

Plasterboard Sustainability Action Plan

October 2010



A contribution to delivering the targets in the joint Government and industry Strategy for Sustainable Construction.

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*

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¹ For more information, please visit the Plasterboard Sustainability Partnership website at: www.plasterboardpartnership.org

Foreword



The plasterboard industry has shown a great willingness over the last few years to develop voluntary commitments to reduce the impact of plasterboard manufacturing and waste. As a widely used construction product, it is crucial to build upon these successes and further improve the sustainability of this product throughout its life-cycle and supply chain.

Sustained collaboration across the plasterboard industry, with Government, has led to this robust Action Plan to further improve the social and environmental impacts of plasterboard, with the establishment of the Plasterboard Sustainability Partnership providing a strong and co-ordinated means of implementation. Many improvement measures have been agreed, ranging from safer handling of plasterboards to reducing waste through design and training of specialist contractors.

This Action Plan will help us achieve the overarching objective of leading the world in sustainable construction, production and consumption, as stated in the joint industry and Government Strategy for Sustainable Construction.

Many of the actions are already underway; demonstrating a strong commitment across the Plasterboard Sustainability Partnership to ensure the Action Plan is delivered. I look forward to seeing significant progress, catalysed through this Action Plan, and the Plasterboard Sustainability Partnership over the coming years.

A handwritten signature in dark ink, appearing to read 'Henley', written in a cursive style.

Lord Henley
(Parliamentary Under-Secretary)

EXECUTIVE SUMMARY

This Plasterboard Sustainability Action Plan is one of a number of key initiatives developed by the Plasterboard Sustainability Partnership (PSP). The PSP is a body made up of industry stakeholders and Government. It has developed into a body for dialogue on plasterboard issues, as it was recognised that industry or Government alone cannot solve the key environmental imperatives. It forms a contribution to delivering the targets identified in the joint Government and industry Strategy for Sustainable Construction, launched in July 2008. Product Roadmaps were also identified as an action within the Waste Strategy for England 2007.

Plasterboard was chosen for a Roadmap because it is a widely used construction product that has environmental impacts, but with a positive contribution to the built environment and the build process. The plasterboard industry has also shown a willingness to engage fully in the Roadmap process. The industry has a record of sustainability improvement, and is keen to embed further improvement within the context of an agreed Action Plan, across the plasterboard supply chain.

Prior to the development of this Action Plan, a comprehensive Evidence Study relating to the sustainability of plasterboard was produced by the PSP. The study report contained a number of recommendations for possible future activity, which were discussed in more detail within the PSP. Consequently, they have been refined, and form the basis for setting out this agreed Action Plan.

The Evidence Study report captured the wealth of initiatives already underway to improve the sustainability of plasterboard. Many of these will continue to grow in impact and range, so it is important to build upon these existing activities wherever possible, and only establish new responsible actions where there is an obvious gap.

To achieve the actions set out in this Action Plan, it is necessary to have engagement across the plasterboard supply chain. This has been described and cross referenced to the membership of the PSP to highlight the need for interaction and consensus in identifying and implementing key actions. This supply chain approach also needs to be set against the necessity to identify key PSP members to take forward each action, to avoid duplication of effort, along with support that may be required outside the PSP group.

Broad objectives house the specific actions within this Action Plan. These are: *Efficient Manufacturing*; *Safer Handling*; *Towards Zero Waste to Landfill*; *Making the Most of Materials* and *Partnering on Sustainability*.

Efficient Manufacturing centres on the activities underway by individual manufacturers to reduce energy consumption in the manufacturing process, a key life-cycle impact. Other measures relate to reduced transport impacts, incorporation of recycled content and development of new products to improve operational performance, such as reduced heat loss, or lower installation waste. There are also actions that cut across all manufacturers, such as reducing carbon intensity through abatement and participation in the EU Emissions Trading System (formerly referred to as the EU Emissions Trading Scheme).

Safer Handling mainly refers to the management of risk of injury from the storage, moving and handling of plasterboard. The Health and Safety Executive has established the Plasterboard Health & Safety Stakeholders Forum to carry this work forward. This forum seeks to manage risk, particularly of musculoskeletal injury to the back, arising from unsafe practices such as the manual handling of heavy sheets up stairs or within awkward

spaces. One key output has been the agreement of major manufacturers within the United Kingdom and Eire to print a safety logo and information on weight on each sheet of plasterboard.

Towards Zero Waste to Landfill is a very active area already, with two existing voluntary agreements and a further two underway to divert plasterboard waste from landfill and reduce waste arisings. Accompanying these existing strategies are a range of new actions developed by the PSP to help towards the ultimate goal of sending no waste to landfill. These cover issues such as providing small scale recycling provision for small and medium-sized enterprises and developing systems to recycle and recover those materials less easily recycled, such as demolition waste, especially thermal laminated boards.

Making the Most of Materials focuses more on the activities to prevent waste occurring in the first place. This is the best environmental option for reducing the impacts and costs of waste. Designers have a fundamental role to play in designing buildings that are inherently less wasteful to construct, and easier to deconstruct, to promote the recycling of demolition materials in the future. When coupled with the actions of specialist contractors and improved site practices, a halving of plasterboard waste, compared to typical levels, becomes eminently achievable.

Finally, it largely comes down to *Partnering on Sustainability*. The PSP has shown how a group representative of the plasterboard supply chain can achieve much more in a quicker timeframe than trying to influence improvements through a silo approach. It is also hoped that this group will be able to focus on improving the logistics of product and material transport to further reduce those impacts. In time, it could also be appropriate to house many of the actions within a Responsible Sourcing Scheme for Plasterboard.

Progress on this Action Plan will be within the remit of the PSP. The PSP will be working towards meeting the targets and actions detailed in the last chapter.

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I. Introduction

This Plasterboard Sustainability Action Plan is one of a number of key initiatives by the Plasterboard Sustainability Partnership (PSP). The PSP is a body made up of industry stakeholders and Government. It has developed into a body for dialogue on plasterboard issues, as it was recognised that industry or Government alone cannot solve the key environmental imperatives. Together they can develop a vision of the future and, based on aspiration and evidence, develop and agree practical actions to help transform plasterboard and its use towards a more sustainable future.

Defra's Sustainable Consumption and Production (SCP) division launched ten Product Roadmaps in 2008. Evidence shows that certain product groupings generate most of the overall impacts on the environment at both a domestic and international level.² In this study, housing, including buildings, construction and appliances were found to generate between 20-35% of overall impacts. The ten selected products were drawn from the product groupings shown to have significant environmental impacts (including food and drink, passenger transport, clothing and textiles). The roadmaps sought to capture evidence on the impacts of each product across their life-cycle, highlight existing initiatives, good practice and gaps.

Plasterboard was chosen for a Roadmap because it is a widely used construction product that has environmental impacts, but with a positive contribution to the built environment and the build process. The plasterboard industry had demonstrated a willingness to engage fully in the Roadmap process. The industry has a record of sustainability improvement, and is keen to embed further improvement within the context of an agreed Action Plan, across the plasterboard supply chain.

