



British Plastics Federation

A Discussion Document

The UK Plastics Industry:
A Strategic Manufacturing
Sector

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Foreword by the President of the British Plastics Federation

For my period of office, as President of the British Plastics Federation, I have adopted the theme of 'A sustainable plastics industry: a strategic asset in our manufacturing economy'. I did so because I felt it encapsulated the challenges and opportunities for the plastics industry in the modern world. I have been delighted by the support this theme has received from BPF colleagues.

As the UK economy gradually recovers from the economic downturn, we are intensely conscious of the essential role that the UK plastics industry plays in the UK economy. Ours is a key enabling industry, and it would be impossible to have a high technological industrial base without the plastics sector.

This strength is also an enormous opportunity for the UK; our industry is composed mainly of small and medium sized firms, it is incredibly innovative and nimble-footed and, over the last decade, has managed its way through some challenging business conditions. On top of all this, the processes and products offered by the industry demonstrate not only an acute degree of environmental understanding and sensitivity but also massive achievements in the cause of sustainability.

This outline discussion document, which we present to Government and other key stakeholders, documents how the UK plastics industry has assumed a fundamental role at the heart of UK manufacturing. It also demonstrates how, when accorded appropriate strategic importance in national policy making, it can benefit the UK economy in terms of job creation, exports and help to resolve key public policy issues.

A handwritten signature in blue ink, appearing to read 'P. Watkins'.

Philip Watkins
BPF President



Foreword by Mark Prisk MP, Minister of State for Business and Enterprise

The UK Plastics Sector plays an important role within the manufacturing sector. The British Plastics Federation has captured that strategic importance in this paper and has set out the strengths and the opportunities that exist for our plastics business. I welcome the chance to offer a few words of support to your sector in this document.

The report highlights the key role that plastics perform across almost all business sectors. Plastics are essential to enabling our advanced manufacturing sectors including aerospace, automotive, energy generation and healthcare. But they are also equally important in packaging and double glazing – the list is endless.

Plastics play a crucial – often unseen - role in our transition to a greener economy and lifestyle through – for example – the provision of insulating material and durable pipes which are increasingly replacing aging water networks. As this report highlights, your businesses are driving innovation in products, applications and processes that are increasingly contributing to our low carbon objectives.

This Coalition Government has publically stated a commitment to rebalancing our economy, across our business base, and throughout our regions. I recognise how important a successful manufacturing sector is to achieving that ambition and we need a vibrant plastics sector to do this. Reading this report I am encouraged by the variety, drive and ambition that you are bringing to your businesses to meet today's global competitive challenges. This Government has published "The Plan for Growth" which sets out how we can finance and grow our businesses; encourage more investment and greater exports as a route to a more balanced economy. This report shows how your businesses are rising to – and meeting - this challenge.

Finally, I would like to acknowledge the dedication and effort that the British Plastics Federation makes on behalf of its members and the industry. They provide a valued source of information and are active in representing the interests of their members across Government.

A handwritten signature in black ink, appearing to read 'Mark Prisk', with a horizontal line underneath.

Mark Prisk
Minister of State for Business and Enterprise
The Department for Business, Innovation and Skills

Introduction

The UK Plastics Industry is a manufacturing sector of critical importance to the future of the UK economy. Plastics products are so widely used in practically every business sector with key beneficial properties. It is a global leader and a key UK economic strength. The UK Plastics Industry enables other user industries and services such as retail, construction, healthcare and transport to function, develop profitably and innovate.

The UK Plastics Industry is at the forefront of developing and implementing sustainable manufacturing processes and products which save energy and reduce carbon emissions. Its operations and output are fully consistent with public policy objectives for sustainability and for the creation of a low carbon society.

