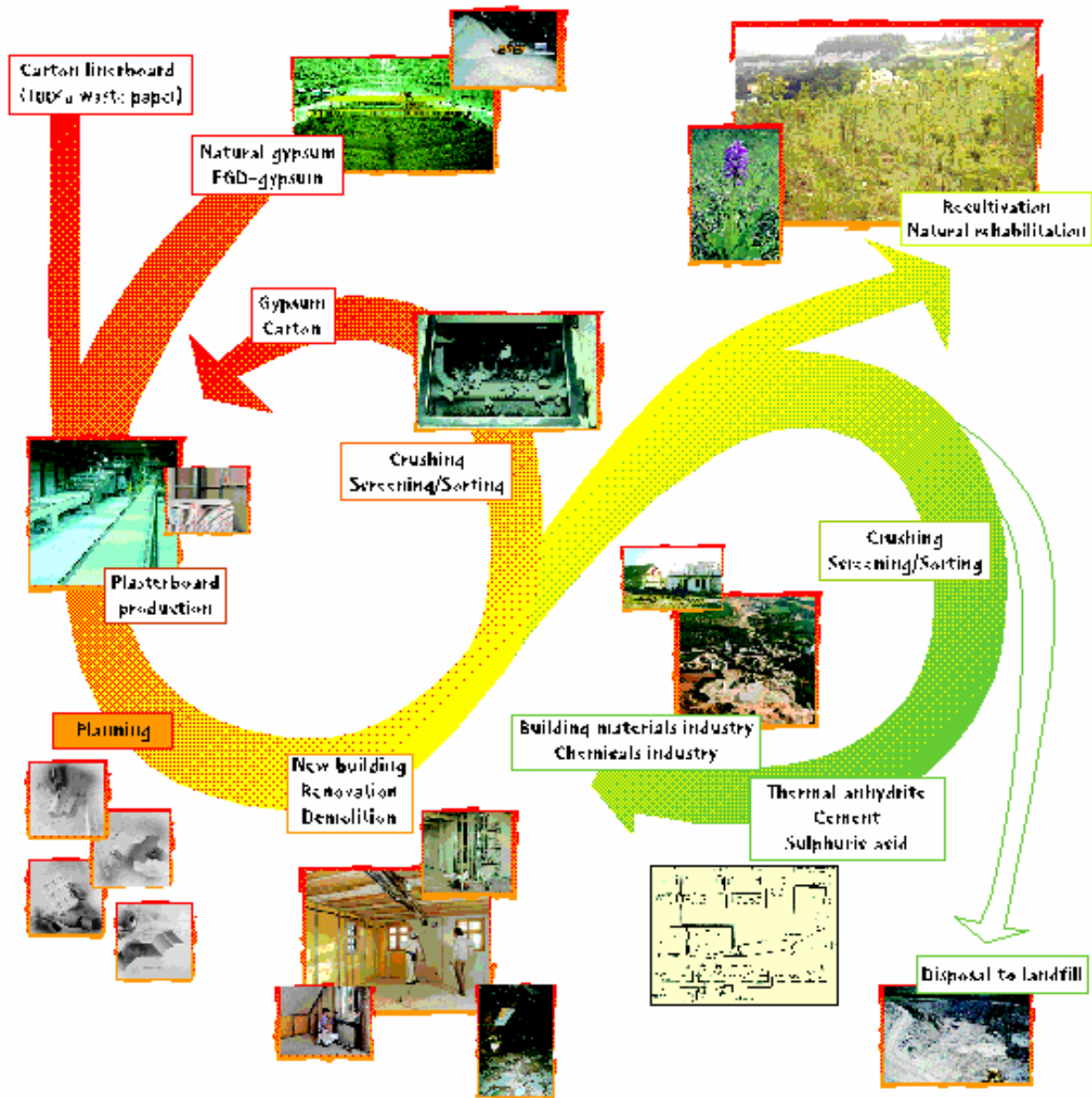
- It can be produced from nearly 100% recycled materials;
- It has low emissions in production;
- It uses little packaging;
- It is an integral part of systems which help reduce emissions from buildings;
- It is used for renovating buildings and therefore helps to extend the life of the building;
- At the end of its life, it can be virtually 100% "closed-loop" recycled into plasterboard.

***The Gypsum Industry has as an objective the recycling of C+D waste gypsum products.***

In fact, gypsum products can be counted among the very few construction materials where **"closed loop" recycling** is possible, i.e. where the waste is used to make the same product again and not merely recovered for use in other "down cycling" applications as is the case with some other construction materials, e.g. waste concrete and bricks used for aggregates in road construction. Gypsum as such is 100% and eternally recyclable. You can always reuse gypsum as the chemical composition of the raw material in the plasterboards and in the rocks always remains the same. The reprocessed gypsum powder obtained in the recycling companies makes up approximately 94% of the gypsum construction and demolition waste. This reprocessed gypsum is sent back to the plasterboards manufacturers for producing new plasterboards. The paper used in the production of plasterboard -which is already recycled paper-, with related contaminants, can be reused in various ways, among others, for composting, heat generation, building materials etc. This material constitutes approximately 6% of the gypsum waste.