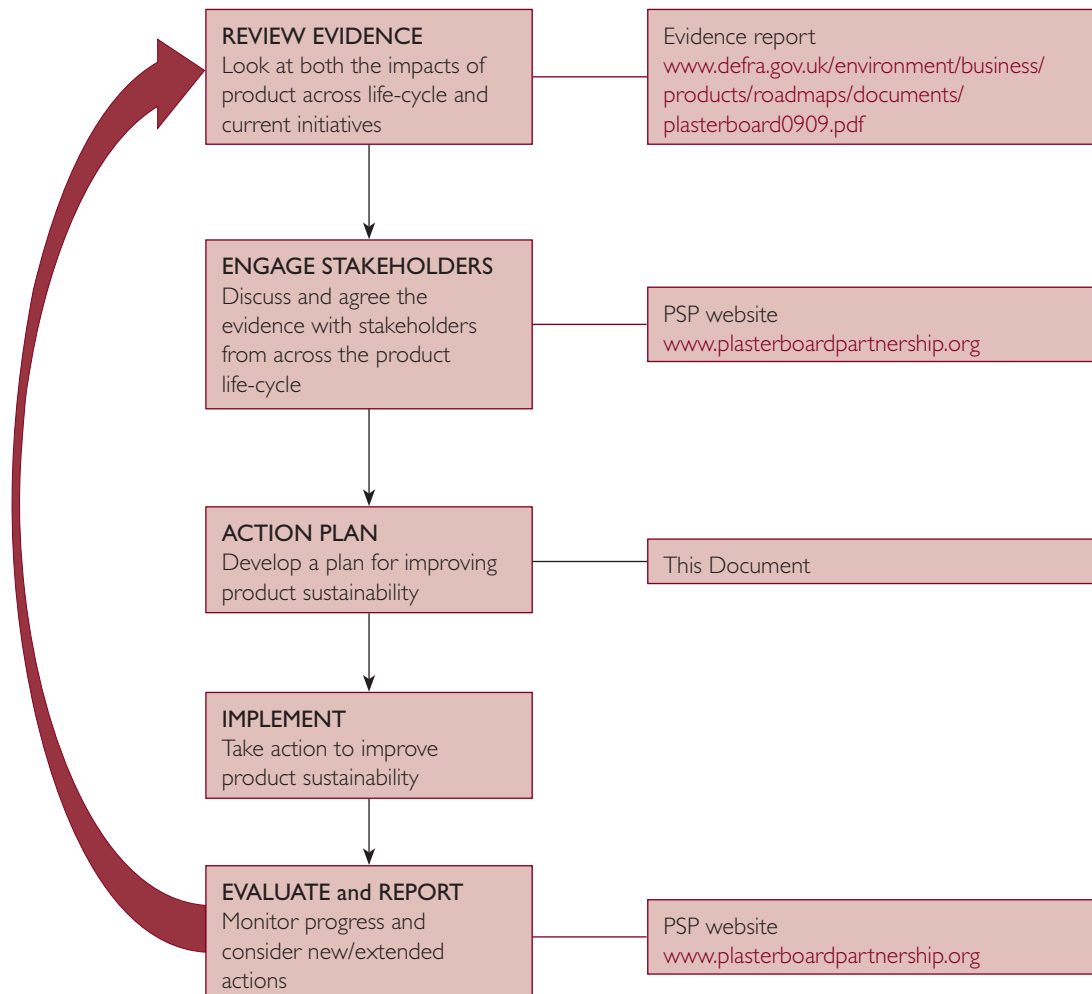
Prior to the development of this Action Plan, a comprehensive Evidence Study relating to the sustainability of plasterboard was produced by the PSP.³ This Evidence Study brought together information from a number of sources to seek to set out the key sustainability benefits and impacts of plasterboard. The environmental, social and economic impacts were compared to existing industry initiatives and Government policy to identify areas where there was scope for potential improvement. The study report contained a number of recommendations for possible future activity, which were discussed in more detail within the PSP. Consequently, they have been refined, and form the basis for setting out this agreed Action Plan.

The final stages of the Plasterboard Roadmap will be to implement and evaluate the Action Plan, as illustrated in Figure 1. The evaluation will consider progress against the actions in this document, and the possible development of new or extended actions to further improve the sustainability of plasterboard. This in turn should lead to updating of the evidence base and a process of continuous improvement through the PSP.

2 The EU-25 study, 'The Environmental Impact of Products' (EIPRO). In this study, buildings, construction and appliances are said to account for 20-35% of all environmental impacts.

3 Plasterboard Sustainability Impacts and Initiatives. September 2009.
www.defra.gov.uk/environment/business/products/roadmaps/documents/plasterboard0909.pdf

Figure 1: Roadmap stages



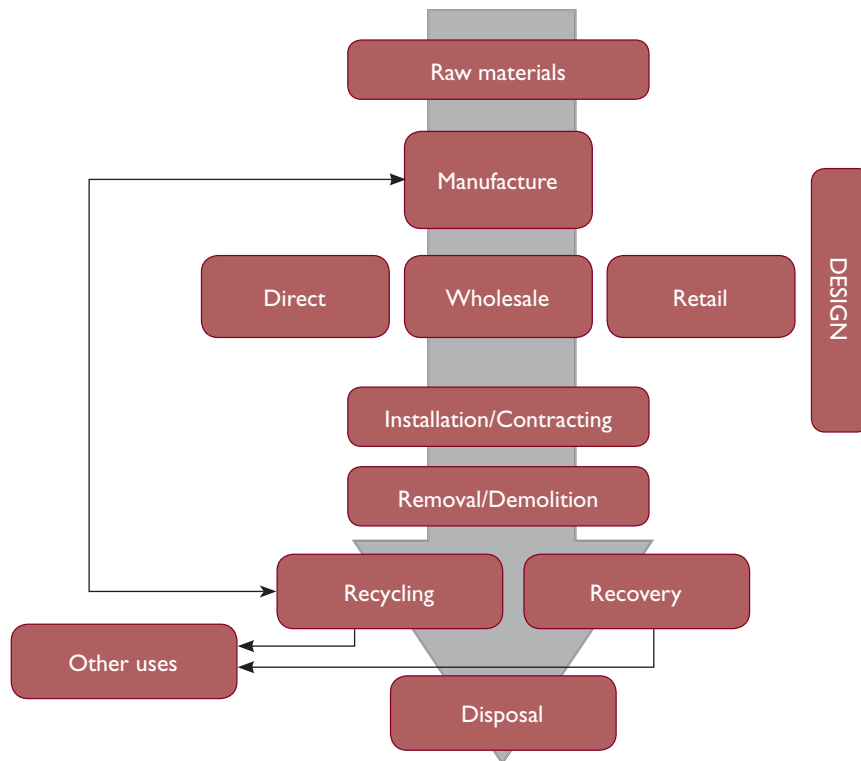
The Product Action Plan is just one of potentially many issues that the PSP will discuss in regular meetings into the future. As such, the PSP is a template for future cooperation between industry and Government.

2. Plasterboard Supply Chain

Plasterboard is a widely used construction product owing to its ease of build, low flammability, acoustic and other qualities. Every year, approx 270 million m² of product are produced, distributed and used in the UK.⁴ End-of-life plasterboard waste is generated as buildings containing plasterboard get refurbished or demolished.