The Scale of the UK Plastics Industry

The UK Plastics industry is a global leader operating at the cutting edge of technology:

- The UK remains one of the top 5 processors of plastics in the EU with some 4.8 million tonnes of materials processed in the UK.
- It is highly important as its sales account for approximately £17.5 billion.
- We estimate that about 2.5 million tonnes of plastics raw materials are manufactured here, approximately 50% of the plastics consumed in the UK.
- 25% of plastics products are exported each year.
- There are over 3,000 primary processors and 7,430 companies in the UK plastics industry.
- The industry employs approximately 180,000 employees equating to 7% of all employees in the UK manufacturing sector.
- The plastics industry is widely dispersed over the UK. All parliamentary constituencies will contain some plastics industry activity. The plastics industry has a record of easy mobility and can be trans-located and can assist in the rebalancing of the regions.
- Supporting the major polymer (plastics raw material) manufacturers are a range of additives, masterbatch and other specialist materials manufacturers, who serve to enhance the performance of plastics.

The Context

The recovery from the recession and our recent heavy reliance on the financial services sector has prompted discussion about the need to rebalance the UK market by according greater weight to manufacturing. We now have an opportunity to set a new course for the economy. Greater investment in and promotion of the UK plastics industry can assist in delivering economic growth, employment opportunities and achieving environmental objectives.

With the rise in unemployment and concern about the private sector's ability to compensate for cuts in the public sector, employment has become a major issue. A revitalised manufacturing industry will play an essential role in providing employment opportunities for the future.

Plastics and Manufacturing

The UK Plastics Industry occupies a strategically crucial position and is a key success factor in the supply chain for a vast array of UK manufacturing and service sectors:

- Aerospace – Composite fuselage, nose cones, tail planes and wings
- Automotive – Bumpers, dashboards, engine parts, seating and doors
- Construction – Insulation, window frames, doors, pipe systems, flooring, roofing and cladding
- Educational – Toys, games, calculators, rulers and computers
- Electrical – Television and computer housings, fridges, freezers, radios, vacuum cleaners and washing machines
- Energy Generation – Wind turbines, solar panels and wave booms
- Furniture – Bedding, upholstery and household furniture
- Marine – Boat hulls and sails
- Medical / Healthcare – Syringes, blood bags, tubing, dialysis machines, heart valves and artificial limbs and wound dressings
- Military – Helmets, body armour, tanks, warships, aircraft and communications equipment
- Packaging – Bottles, crates, pallets, food containers, trays, drums and films

Plastics are versatile. There are over 20 different types which are commercially available, each with an individual range of physical and chemical properties. These include: Polyethylene, Polyvinyl Chloride, Polypropylene, Polystyrene, Nylons, Polycarbonate, Polyacetal and Polyethylene Terephthalate. An infinite variety of properties can be created by the addition of additives with specific technical effects such as flame retardants, antioxidants, reinforcing agents and plasticisers.

To broaden the base of the raw materials and products available and to offer users an even wider choice there is a small but growing use of bio-based and degradable plastics. The UK has academic centres of excellence in this and other areas.

The design freedom created by plastics creates enormous opportunities for product designers and specifiers. Plastics are lightweight and durable and with their versatility in colour, touch and shape, they provide tremendous marketing advantages to users in addition to their functional performance. The UK Plastics Industry allied to our world class Design Industry is a powerful creative force.

Plastics lend themselves to mass manufacture and for this reason plastic products are affordable to buy and offer benefits in a wide range of economic and social uses.

Plastic products can be recycled and can often be re-used. Where there is no environmental benefit to be derived from recycling, used plastics can be combusted and energy recovered.

The Key Strengths of the UK Plastics Industry

The UK has a number of natural advantages for the manufacture of plastics:

- The UK is still a significant oil and gas producer, providing the chemical building blocks for plastics raw material production.

- A richly varied geology on the mainland gives rise to the manufacture of a wide range of additives. Consequently we have particular strengths in specialist materials manufacture, compounding and masterbatch production.
- The UK has leading academic centres of excellence for polymer studies. The BPF works closely with the Government supported Materials Knowledge Transfer Network (Materials KTN) for Polymers to ensure universities and companies co-operate on joint research and development projects.
- The UK Plastics Industry is allied to our world class design sector.
- The UK had a strong pre-existing industrial base in which key raw materials were readily substitutable by plastics. For example the West Midlands engineering industry gradually abandoned metals in favour of plastics and the textile industries of Lancashire and Yorkshire gradually abandoned cotton and wool for products based on Nylon, Polyester and Polyvinyl Chloride. The process continues and the paper industry has now begun to convert to plastics, with the publishing industry moving to electronic books.

