



GYPSUM TO GYPSUM



## GtoG Project

From production to recycling: a circular economy for the  
European gypsum Industry with the demolition and  
recycling Industry

LIFE PROGRAMME  
LIFE11 ENV/BE/001039

**DA2 Inventory of best practices**

**EXECUTIVE SUMMARY**

**DECEMBER 2015**

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## Introduction

The GtoG project, running from January 2013 to December 2015, has meant a European collaborative approach for upgrading the gypsum value chain towards a circular economy around gypsum.

The present report is meant to provide the most appropriate best practices for the value chain operators, with the aim of increasing gypsum recycling rates and producing quality recycled gypsum.

To achieve the main objective of the study, i.e. to identify the most appropriate best practices for the gypsum value chain, key performance indicators (KPIs) were firstly developed and applied in 5 EU pilot projects located in Belgium, France, Germany and the United Kingdom. Only KPIs specifically aiming to recognize and encourage best practices were selected as best practice indicators (BPIs). On this basis, practices addressing BPI's compliance were drafted.

In this report, the concept of good practice is applied to actions leading to optimize closed-loop recycling. Among them, best practices are identified from an EU consultation mainly targeting construction companies, waste collectors, gypsum recyclers and gypsum products manufacturers.

## Methodology

On the basis of previous BPIs developments (DC1 Report on best practice indicators for deconstruction, recycling and reincorporation), the process of identifying good practices involved data gained from desk research, field visits and expert meetings (Figure 1). In this regard, the desk research focused on compiling previous studies on good measures concerning waste management, recycling and secondary materials quality criteria. The site visits and

expert meetings helped to verify the current practices as well as the interests and concerns of the operators of the value chain. A total of 23 good practices are identified, 11 practices concerning construction/deconstruction, 11 related to recycling and manufacturing issues and 1 common to both processes.

In order to rank good practices, to select best practices and to study the relevance given by agents, an online survey questionnaire was conducted at European scale, mainly targeting construction, deconstruction and demolition companies, gypsum recyclers, gypsum products manufacturers as well as researchers.

The 17 most valued practices recognised by agents in recycling countries are considered as best practices, which are the most leading approaches for the achievement of an improved value chain.

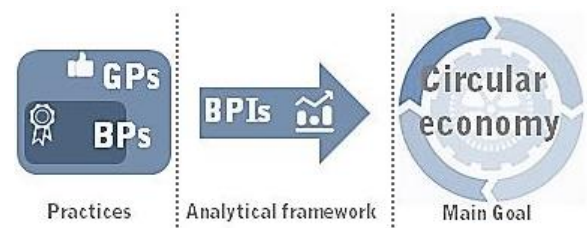


Figure 1. Interdependence among good practices (GPs), best practices (BPs) and BPIs (best practice indicators)

## Results

Practices promoting closed-loop recycling and quality recycled gypsum are outlined through factsheets (Figure 2) with a layout divided into three main sections:

- An introductory part contains a general explanatory description, concisely emphasizing key points, advantages or drawbacks of their performance.
- Main body highlighting extra relevant information, casing of: technical data, statistics, GtoG project results.
- Bottom section presenting results from the questionnaire survey.

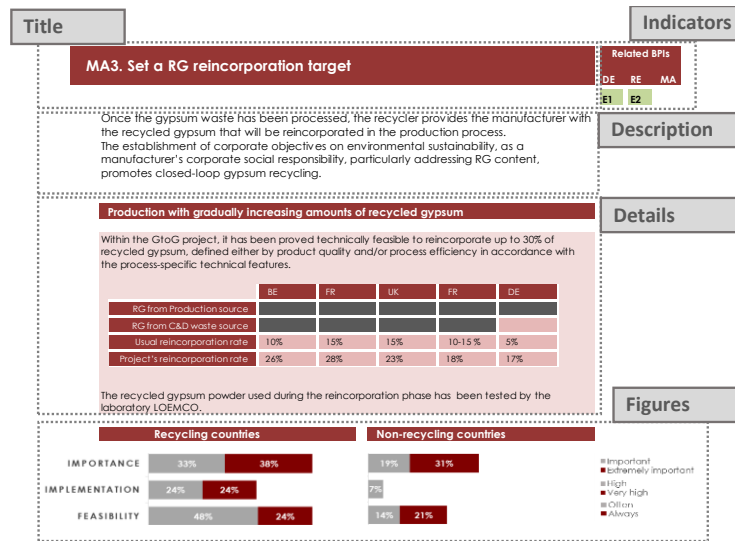


Figure 2. Datasheet layout

Good practices are ranked in order of importance concerning their relevance for closing the loop of gypsum products and per stage, as listed hereunder (Tables 1 and 2). Selected best practices out of the total good practices are highlighted in green.