The plasterboard supply chain is illustrated in Figure 2.

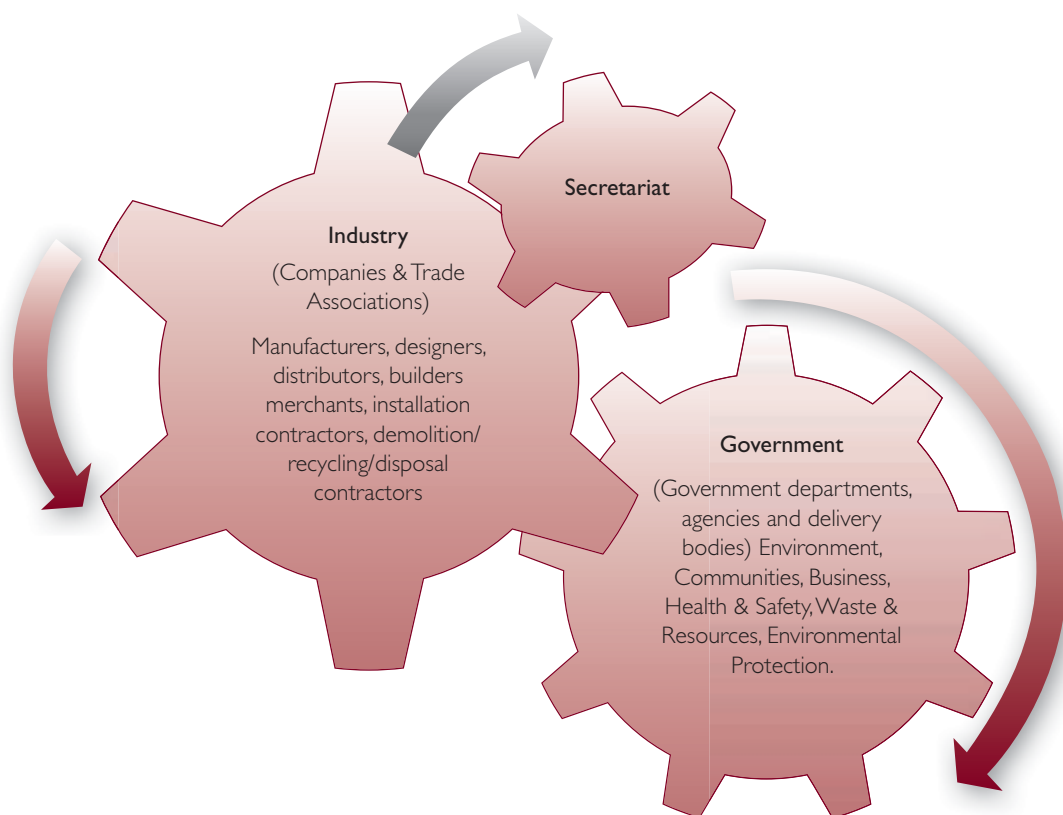
Figure 2: Simplified windows supply chain



Everyone in this supply chain can directly or indirectly influence the sustainability of plasterboard. Therefore, the PSP industry stakeholders are representative of this supply chain. There are also a number of Government agencies and delivery bodies with key responsibilities in specific areas of impact and improvement. Successful implementation of many of the actions requires a partnership approach across elements of the supply chain, with support from the relevant Government department or agency. Accordingly, the PSP membership can be broadly split into *Government* (including agencies and delivery bodies) and *industry*, as illustrated in Figure 3.

⁴ Plasterboard Sustainability Impacts and Initiatives. September 2009.
www.defra.gov.uk/environment/business/products/roadmaps/documents/plasterboard0909.pdf

Figure 3: Composition of the PSP (Plasterboard Sustainability Partnership)



The PSP is currently chaired by the Construction Products Association and at present, secretariat is provided by BRE (Building Research Establishment). It is planned to rotate the chair between industry and Government representatives every year. The PSP constitution is presented in Chapter 10.

The Government departments, agencies and delivery bodies that have a policy interest in the sustainability of plasterboard include Defra (Department for Environment, Food and Rural Affairs), BIS (Business, Innovation and Skills), CLG (Communities and Local Government), DECC (Department of Energy and Climate Change), the Health and Safety Executive (HSE), the Environment Agency (EA), and WRAP (Waste & Resources Action Programme).

Raw materials and manufacturing – there are three manufacturers in the UK: British Gypsum, Knauf Drywall and Lafarge Plasterboard. The trade associations that represent manufacturers are the GPDA (Gypsum Products Development Association) in the UK, and its sister organisation in Europe, Eurogypsum. Manufacturers potentially have the greatest ability to influence plasterboard sustainability since the greatest proportion of environmental impact is linked to the raw materials used and the manufacturing process. These impacts are summarised in Section 6 of the Plasterboard Evidence Study, along with existing initiatives to reduce impacts and improve sustainability.

There are several forms of distribution:

- Direct distribution (DIRECT)
- Distribution via builders merchants (WHOLESALE)
- Distribution via DIY retail chain (RETAIL)

The ability to influence and implement improvements is, to a certain extent, dependent on the type of distribution. The impacts of distribution are summarised in Section 7 of the Plasterboard Evidence Study along with existing initiatives to reduce impacts and improve sustainability. Representation on the PSP includes the Builders Merchants Federation (BMF), and Jewson (part of Saint Gobain Building Distribution).

Installation of plasterboard is undertaken by either specialist contractors, part of general contracting and small house builders. The impacts of installation are summarised in Chapter 8 of the Plasterboard Evidence Study along with existing initiatives to reduce impacts and improve sustainability. Specialist contractors are represented by the Association of Interior Specialists (AIS) and the Federation of Plastering and Drywall Contractors (FPDC), with general contracting represented by the UK Contractor Group (UKCG) within the PSP. It is also important to consider the influence of design details of the building in which the plasterboard is being installed, at this point in the supply chain. Along with input from specialist contractors such as those represented by FPDC and AIS, the membership of the PSP should be expanded shortly to include representation from small to medium sized contractors, for example the Federation of Master Builders (FMB); and building designers, for example the Royal Institute of British Architects (RIBA) or the Chartered Institute of Architectural Technologists (CIAT).

At some point, installed plasterboard will be removed and has to be recycled, recovered or otherwise disposed of. The end-of-life impacts for plasterboard are considered in Chapter 10 of the Plasterboard Evidence Study, along with existing initiatives to reduce impacts and improve sustainability. UKCG is able to represent aspects of refurbishment and the National Federation of Demolition Contractors (NFDC) represents the demolition sector. Plasterboard recycling is represented in the PSP by the Manufacturers and Recycling organisations, such as Roy Hatfield and New West Gypsum. Where plasterboard cannot be readily recycled back into new plasterboard, alternative recovery options exist, for example in soil conditioning, which is represented by Land Network. However, a significant proportion of plasterboard waste still ends up in landfill, so the group is seeking representation of general waste management, although a key aspiration of the PSP is to send zero waste to landfill.