A Platform to Exploit Global Manufacturing Opportunities

The British Plastics Federation provides a platform to promote the excellence in UK plastics manufacturing to the global marketplace. It co-operates strongly with UKTI to seize business development opportunities overseas and to help attract inward investment by plastics-using companies into the UK.

- The BPF accesses global markets through its participation at major international trade shows notably in China, India, Turkey, Poland and Germany.
- The BPF is the world leader in promoting sustainable manufacturing in plastics. With UKTI backing it published 'Sustainable Manufacturing: A Guide for the Plastics Industry', essentially a guide to UK expertise in the field which was successfully launched at the K fair in Dusseldorf, Germany in 2010.
- The BPF is a member of six EU-level trade associations for plastics industry interests : for Plastics Converters in general, Pipes, Profiles, Expanded Polystyrene products , Plastics Recyclers and Machinery producers. It also has a close relationship with the EU-level associations for plastics raw materials and additives.
- The BPF's website, www.bpf.co.uk ,is the leading plastics industry website globally. It has 1.2 million visits per annum and has several unique features including a UK plastics industry Directory, 'Plastipedia', the world's largest on-line plastics encyclopaedia, and 'Plastbook, a plastics business networking site which features over 1000 UK experts ready to help resolve manufacturing problems worldwide.

Achieving a Low Carbon Economy

Plastics products must be considered as a major tool in achieving a low carbon economy. The use of plastics materials and products across their life cycles from production, use and to end of life can assist in significantly reducing carbon emissions.

Production

- Plastic production accounts for just 4% of oil and gas use. Once used in the manufacture of plastics this oil and gas can be considered to be 'borrowed' as it can be recovered through recycling or as energy from waste.
- Making plastics requires the use of a small range of molecules, largely carbon and hydrogen which are today most conveniently derived from oil and gas. In the long term, if supply and

demand of oil and gas tightens, we can access carbon and hydrogen for plastics from other sources such as biomass.

- Plastics materials and products are enablers of renewable energy production and are used in the production of rotor blades for wind turbines and key components in solar panels.
- Modern plastics processing machinery is becoming increasingly energy efficient and uses between 20%-50% less energy than ten years ago.
- The BPF's Climate Change Energy Reduction Agreement with the Government had, by the end of 2010, saved 122,000 tonnes of CO₂, enough to fill 54 Wembley Stadia.

Use

In the EU plastics usage from a lifecycle perspective saves 2,300 million GJ of energy per year. This equates to 50 million tonnes of crude oil, the equivalent of 194 very large oil tankers. The use of plastics products, equally, prevents green house gas emissions of 120 million tonnes per year.

Packaging

- Plastics are lightweight materials. A classic German study concluded that without plastics packaging there would be dramatic increases in the weight, energy consumption and volume of waste:
 - The weight of packaging would increase by 398%
 - Energy consumption would increase by 208%
 - The volume of waste would increase by 258%

Today's plastics packaging is up to 80% lighter than it was 20 years ago. Advances in materials and processing technology have seen the weight of items decrease substantially over the years. Plastics allow packaging producers, packaging specifiers and packaging users to optimise use of their resources by cost-efficiently delivering products to consumers with minimal wastage.

- A plastic carrier bag weighs six times less than alternative materials and saves energy in transportation.
- The use of plastic bottles rather than alternatives leads to savings of up to 40% on distribution fuel costs and saves on transport pollution.

Construction

- Plastics are low conductors of heat and with the tight seals achievable with plastic building products, significant energy savings can be achieved in buildings.
- PVC-U double glazed windows and doors are essential for an energy efficient home. They have a minimum 35 years life and are easily maintained. The BRE's Green Guide to Specification has given PVC-U windows an 'A' rating in domestic use and 'A+' in commercial use.
- Expanded Polystyrene (EPS) Insulation has a key role to play. The heating and cooling of buildings accounting for half of Europe's total energy consumption.
 - Each Kilogram of oil used in producing EPS insulation panels means a saving of 150kg. of oil for heating fuel used in residences and buildings (calculated over a fifty year period).
 - EPS thermal insulation contributes to reducing the energy needs of buildings and this can reduce CO₂ emissions by up to 50%.
- Plastic piping systems are essential for the collection and emission of heat, a pre-requisite for low carbon technology heating and cooling systems. Insulated plastic piping systems enable the efficient carriage of heat from district heating systems or combined heat and power units. Plastic piping systems form the ducting for active or passive ventilation systems that are coupled with heat recovery units.