# Closed-loop economic cycle of gypsum products

Example: **plasterboard**



Source: [www.gypsum.org](http://www.gypsum.org)  
 Copyright © 2007 by the  
 Gypsum Institute  
 1000 North 17th Street  
 Arlington, VA 22209

## **B. Issues**

The objective to recycle gypsum is not as straightforward as the decision facing other construction products. There are technical obstacles that limit the proportion of waste to raw gypsum that can be used in the manufacturing process. There is also an environmental penalty to pay as recycling gypsum waste is more energy intensive than using raw gypsum, because of the need to collect and transport the material, sort and purify it and remove the moisture content, which is the most energy intensive part of the manufacturing process.

Technically, it is possible to recycle unused construction plasterboards or gypsum blocks at manufacturing plants, if it is not contaminated with other products. The gypsum industry is keen to fulfil this potential. The costs involved in the transport of this waste from construction sites to gypsum plants can be high, such that users are rarely willing to participate in recycling schemes. However, a successful scheme to recover and recycle 'construction' gypsum waste has been introduced in the Netherlands and in Denmark. The majority of European plasterboards plants have recycling facilities.

Demolition waste is a bigger problem with additional contamination to remove (paper, paint, screws, wood, etc.). Over the next 20-30 years the economics for demolition waste is expected to change as the quantities begin to increase substantially, due to the strong increase in the use of plasterboards in construction which began in Europe in the 1960 and 1970s. Renovation and demolition work will see increasing volumes of gypsum waste. The increasing use of dismantling or deconstruction techniques will increasingly make possible demolition collection and recycling.

The two main recyclers operating in Europe since 2000 is **Gypsum Recycling International (GRI)** <http://www.gypsumrecycling.biz>, subsidiary of NKR demolition Group, the largest demolition company in Scandinavia and **New West Gypsum Recycling Inc**, <http://www.nwgypsum.com/>, a Canadian Company.

## **C. Gypsum Waste Products in the European Waste Catalogue**

In the last revision of the European Waste Catalogue, the European Commission created the specific heading 17.08 for gypsum-based C&D waste management.

Waste code 17.08.02 classifies non-hazardous gypsum construction and demolition wastes such as plaster, plasterboard and floor screed.

The main reason for creating this separate category was to improve recycling opportunities for the overall mineral C&D waste stream.

## **D. Gypsum Waste Products and the Landfill Directive**

On 19 December 2002, the Council took a decision establishing criteria and procedures for the acceptance of waste at landfills with the following paragraph for gypsum products waste:

### Paragraph 2.2.3

"Non-hazardous gypsum-based materials should be disposed of only in landfills for non-hazardous waste in cells where no biodegradable waste is accepted. The limit values for total organic carbon and dissolved organic carbon given in sections 2.3.2 and 2.3.1 shall apply to wastes land filled together with gypsum-based materials".

The principal reason for excluding gypsum waste products from the list of waste acceptable at landfills for inert waste without testing is the inclusion of the parameter "sulphate" which is inherent to all gypsum products. The sulphate content of gypsum

mixed with biodegradable waste in a landfill may break down, amongst other substances, into hydrogen sulphide (H<sub>2</sub>S), dangerous gas that in high concentrations is lethal and in low concentration gives a rotten egg smell.

Consequences of this decision

- Plasterboard and blocks need to be removed from demolition waste destined for disposal in inert landfills;
- Greater risk of hydrogen sulphide gas unless the dedicated cell is protected from water intrusion;
- Municipal waste landfill charges are considerably higher than inert landfill;
- Dedicated cell costs can be considerably higher than those for normal land filling.

The Decision took effect on 16/07/04 and Member States had to apply it by 16/07/05.

### **E. Looking towards a sustainable future**

The economics of gypsum waste products recycling will critically change in the near future, due to scarcity of landfills able to receive non-inert waste and to much higher landfill costs and taxes. The demand for more environmentally-friendly products is also increasing, both from government side and customer's side who are demanding that a waste solution for the construction off-cuts be provided and that this solution does not mean landfill.

So, the pressure is on and the Gypsum Industry needs to be able to provide a response by increasing the C&D waste being recycled.

For being successful in recycling C&D gypsum waste, we need the involvement of several actors:

- Contractor and sub-contractor: for careful deconstruction and sorting
- Collector: for effective logistics
- Recycler: for a separation of paper liner and gypsum core, allowing a high recycling ratio
- Plasterboard producer: for reintroduction of gypsum waste into the process

To achieve a high rate of recycling, the Gypsum Industry needs in practice to combine its expertise in plasterboard production with third-party expertise in sorting, collecting and recycling gypsum waste.

### **F. The Danish and the Irish Recycling Plasterboard Programme**

This programme started in fall 2001 and consisted in collected plasterboard scraps at collection points. Today, 500 collection points are serviced all over the country using two grable trucks. 90% of all public waste cycling stations and civic amenity sites are now covered by the collection system and have containers. The coverage is still increasing.

This waste is recycled before being to the production facilities of plasterboard manufacturers.

A similar programme was set up in Dublin in spring 2005. The system has been inspected by the Irish Minister of the Environment with great satisfaction. Most customers are from the greater Dublin area, but everyday the coverage of the system is expanded to other areas.