The engagement of stakeholders from across the plasterboard supply chain will enable the main objective of the Plasterboard Sustainability Partnership (PSP) to be met. This is to improve the sustainability of plasterboard through awareness and understanding amongst all stakeholders of existing knowledge about the role plasterboard plays in construction and of the sustainability issues throughout the supply chain.

3. Plasterboard Impacts

Economic, social and environmental impacts have already been captured in the Plasterboard Evidence Study, along with key initiatives already underway to mitigate these impacts. This action plan builds upon the evidence study and refers to it, rather than replicating its contents. The key impacts that were identified as having scope for further improvement are summarised below:

Table 1: Key supply chain impacts with potential to improve

Supply Chain Stage	Key Impacts
Raw materials	Transport to manufacturing sites; mining impacts (primary gypsum only); responsible sourcing
Manufacturing	Energy consumption and associated emissions in manufacturing process; ability to incorporate recycled and secondary feedstock
Distribution	Transport impacts; packaging waste arising; risk of injury from unstable loads
Installation	Waste of product during installation; risk of injury from manual handling
In use	Technical performance of products – thermal, acoustic, fire resistance
End of life	Recycling and recovery of waste, emissions from landfill, transport impacts

Economic impacts – there is always potential to reduce costs, which are frequently aligned to reducing environmental impacts. For example, reducing energy consumption, wastewater discharge and transportation.

Social impacts – a significant reduction may be achieved in the number of personal injuries sustained by those who distribute and install plasterboard. The focus is upon risk control by safe packaging and storage and the avoidance or reduction of manual handling. Also consideration of the need to reduce and/or eliminate dust from cutting and sanding joints.

Environmental impacts – most of the potential for improvement relates to reducing environmental impacts across the supply chain, key areas for action includes:

- Reduction in carbon dioxide (equivalent) emissions from manufacturing – reduced energy consumption, less reliance on fossil fuels
- Reduction of other emissions from manufacturing – air, water, waste
- Resource efficiency in manufacturing – increasing recycled feedstock, use of by-products, reduced water use
- More environmentally efficient transportation of raw materials, product and waste
- Waste reduction – improved design and installation
- Responsible sourcing – understanding, verifying and reducing social, economic and environmental impacts up and down the supply chain for raw materials and product
- Optimisation of packaging – reduced waste of both packaging and damage to product
- Reduced disposal impacts – increased recycling and recovery of all plasterboard waste, improved infrastructure, reduce flytipping, segregated landfill if disposed of.

Forward actions to reduce these impacts are summarised in the following sections:

- a) Efficient Manufacturing
- b) Safer Handling
- c) Towards Zero Waste To Landfill
- d) Making The Most Of Materials
- e) Partnering On Sustainability



Feedstock: Source: Eurogypsum

4. Action Already Being Taken

A great deal of activity is already underway, both in the UK and in the global context. The international nature of the gypsum industry makes it ideal to actively work on issues in many countries and to then communicate improvements so that they can be rapidly adopted.

The Plasterboard Evidence Study captured information on existing initiatives that are improving aspects of sustainability:

Table 2: Summary of existing initiatives to reduce the impact of plasterboard

Supply Chain Stage	Initiative to reduce impacts
Manufacturing	<ul style="list-style-type: none">• Climate Change Umbrella Agreement with Company specific targets – with associated actions to significantly reduce energy use.• EU Emissions trading system – capped allocation of CO₂e• Use of by-products (Gypsum from cleaning power station emissions) and recycled content in board manufacture• Ashdown Agreement to reduce manufacturing waste to landfill and increase recycling of installation waste back into boards
Distribution	<ul style="list-style-type: none">• Some distribution via rail and water transport• Pallet repatriation schemes• Collection of waste materials combined with delivery of new product
Installation	<ul style="list-style-type: none">• Increasing amounts of waste being segregated out and recycled back into new product• Contractors and Developers Agreement to reduce waste and divert from landfill• Site Waste Management Planning to increase recovery of all waste materials and reduce flytipping• Industry commitments to halve construction waste going to landfill by 2012
In use	<ul style="list-style-type: none">• Increasing use of products that improve thermal performance, moisture resistance, acoustic performance and fire resistance
End of life	<ul style="list-style-type: none">• Increased capacity to recycle waste plasterboard• Options emerging for recovery of plasterboard unsuitable for recycling back into new products• Quality Protocol developed for Recycled Gypsum• Development of End-of-Life Plasterboard Agreement

This Action Plan seeks to reinforce those initiatives that are ongoing with continuous improvements planned into the future, along with newly developed and developing actions that have been identified through the development of the Evidence Study and the discussions of the PSP.

5. Efficient Manufacturing

Each manufacturer is engaged in continuous improvement activities to mitigate the impacts associated with manufacture. In addition, work on specific issues is undertaken on a European level by Eurogypsum – the European federation of national associations of gypsum products manufacturers.⁵

Key areas where improvements are underway and examples of how different manufacturers have approached these areas are summarised below:

Meeting the Climate Change Agreement targets

Since the beginning of the sector Climate Change Agreement (CCA) in 2001, all plasterboard manufacturing sites have to minimise their emissions of greenhouse gases. Each site has specific targets for carbon emissions reduction agreed with Government. These centre around reducing the energy required to manufacture plasterboard. The overall target for Milestone Year 5 (ending 30th November 2010) is for an 8% improvement compared to 1999/2000 baseline year, which the Gypsum industry is on track to achieve.

British Gypsum results for Year 4 (ending 30th November 2008) show that performance was better than the target 5% reduction in energy per unit of production required by the Agreement.⁶ This has been achieved through a number of improvements, including building more efficient plant; process optimisation, heat recovery, burner improvement and compressed air improvements. Waste heat is recycled into other parts of the process such as water heating and space heating. Wind power is one of the renewable energy options being investigated.

Knauf Drywall have improved the efficiency of key processes, including the installation of a new calcination plant and equipment at the Sittingbourne plant, alongside new gypsum milling equipment, making the whole process of calcining gypsum much more energy efficient.⁷ Heat exchanging equipment at the Immingham factory has saved approximately 10% of energy usage. 'Excess' water content of boards has been reduced by around 12.5%, with proportionate savings in the gas needed to dry it, plus a saving of 100 tonnes of water per day. Further plans include evaluating a 2MW wind power plant and a combined heat and power plant.

Lafarge Plasterboard has exceeded the targets set in its Climate Change Agreement with the Government, saving over 30,000 tonnes of CO₂ to date.⁸ The recycling of waste heat within the kettle calciners was identified as a potential energy saving for the final CCA assessment period. Encouraged by successful pilot results, the heat recycling modification was retrofitted to all kettles during 2009. The company now has a target for 2010, the last in the present scheme, of 9% improvement compared with the 2000 base year.

Environmental Management Systems (EMS)

The wider environmental impacts of the manufacturing process also need to be considered. This could be in the form of a comprehensive environmental management system, or individual actions to cut impacts from areas such as water use and wastewater discharge. Being able to measure and report against such impacts is key to EMS and to supply chain requirements of Responsible Sourcing.