- Durable plastic pipes and storage systems provide the capability for effective water management from storm water control and attenuation through to water quality and re-use.
- Flexible plastic piping systems ensure quality and prevent leakage which can be as high as 30% in some of the UK's potable water supply systems. 772 miles of cracked Victorian water mains are currently being replaced by blue plastic pipes in London alone.

Transport

- All forms of transport make demands on energy sources to provide movement and this represents a substantial cost to owners and wider society. Reducing the weight of cars, aeroplanes, boats and trains can cut fuel consumption dramatically. The lightness of plastics therefore makes them invaluable to the transport industry. 22% of an Airbus A380 double decker aircraft is built with lightweight carbon fibre reinforced plastics, saving fuel and lowering operating costs by 15%. The Boeing 787 Dreamliner is the first ever aircraft to be made of 50% carbon fibre composite material. An increased use of carbon fibre composite materials over traditional aluminium has significantly reduced the weight of the aircraft and there is a reported 20% saving in fuel with no compromise on speed
- 105kg of plastics, used in place of traditional materials, in a car weighing 1,000kg, makes possible a fuel saving of 750 litres over a lifespan of 90,000 miles. This reduces oil consumption by 12 million tonnes and consequently CO₂ emissions by 30 million tonnes in the European Union.

End of Life

Recycling

- Used plastics constitute a valuable resource. They are eminently recyclable and typically they can be recycled for a minimum of approximately six times. They should not be landfilled.
- Plastics recycling tonnage has increased annually by around 11% per year over the last 10 years. In 2010 24.1% of Plastic packaging consumed in the UK was recycled, exceeding the Government's target of 22.5%. The plastics industry has its own target to increase recycling of used plastics to 50% by the year 2020. The target is conditional on co-operation amongst the partners in the plastics recycling chain and improvements in the quality of local Authority Material Reclamation Facility output.
- 40% of available plastic bottles from households were recycled in 2010 with 76% of plastic milk bottles being recycled in the same year.
- In 2009, 5031 tonnes of Expanded Polystyrene packaging was recycled in the UK. This is approximately 33% of the EPS packaging manufactured here.
- The Vinyl 2010 Voluntary Commitment of the EU's PVC industry saw 49,343 tonnes of PVC recycled in the UK in 2010 consisting of recycled windows, doors, pipes, flooring and roofing. Mark Prisk MP, Minister of State for Business and Enterprise, stated 'It is gratifying to know that an industry sector is prepared to accept a major challenge and commit the necessary resources to ensuring its achievement. I am extremely pleased at the contribution the UK PVC industry has made towards achieving the recycling target for 2010, all the more so because of the long-life of PVC building products and the recent economic difficulties in the construction sector. The PVC industry's work has certainly advanced the sustainability of PVC building products... Initiatives such as these give me great cause for confidence in the industry's future'.

Energy from Waste

- It is not feasible to recycle all plastics. However it is possible to convert the remaining plastics waste into energy. Used plastics have a relatively high calorific value, on average 35mj/kg, greater than coal. This makes for efficient incineration and assists in the combustion of other materials.

- Used plastics in energy from waste plants promote an efficient burn of the entire incinerator feedstock, helping to reduce the volume of final waste by 70%.
- Amsterdam's energy from waste plant provides electricity to 25,000 households, the tram system, concert hall and all municipal offices.
- With further development energy from waste could provide 11% of UK energy needs from unrecyclables, saving expensive fossil fuels.

It is vitally important that the whole life cycle of a material or product is fully considered when assessing its contribution to the future low carbon economy.

The UK: A Strong Plastics Heritage

The UK can justifiably claim to have invented the commercial plastics industry. In 1855 Alexander Parkes developed 'Parkesine' a cellulose nitrate material which was put on show for the first time in 1862 at the Great International Exhibition in London.