No.	Best practice	Rank
DE7	Perform an on-site segregation of recyclable (e.g. plasterboard, blocks) gypsum waste	1
DE2	Appointment of a responsible for the follow-up of the waste management	2
DE3	Implement an effective pre-deconstruction audit for gypsum-based systems	3
DE5	Train workers concerning gypsum products dismantling, as well as sorting and storing of GW	4
DE1	Plan coordination and review meetings about C&D waste	5
DE11	Perform gypsum waste traceability, from source to final destination	6
DE4	Draft and implement a precise Site waste management plan (SWMP)	7
DE9	Plan number and size of containers needed	8
DE10	Minimize number of roundtrips (from building site to transfer station/recycling)	9
DE8	Effective planning of gypsum waste capture systems (from source to on-site storage)	10
GE2	Availability of suitable closed-top skips	11
DE6	Appointment of trained workers in gypsum products dismantling, sorting and storing of GW	12

Table 1. Good and best practices for deconstruction

No.	Best practice	Rank
RE4	Set clear Waste Acceptance Criteria (WAC)	1
RE5	Perform effective sorting operations prior to gypsum recycling	2
RE2	Have an adequate warehouse for gypsum waste and recycled gypsum storage	3
MA1	Agree clear recycled gypsum quality criteria	4
RE1	Recycling plant or warehouse strategically located	5
RE3	Operate a Quality Management System (QMS)	6
RE7	Agree suitable supply contracts between recyclers and manufacturers	7
MA3	Set a recycled gypsum reincorporation target	8
RE6	Prepare a schedule of sampling and test frequencies for each quality criteria parameter	9
MA2	Promote plasterboard take-back schemes	10
GE1	Address the End-of-Waste (EoW) status	11
GE2	Availability of suitable closed-top skips	12

Table 2. Good and best practices for recycling and manufacturing

## Conclusions

Currently, in the EU-28, a market for recycled gypsum only exists in France, Benelux, Finland, the UK, Denmark and Sweden. The European Life+ GtoG Project ENV/BE/001039: “From Production to Recycling, a Circular Economy for the European Gypsum Industry with the Demolition and Recycling Industry” has laid the foundations to transform markets for recycled gypsum in order to achieve higher recycling rates, thereby helping to contribute to an effective resource efficient economy. Large amounts of recyclable gypsum waste (i.e. mainly plasterboard and gypsum blocks) can be recovered from the existing building stock and follow the recycling route. By choosing better practices that promote gypsum recycling instead of landfilling, natural resource depletion is minimized, H<sub>2</sub>S, CO<sub>2</sub> and CH<sub>4</sub> emissions from landfill disposal are avoided and landscape preservation is promoted.

The present report presents 23 good practices focused on optimal gypsum waste management and the use of recycled gypsum in new gypsum products, assessed by their importance on closing the loop of gypsum products, implementation and feasibility. Among them, the 17 most valued practices recognised by agents in recycling countries are considered as best practices, which are the most leading approaches for the achievement of an improved value chain. The identified best practices address the entire gypsum value chain (i.e. deconstruction, recycling and reincorporation), being focused on the end-of-life (EoL) of gypsum products (i.e. deconstruction, transport to recycling, recycling), due to the importance of the EoL stage on closing the materials cycles. Recommended best practices are listed below by influence order and per stage of the value chain.

During the deconstruction process:

- Perform an on-site segregation of recyclable (e.g. plasterboard, blocks) gypsum waste
- Appointment of a responsible for the follow-up of the waste management

- Implement an effective pre-deconstruction audit for gypsum-based systems
- Train workers concerning gypsum products dismantling, as well as sorting and storing of gypsum waste
- Plan coordination and review meetings about C&D waste
- Perform gypsum waste traceability, from source to final destination
- Draft a precise Site waste management plan (SWMP) and implement it
- Plan number and size of containers needed
- Minimize number of roundtrips (from building site to transfer station/recycling)

During the recycling and manufacturing processes:

- Set clear Waste Acceptance Criteria (WAC)
- Perform effective sorting operations prior to gypsum recycling
- Have an adequate warehouse for gypsum waste and recycled gypsum storage
- Agree clear recycled gypsum quality criteria
- Recycling plant or warehouse strategically located
- Operate a Quality Management System (QMS)
- Agree suitable supply contracts between recyclers and manufacturers
- Set a recycled gypsum reincorporation target