⁵ Eurogypsum – www.eurogypsum.org

⁶ British Gypsum Responsibility and Sustainability Report 2009

⁷ www.knaufdrywall.co.uk/environment/

⁸ <http://www.lafargeplasterboard.co.uk/wps/portal/SustainableDevelopment/Sustainability>

Knauf Drywall work with the Environment Agency and report annually on the use of energy, raw materials, water and the generation of waste. At factory level, as part of BS EN ISO 14001:2004, they seek to continually reduce consumption of resources and generation of waste, and have succeeded in emitting less than 1% to landfill from the Sittingbourne factory.

In November 2009, Lafarge UK launched its Responsible Sourcing policy which applies to all Lafarge businesses in the UK. BS EN ISO 14001:2004 certification for environmental management was gained by Lafarge Plasterboard in 2004 and the operation of all plants in accordance with these international standards has been policy ever since. Both historic performance and future targets over a number of KPI's are publicly available.⁹

In 2008, British Gypsum became the first plaster and plasterboard manufacturer to achieve BS EN ISO 14001:2004 certification across all manufacturing and mining sites in the UK.

Reducing transport impacts

Transport impacts arise from the haulage of feedstock materials to the manufacturing facility and of product out to retailers, or directly to customers.

Good progress has been made in terms of transferring from road haulage to rail or water transport for incoming raw materials. British Gypsum estimate they have made an estimated 2300 tonnes carbon savings and taken over 3 million lorry miles off the road. Knauf Drywall transport gypsum raw material to both UK plants by ship, and Lafarge Plasterboard's Ferrybridge plant is co-located with a power station, enabling synthetic (flue gas desulphurised) gypsum to be transported via conveyor belt.

Moving product out to customers is more difficult to transfer from the road network, though Knauf Drywall have carried out successful trials to transport finished plasterboard by barge to waterside projects in London, and British Gypsum have started delivering to projects using the rail network, depending on the availability of suitable infrastructure and offloading facilities. In addition, work has gone into making the road haulage aspect more efficient, for example through better tracking of 'full' and 'empty' road miles with logistical improvements. Lafarge Plasterboard have recently invested in a fleet of 25 "Teardrop" trailers and efficient tractor units that are aerodynamically styled to reduce fuel emissions per load mile by up to 10%.

Packaging

Packaging waste is significant on most construction sites. This arises through the packaging applied to all construction products and materials to protect from damage and to assist handling and distribution. The Strategy for Sustainable Construction has a packaging reduction target of 20% by 2012 to focus on the optimisation of packaging and the greater reuse, recycling and recovery of all packaging.

Lafarge Plasterboard examined its packaging practices and announced a public target of 58% unit weight reduction across its product range by 2010. From 2008, alternative renewable and biodegradable material has been used for pack bearers, replacing the plasterboard formerly used. This measure is estimated to have reduced the quantity of waste being sent for disposal by about 6,000 tonnes in the first year. Also, new packaging machinery has been installed at each of the company's three boardlines, leading to improvements in quality and safety, alongside a reduced plastic weight per pack.

⁹ www.lafargeplasterboard.co.uk/wps/portal/SustainableDevelopment/EnvironmentPolicy

British Gypsum operate a pallet repatriation scheme to encourage the reuse of pallets and the reduction of waste. In 2008, over 10% of pallets were returned. The target for 2010 is 30%, with every new pallet made from wood from certified sustainable sources.

Use of recycled and secondary feedstock

As detailed in Section 7, all manufacturers have signed up to the Ashdown Agreement – a commitment to reduce plasterboard waste and to divert waste from landfill, of both manufacturing waste and offcuts from installing plasterboard. The Ashdown Agreement is reviewed annually by WRAP, GPDA and the manufacturers. The flip side of diverting waste from landfill is to have a use for the recycled material, hence increasing amounts of recycled gypsum are being used in plasterboard manufacture. This builds upon a longstanding use of by-product (also called FGD or synthetic) gypsum from the flue gas desulphurisation process required at coal-fired power stations.

British Gypsum is the only manufacturer to mine gypsum in the UK. Their mining process has been made less intrusive and more efficient through the use of new mining techniques and equipment. Meanwhile, a significant proportion of gypsum feedstock is 'synthetic', along with gypsum recycled from waste plasterboard.

Much of Knauf Drywall's raw material is FGD gypsum, supplemented by further recycled material from production waste and clean building waste, the paper liners are made from fully recycled fibres. Knauf Drywall run their R3 recycling program to take their customers waste back into plasterboard production by utilising labour local to the projects. Knauf Drywall do not mine or quarry gypsum in the UK, but do so elsewhere in Europe, and subscribe to the European industry body's, Eurogypsum, efforts to promote best practice in biodiversity throughout Europe.

Product innovation

One of the areas driving innovation is the Government's zero carbon strategy for new homes by 2016, and all new buildings by 2019, this is accompanied by the progressive tightening of building regulations. Other areas include designing out waste and increasing the recycled content of products.

Knauf Drywall Futurepanel has high recycled content levels and the carbon emissions relating to the manufacture of this product are offset through investment into carbon reducing projects, such as building community level renewable energy systems. The use of the 'Eco Door Jamb' detail has resulted in reduced wastage on many projects. Lastly, the Brio dry screed board reduces the ongoing energy usage of a building by improving the efficiency of underfloor heating systems and of ground and air source heat pumps.

Lafarge Plasterboard has developed GTEC Aquaboard, a new product launched on the UK market in 2008 as an alternative to cement boards, being much easier to cut and install. Its weight is 38% lighter; reducing the risks of handling injury and embodied carbon is around 63% less than cement board.

British Gypsum has been working with house builders and main contractors to develop systems that make specifying drylining systems easier, quicker and more effective. For example, the Gypframe Acoustic Stud, providing greater acoustic isolation, less sound travel and quieter rooms; and Gyproc Soundcoat Plus which is used like plaster, sealing cracks and gaps in external brickwork, preventing warm air escaping and improving energy efficiency.

Actions relating to manufacture

The existing activity to reduce the impact of manufacture and the transport of plasterboard is ongoing, as detailed previously. This work will be built upon to further reduce the impacts of manufacture and improve efficiencies. Each manufacturer is targeting areas for improvements, typically focussed on innovative products to help deliver zero carbon buildings, reduction of transport impacts, increasing reliance on renewable energy, and further reductions in carbon emissions from manufacture in accordance with the EU Emissions Trading System and the sector Climate Change Agreement.

Table 3: Combined actions relating to all manufacturing

Action	Implementation
Innovate to support zero carbon homes by 2016, and zero carbon non-residential buildings by 2019	Each manufacturer is undertaking research and development to deliver new and improved products. This will be dependent upon commercial demand
Continue to reduce transport impacts of raw materials in and product out	Each manufacturer has identified existing and planned actions to reduce transport impacts. These will be reported in company environment policy statements
Reduced carbon intensity through abatement and participation in the EU Emissions Trading System	GPDA to work with DECC to establish targets, manufacturers to continue to invest in energy efficiency and renewable energy measures
Negotiate and agree targets for improved energy in the extended CCA scheme, 2011-2016	GPDA to work with DECC to establish targets, manufacturers to continue to invest in energy efficiency and renewable energy measures
Other actions in which manufacturers play a key role (more detail in later sections)	
Continuing measures to reduce, reuse and recycle plasterboard waste	
Demonstrable contribution towards the target to reduce packaging by 20% by 2012	
Product development and labelling to facilitate safer packaging and handling	
Developing and implementing a responsible sourcing scheme for plasterboard	

6. Safer Handling

While there are targets to reduce packaging waste, it is also important to ensure that the product itself is safely packaged and not subject to unplanned movement in storage or transit. Loss or injury may occur when plasterboard is stored or transported in an unsafe manner.