The UK also discovered Polyethylene in 1933 and was one of the first countries to exploit the amenability of polyester to the stretch-blow moulding process for the manufacture of PET bottles.

The earliest plastics products were consumer products and from the outset the industry has been in strong collaboration with the UK's cutting edge designers. Early products included ashtrays and housings for radio sets.

The British Plastics Federation is the world's first plastics association founded in 1933 and continues to be a leading model for the creation of other plastics associations around the world. The British Plastics Federation works with a responsible and caring industry on projects, for example, aimed at improving industrial health and safety (SIMPL) and reducing marine litter. It is a working partner of the 'Love Where You Live' litter prevention campaign. The Prime Minister, David Cameron, wrote to the BPF on its 75th Anniversary in 2008 stating 'this is a remarkable achievement, and is a sign of the effectiveness of the Federation in representing the interests of this sector of manufacturing in Britain'.

Historically the UK was an entrepôt trading nation depending heavily on packaging to protect goods in transit. Again the industries producing traditional packaging materials began to convert to plastics. This was also helped by the development of a uniquely sophisticated and centralised supermarket retailing system which needed the benefits of plastics packaging systems to facilitate its logistical arrangements. For example, UK supermarkets pioneered re-usable plastic crates and trays at the rear of stores.

Today the UK Government has recognised parts of the plastics industry as strategic manufacturing activities which merit their own Government sponsored strategies such as 'Plastics Electronics: A UK Strategy for Success: (2009)' and 'The UK's Composite Strategy (2009)'.

Conclusion and Key Messages for Government

The plastics industry is critical to the success of UK Government's manufacturing strategy. Due to their versatility plastics are now essential for most manufacturing and distribution industry sectors. The industry is a vital part of our heritage. At a time of economic and environmental concerns plastics can be seen as providing more solutions to crucial public issues than any other material: moderating the effects of climate change, the provision of housing, the provision of high quality healthcare and education, the management of water as a valuable resource and the prevention of food wastage through packaging.

In the rebalancing of the UK economy in favour of manufacturing, plastics technology will play a key role in facilitating the expansion of UK manufacturing activity. It will accelerate the progress made by UK Companies to adopt the advanced manufacturing techniques of the future and enable them to achieve the necessary flexibility, precision, quality and environmental performance.

In order to fully realise this extraordinary potential there are a number of key issues that must be addressed by government with some urgency:

- There is serious concern about the educational attainments of school leavers and available skill levels in the UK. At a time of economic recovery a skilled and educated workforce is essential in order to gain and create opportunities for business development. In the plastics industry we have a shortage of technician level skills.
- Government resources to support the development of export opportunities and inward investment of customer industries need to be reviewed. The Government needs to maintain and expand through UKTI the exploitation of new export opportunities.
- UK manufacturers need to have secure access to essential raw materials at stable prices. We have seen a long-term trend in the relocation of raw material manufacturing from Western Europe to the Middle and Far East where there is a perception of faster economic growth and a regulatory environment more supportive of manufacturing. Loss of local raw material production will impede the UK's long term competitiveness.
- Legislation and taxation affecting the plastics industry needs to be kept to a minimum to encourage its growth and competitiveness with other countries. Any targets introduced into legislation for example on recycling, should be realistic and based on reliable evidence.
- Government needs to fast-track new replacement energy generation capacity and gas storage to ensure that supply equals demand and that energy costs do not escalate.
- Government, especially the Department of Business Innovation and Skills, should consider how the uniqueness and strategic importance of the UK plastics industry is recognised. Plastics products are the outcome of sophisticated engineering, design, digital technology and intensive dialogue with customer sectors such as automotive, construction, healthcare and retail.
- Government and industry together should promote the benefits of plastics products in order to secure public appreciation from investors and consumers alike, and to counter myths and misinformation.
- Government and industry together should intensify Research and Development of plastics in UK universities in collaboration with the manufacturing industry and the Materials KTN.

We look forward to forming a close partnership with UK government, firstly to discuss these points and then to help accelerate the development of the UK plastics industry, a strategic manufacturing sector.

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