Most injuries relating to plasterboard arise from unsafe moving and handling operations. Musculoskeletal disorder, in particular back injury, may arise from traumatic events but is often associated with repeated or extended manual handling activity. Risk may be increased by factors such as the load weight, size and shape, the environment, the nature of the task and the individuals involved. Plasterboard weights have tended to increase in line with improved technical performance. Awkward or heavy lifts which involve bending and twisting, for example the manual handling of plasterboard up stairs or through doors, are especially likely to cause harm and should be avoided.

The Health and Safety Executive has established the Plasterboard Health and Safety Stakeholders Forum to address this key issue. The group has representatives from throughout the plasterboard supply chain and has met several times. Work is underway to identify and implement a range of actions which may be taken to better manage the risk of musculoskeletal injury from handling plasterboard.

This year, manufacturers in the United Kingdom and Eire commenced printing of a safety logo and information on weight on the reverse of each sheet of plasterboard. This will be printed on boards regardless of size, as even smaller and lighter boards may be handled unsafely, for example by persons lifting and carrying several at the same time. The message may vary slightly between manufacturers and includes:

- Logo showing two persons lifting a single board
- Approximate board weight in kilograms (rounded up)
- Message reading 'Handle Safely'.

For example:



This will be followed by other actions, for example, to promote the new warnings and to publish generic information on best practice.

Table 4: Actions relating to safer handling

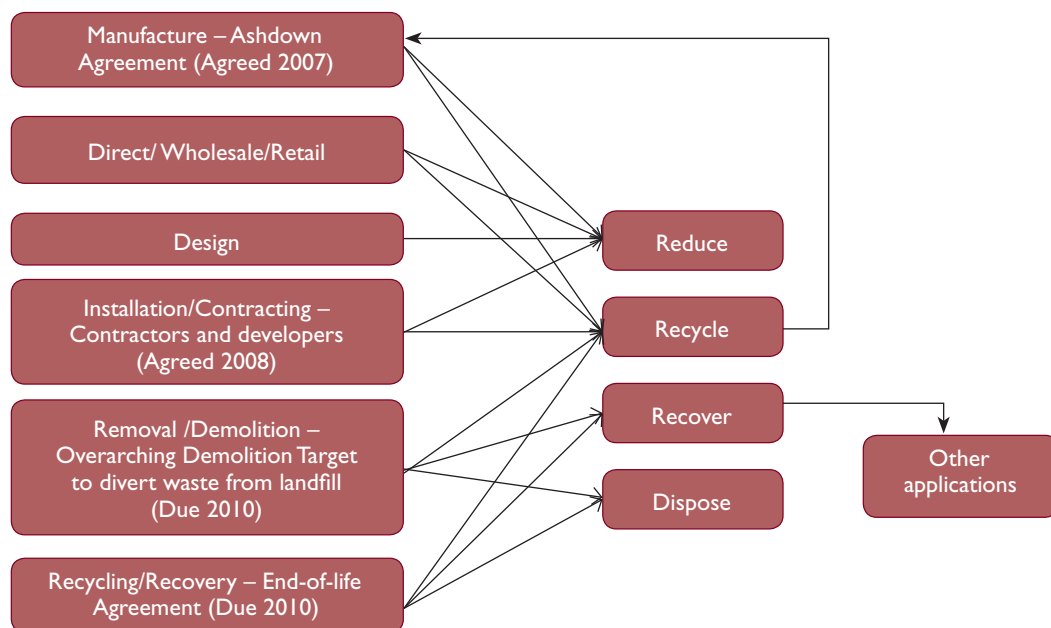
Action	Implementation
Labelling of boards to promote safer manual handling	HSE and GPDA
Use packaging systems that promote stability of the pack and reduce slippage	HSE Manual Handling Forum
Safe handling guidance	HSE Manual Handling Forum

7. Towards Zero Waste To Landfill

The diversion of waste from landfill and the reduction of waste are key areas for improving plasterboard sustainability. Plasterboard is an easily recyclable product that can be recovered in several ways, principally as a feedstock for new plasterboard.

A number of voluntary agreements are established and underway to reduce the waste impact of plasterboard. The figure below summarises the agreements that exist, or are under development, along with the main area of resource efficiency activities that can be influenced by each specific supply chain stage.

Figure 4: Supply chain agreements towards zero waste to landfill.



In addition to those agreements identified above, there have been calls to develop an agreement to focus on design issues, where significant improvements in waste reduction could be made. WRAP have been active in the area of designing out waste with the publication of several good practice guides aimed at the design profession, and as part of the Construction Commitments: Halving Waste to Landfill, designers can now commit to reducing all waste through their design solutions.

Targets relating to the agreements currently in place for manufacturers (Ashdown Agreement), and installation (Contractors and Developers Agreement) are detailed in Annex A.

Table 5: Summary of actions from existing voluntary agreements

Agreement	Action
Ashdown Target 1	<ul style="list-style-type: none"> Manufacturers will work with WRAP to identify and implement solutions Manufacturers will explore opportunities to reduce waste and identify solutions for future plasterboard waste recyclability Alternative recovery routes to be developed for the demolition waste stream Ensuring sufficient landfill space for transition period to zero waste to landfill
Target 2	Manufacturers will continue efforts to reduce waste plasterboard arising from original manufacture
Target 3	<ul style="list-style-type: none"> Manufacturers will continue to develop and accelerate recycling into new board, e.g. extend to regional housebuilders, commercial contracts Manufacturers will continue to work with all stakeholders to encourage the improved segregation of plasterboard waste on sites and the minimisation of volumes discarded Manufacturers are developing links with waste companies to obtain waste plasterboard through additional channels WRAP will support the development of alternative solutions for small and medium-sized enterprises, e.g. localised waste collection and logistic solutions
Target 4	Manufacturers will liaise and work with other parts of the supply chain to identify opportunities to reduce waste and landfill disposal
Contractors & Developers Target 1	<ul style="list-style-type: none"> Contractors, developers and their trade associations will continue to work with CRWP (Construction Resources & Waste Programme*) and WRAP, together with other stakeholders, to identify and implement solutions Contractors, developers and their trade associations to work with others to produce best practice guidance and advice, and a toolkit to accurately measure waste, resulting in sector benchmarks for housing and commercial new construction plasterboard waste
Target 2	Contractors and developers will make efforts to implement a standard measurement of waste arising, to benchmark performance, and to reduce waste through improved materials management by adoption of identified best practice
Target 3	Contractors and developers will work to improve the segregation of waste on site and support recycling/recovery routes

* CRWP programme was absorbed into WRAP in April 2010.



Plasterboard waste pile awaiting reprocessing. Source: Roy Hatfield

Table 6: Summary of zero waste to landfill actions agreed by PSP

Action	Implementation
Develop an agreement for designing out waste	An agreement for designers should be developed. This would also build upon the Contractors and Developers Agreement where designing out waste is a key target. Lead: FPDC Timescale: 2011
Complete agreement for demolition	The Demolition agreement for plasterboard is a single target within an Overarching Commitment to Divert Demolition Waste from Landfill Lead: National Federation of Demolition Contractors/BRE Timescale: 2010 (completed to be reviewed in 2011)
Complete agreement for end-of-life	This agreement has been drafted and is currently being commented upon by the relevant members of the PSP. Lead: BRE Timescale: 2010
Combined review of all existing agreements	A review should be undertaken each year to review the progress of each agreement in place at that time. This would compare actual progress against targets, and would require collation of performance data before the review took place at an agreed PSP meeting each year; and should also be combined to provide an overview relating to the entire Supply Chain. Lead: PSP Timescale: Annually from 2011
Recycling of thermal laminated boards	Develop a methodology and practical means of implementation to collect and recycle thermal laminate boards. Lead: GPDA Timescale: 2011
Quality Protocol for recycled gypsum	Communicate the key opportunities that have been created through the development of this newly developed Quality Protocol. Provide guidance to relevant stakeholders to promote uptake. Review levels of compliance and implementation of the Quality Protocol in 1 year. Updated regulatory position statement on PAS 109 and SWMPs. Lead: WRAP Timescale: 2011
Improved data on wastage rates	Develop and agree benchmarks for wastage rates of plasterboard, along with key causes. Link into relevant voluntary agreements by way of revised targets and progress reporting. Lead: UKCG & BRE Timescale: 2011
Provision of local recovery infrastructure	Develop and agree a methodology to link planned construction to the provision of local capacity to collect and recover plasterboard waste. Lead: WRAP Timescale: 2013
Further reduce environmental impacts relating to plasterboard recovery	Develop good evidence on current recycling, recovery and disposal of plasterboard. Link to recommendations of WRAP life-cycle study to reduce overall impacts of plasterboard recovery. Lead: Environment Agency & WRAP Timescale: 2011

8. Making The Most Of Materials

One of the most direct ways to reduce the environmental impact of plasterboard is to waste less of it. A wastage rate of 10% effectively means that an extra 10% of impact is added across the life-cycle, including financial cost and social impacts, such as health and safety. Whilst it is difficult to achieve zero waste, there is compelling evidence to suggest that wastage rates can be reduced significantly. The main areas to focus on for waste reduction are: design, procurement and site practices.

At Carmel College in St Helens, Merseyside, recently completed by Kier North West, plasterboard waste was halved from 10% to 5% through adoption of some core waste reduction strategies, including:

- Minimising over-ordering
- Just-in-time delivery
- Material supply to the work place
- Adequate storage
- Reuse of off-cuts

In terms of designing out waste, this needs to be taken forward by manufacturers, designers of buildings and specialist drywalling and internal fit-out contractors. With building design, there are a number of ways to reduce waste, such as designing for standard sizes to reduce cutting and utilising manufacturer's waste reducing details, such as the eco-door jamb detail.

A Eurogypsum report, published in February 2010, established the following key strategies for designing out waste:

1. Promotion of an efficient and interactive dialogue with Construction Site Managers for proper storage, handling, sequencing, fixing and finishing of gypsum products and systems
2. Promotion of demountable and reusable partitions for commercial buildings
3. Promotion of, whenever feasible, bespoke size boards (plasterboards, fibreboards and blocks).¹⁰

Across design, procurement and site practices there is a growing body of knowledge relating to reducing plasterboard waste that needs to be built upon and communicated to those able to improve wastage rates through their working practices.

Another area of waste reduction that is relevant is the prevention of packaging waste. This could be through having returnable packaging solutions that are also consistent with the need to move and store products safely, and with minimal damage. This also fits with the Sustainable Construction Strategy target of reducing packaging waste by 20% by 2012.

For non-returnable packaging, the requirements of the Producer Responsibility (Packaging Waste) Regulations need to be complied with. The targets set for recycling and recovery of specific materials are likely to increase to 2020, in line with the Packaging Strategy of 2009.¹¹

Finally, plasterboard incorporates a by-product, resulting from Flue Gas Desulphurisation of power station emissions. The production of this by-product will fall in line with the closure and reduced use of coal fired power stations. A level of strategic planning will help ensure this by-product is stock-piled to enable it to be used in the production of plasterboard for many years to come.

¹⁰ Sustainable C&D Waste Management: towards 70% Recycling, Re-use and Material Recovery Target, Eurogypsum. February 2010.

¹¹ Making the most of packaging: a strategy for a low carbon economy. Defra, June 2009.

Table 7: Summary of actions relating to making the most of materials

Action	Implementation
Reduce waste through design of buildings	Educate designers to design buildings that reduce waste/aid end-of-life recovery. Key action in any Designer specific voluntary agreement. Develop plasterboard specific information for the RIBA Core Curriculum for CPD. Lead: WRAP Timescale: 2011
Reduce waste through practices and design details in specialist contracting	Develop detailed guidance and training material to reduce plasterboard waste during installation/at design stage. Encourage adoption of innovative systems that reduce waste. Lead: FPDC & AIS Timescale: 2011
Optimisation of packaging whilst maintaining protection to avoid damage and waste	Adopt best practice emerging from the (Construction) Packaging Resource Efficiency Plan. Lead: GPDA Timescale: 2012
Long-term use of FGD Gypsum	Guidance document on long-term storage of FGD Gypsum. Lead: GPDA & Environment Agency Timescale: 2011



Source: WRAP

9. Partnering On Sustainability

The PSP provides the forum for all parts of the supply chain to work together, which has resulted in this Plasterboard Sustainability Action Plan. Collectively the group is working together towards common aims, which are recorded as actions in the previous sections.

This section captures two further aspects which need to be considered across the supply chain to achieve the best results, these are:

- Transport impacts
- Responsible sourcing

Transport impacts

The manufacturers are committed to reducing the transport impact of raw materials to the manufacturing site and, to a lesser extent, the movement of product from the manufacturing site. However, most plasterboard product and virtually all plasterboard waste management, recycling and recovery are dependent upon road transportation. Whilst it will be difficult to divert significant quantities onto alternative transport modes, such as rail and water, there is scope to improve upon the current efficiency of transport and logistics. There is no immediate strategy for identifying and implementing transport efficiency measures. Therefore, the key activity relating to improving transport impacts is to consider the currently applicable logistics in more detail, and to then propose alternative scenarios that could be more efficient. Assuming viable efficiencies are identified, these could be trialled and possibly adopted in the future.

Responsible Sourcing

Responsible sourcing of materials (RSM) provides a holistic approach to managing a product from the point at which a material is mined or harvested in its raw state through manufacture and processing, through use, reuse and recycling, until its final disposal as waste with no further value.

Responsible sourcing of materials is demonstrated through an ethos of supply chain management and product stewardship and encompasses social, economic and environmental dimensions.

Responsible sourcing of materials addresses aspects such as stakeholder engagement, labour practices and the management of supply chains serving materials sectors upstream of the manufacturer.

There are currently two responsible sourcing standards relevant to the construction sector:

- BRE Global launched a framework standard for the responsible sourcing of construction products – BES 6001 Standard in 2008.¹² The standard sets out requirements under three main headings:
 - Organisational management
 - Supply chain management
 - Environmental and social issues

To meet this Standard, organisations must satisfy certain compulsory elements. In addition, there are higher levels of compliance that can result in a higher performance rating being awarded.

¹² BES 6001: ISSUE 2.0 Framework Standard for the Responsible Sourcing of Construction Products. June 2009.
http://www.greenbooklive.com/filelibrary/BES_6001_Issue_2_Final.pdf

- In October 2009, BSI produced BS 8902:2009 *Responsible sourcing sector certification schemes for construction products. Specification*.¹³ It provides a framework for the development of sector certification schemes for responsible sourcing of construction products. It gives requirements for the management, development, content and operation of sector certification schemes for responsible sourcing and supply of construction products. It includes specific requirements for audit and review, and is specific to the supply of construction products within a responsible sourcing scheme, focussing on bodies that certify construction products.

The PSP, and this action plan, form an ideal platform to explore the options for a Responsible sourcing scheme for plasterboard. PSP members will be able to propose a framework for the whole group to discuss, amend and agree.

Table 8: Summary of actions relating to transport impact and responsible sourcing

Action	Implementation
Reduce impacts relating to transporting plasterboard product, waste and recycled/recovered material	Set up logistics working group to focus on reducing the transport impact of product and waste through improved logistics. Also consider the effective retrieval of small amounts of waste. Lead: BMF & UKCG Timescale: 2010 (1st meeting held already)
Explore the options for a responsible sourcing scheme for plasterboard	Explore the options to see if suitable for the Plasterboard supply chain. Determine level of support required and available to proceed with this option. Lead: GPDA Timescale: 2011

¹³ BS 8902:2009. Responsible sourcing sector certification schemes for construction products. Specification. October 2009.
<http://shop.bsigroup.com/ProductDetail/?pid=000000000030191223>

10. Implementation, Monitoring And Review

A key part of the PSP moving forward will be to monitor progress against this action plan. At least one meeting per year will be dedicated to a 'Review of the Action Plan' to capture not only progress but the need for actions to be added or amended. The Action Plan is contained in Section 11. This will benefit from work in advance of the review meeting to update evidence and provide a quantification of progress, as applicable, for each action.

Plasterboard Sustainability Partnership: Constitution

Purpose

The purpose of the Plasterboard Sustainability Partnership (PSP) is to improve the sustainability of plasterboard through awareness, and understanding amongst all stakeholders, of existing knowledge about the role plasterboard plays in construction and of the sustainability issues throughout the supply chain. Furthermore, to use this knowledge to develop and implement practical and coordinated strategies for sustainability. This includes economic and social as well as environmental impacts.

Membership

Membership of the PSP is open to any company or trade association involved in the production, distribution, installation, reuse, recycling and disposal of plasterboard and gypsum as well as the relevant government departments, regulatory agencies and delivery bodies.

Chair and Deputy Chair

The Partnership will appoint a Chair and Deputy Chair. The post of Chair and Deputy Chair will be for one year only and will alternate between industry and government/regulators.

Secretariat

The Secretariat will be responsible for maintaining the list of PSP members and their contact details, of liaising with the Chair to decide the agenda of meetings, for circulating relevant papers and minutes of meetings, and for forwarding relevant documentation to the PSP website manager.

Communications

The Partnership will meet, as a minimum, twice a year to discuss relevant sustainability issues relating to plasterboard and gypsum. A website (<http://www.plasterboardpartnership.org/>) will be maintained to enhance the understanding of plasterboard issues.

I. Summary of Actions and Review template

Action	Lead	Timescale	Progress
Innovate to support zero carbon homes by 2016, and zero carbon non-residential buildings by 2019	Manufacturer specific	Ongoing	
Continue to reduce transport impacts of raw materials in and product out	GPDA	Ongoing – annual review	
Reduce carbon intensity through abatement and participation in the EU Emissions Trading System	GPDA	Ongoing – annual review	
Negotiate and agree targets for improved energy in the extended CCA scheme, 2011-2016	GPDA	Ongoing – annual review	
Labelling of boards to promote safer manual handling	GPDA & HSE	2010	Implemented
Use packaging systems that promote stability of the pack and reduce slippage	HSE Manual Handling forum	Ongoing	
Safe handling guidance	HSE Manual Handling forum	Ongoing	
Develop an agreement for designing out waste	FPDC	2011	
Complete agreement for demolition	NFDC & BRE	2010	Completed, review 2011 www.crwplatform.co.uk/conwaste/other-publications/
Complete agreement for end-of-life	BRE	2010	

Combined review of all existing agreements	PSP	2011	
Recycling of thermal laminated boards	GPDA	2011	
Review and provide guidance related to the Quality Protocol for recycled gypsum	WRAP	2010	Ongoing activity in progress www.environment-agency.gov.uk/business/topics/waste/114435.aspx
Improved data on wastage rates	UKCG & BRE	2011	
Provision of local recovery infrastructure	WRAP	2013	
Further reduce environmental impacts relating to Plasterboard recovery	EA & WRAP	2011	
Reduce waste through design of buildings	WRAP	2011	
Reduce waste through practices and design details in specialist contracting	FPDC & AIS	2011	
Optimisation of packaging whilst maintaining protection to avoid damage and waste	GPDA	2012	
Long-term use of FGD Gypsum	GPDA & EA	2011	
Reduce impacts relating to transporting plasterboard product, waste and recycled/recovered material	BMF & UKCG	2010	First meeting held
Explore the options for a responsible sourcing scheme for plasterboard	GPDA	2011	

Annex A

Current Voluntary Agreements And Targets For Plasterboard Waste

Supply chain stage	Status	Current Targets	Progress
Manufacture (Ashdown Agreement)	Agreed 2007	<ol style="list-style-type: none"> 1. Engage with Stakeholders to undertake activities to reduce and recycle waste 2. Reduce the amount of plasterboard waste sent to landfill from UK manufacturing operations to 5000 tonnes per year by end 2010 3. Increase take back and recycling of plasterboard waste, for use in plasterboard manufacture, to 50% of new construction waste arisings by end 2010 4. To work with all parties in the supply chain towards achieving zero plasterboard waste to landfill 	<p>Reviewed yearly by WRAP. Some targets have been exceeded whilst others have been revised. Latest review to March 2009, where Target 2 was reduced from 7500 t to 5000 t (08/09 2,618 t sent to landfill). Target 3 remains the same but the estimate of overall new construction plasterboard waste was reduced from 300,000 t to 210,000 t due to construction downturn (08/09 20% recycled)</p>
Installation (Contractors and Developers)	Agreed 2008	<ol style="list-style-type: none"> 1. Engage with Stakeholders to undertake activities to reduce and recycle waste, long term objective of zero waste to landfill by 2025 2. Reduce plasterboard waste from construction to 15% (wastage rate) by end 2010 3. Encourage reuse, recycling and recovery at all sites, to be detailed in site waste management plans by end 2010 	Review yearly

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