A report by the Associate Parliamentary Sustainable Resource Group

Associate Parliamentary sustainableresource Group

# EXPORTING OPPORTUNITY?

## PUTTING UK WASTE TO WORK AT HOME AND ABROAD

"The topic of waste exports is incredibly diverse, and one which merits detailed, cross-departmental consideration from Government, and united, forward-thinking drive from the industry itself"

Rt. Hon. Caroline Spelman MP,
Inquiry Chair

# CONTENTS

# FOREWORD

The UK has made huge improvements in how it manages its waste in recent years, and the waste management sector is a real 'good news' story for UK plc: providing many thousands of jobs to the economy and showing sustained growth throughout these challenging financial times.

As the process of managing our waste has developed and become more sophisticated, there has been a growing awareness of the vital importance of treating our waste materials as a 'resource', and reflecting this at all times in the way in which we handle them.

This report considers the export of both recyclates and waste derived fuels. Both have developed as exports due to a range of different factors, including energy and labour costs, as well as available domestic reprocessing and treatment capacity, and these exports have been important in helping the waste management sector meet ambitious new recovery and recycling targets, as well as landfill diversion targets.

However, there is no doubt that opportunities remain within the domestic market to develop targeted areas of the recycling and reprocessing industries in order to re-capture some of these exported recyclates, providing further jobs and value to the sector, and the country. Furthermore, with the export of waste derived fuels taking place against the backdrop of a debate on energy bills and the security of future energy supply, strategic thinking must be applied, acknowledging the inherent value in these 'fuels', and exploring potential future scenarios for their use here in the UK.

In order to make the most of these opportunities, work is required from both Government and industry to ensure barriers to development are tackled, and the export of valuable recyclable materials and fuels is never incentivised to the detriment of the domestic market.

There is huge potential for the sustainable resources sector. Ultimately, what will underpin the development and future of this sector is materials quality. We should be ambitious in aiming for the highest possible quality recyclate, in order to supply a thriving and innovative UK market and to ensure the greatest possible stability and variety in our transactions abroad.

Alongside this, a real sense of strategy when it comes to the UK's industrial aims is needed to support the ambitions of the waste sector in supplying UK manufacturing, with material from recyclate, with fuels,  and with low-carbon electricity and heat, which can be produced from the waste-derived fuels we currently export.

The topic of waste exports is incredibly diverse, and one which merits detailed, cross-departmental consideration from Government, and united, forward-thinking drive from the industry itself.

This report makes recommendations to central government and industry on how to build the most economically and environmentally robust system for waste and materials treatment, whether it be in the UK or abroad. We hope that adoption of these recommendations will result in a more streamlined and robust management of our resources, and provide further steps towards the development of a truly resource efficient economy.

I would like to thank everyone who generously gave their time and expertise to contribute to this inquiry, including the steering group members for their direction and oversight. I would also like to thank the British Metals Recycling Association, Closed Loop Recycling, DS Smith Recycling and SITA UK for sponsoring this inquiry, and Laura Wilton and Katrina Borrow for compiling this report.

Rt Hon Caroline Spelman MP
Inquiry Chair

# EXECUTIVE SUMMARY

The key objective of this inquiry has been to examine a range of different waste exports, including a variety of recyclates and waste-derived fuels, and to identify trends, risks and opportunities in relation to how the UK manages its waste as a resource.

The export of waste is an incredibly complex and varied topic, due to the range of different drivers affecting each different waste stream that is exported from the UK. It is important to first note that exports of waste are a by-product of the UK's position in a global marketplace and in many cases represent a valuable transaction to the UK economy, boosting the balance of payments and supplying manufacturing economies overseas, which in turn provide the UK with valuable products. Environmental gains can also be achieved through exports; a good example of this being exports of Refuse Derived Fuel (RDF) to the Scandinavian Energy from Waste (EfW) market, where the high operating efficiencies of EfW plants mean that as much energy – in electricity and low-carbon heat – as possible is extracted from waste.

Nonetheless, there is no doubt that, within this varied picture of recyclate and waste-derived fuel export, significant opportunities remain for the UK to extract greater value from its waste.

In relation to recyclable material, this may be through raising the quality of recyclate due to be exported, in order to supply a wider range of end markets and to reduce volatility in demand, but there is certainly also scope for development in the range of recycling and reprocessing facilities in the UK. This will only be achievable with improved investor confidence, coherent policy measures and the creation of stronger demand for recyclate in the domestic market.

With regards to waste-derived fuels, opportunities focus around the potential to recognise and harness the inherent energy value in the RDF and Solid Recovered Fuel (SRF) currently exported to other EU and EFTA (European Free Trade Association) nations. Whilst the economics remain so favourable to export, this is a practise that is likely to continue in the short to medium term. However, as with all resources policy, long-term thinking is required in order to ensure that the UK can make the most of this indigenous fuel supply, whilst learning from miscalculations made in EfW development in countries which are now experiencing over-capacity in this regard.

The aim of this report is to make a range of recommendations to Government, to industry, and to the resources sector to address areas where opportunities for UK economic growth and resilience remain untapped.

The recommendations in this report focus around these key findings:

The PRN/PERN system has significantly impacted the recovery of waste packaging in the UK and for export. However, the methodology applied to the issuing of Notes needs to be reviewed to address concerns linked to inconsistencies between the costliness of recycling in the UK vs. export for recycling.

The recycling industry offers the potential for growth in employment opportunities. Economic research is required to identify which parts of the supply chain can be re-shored or developed to maximise this opportunity for the UK.

The UK is increasingly collecting more recyclable material than can be processed domestically, with the gap predominantly being filled by exports. Alongside this, the production of increasing volumes of RDF is taking place, the majority of which is also being exported.

Given the increasing levels of RDF/SRF being exported, the current absence of sufficient treatment capacity in the UK, and the inherent energy value in the waste stream, there is a need for greater clarity on the UK policy for how such material can best serve national needs.

The ability of the UK to address the gap in reprocessing and thermal treatment capacity is being constrained by a lack of investment. In view of this, greater confidence should be given to the investment community through a range of fiscal measures to mitigate risk and manage growth, alongside increased and improved data capture.

# RECOMMENDATIONS

## Section Two: Export of Recyclate

### Recommendation 1

In order to support a 'level playing field' between the issuing of PRNs and PERNs, Defra and the EA should ensure that PERNs are only issued for 100% of material exported if this is supported by evidence provided by the exporter.

### Recommendation 2

Industry and Government should undertake research into the identification and development of a range of opportunities to supply high-quality recyclate to manufacturers, including those abroad.

### Recommendation 3

In line with the current Government's support for voluntary agreements, Defra should explore, through WRAP, how future voluntary schemes, such as the Dairy Roadmap, could stimulate demand for key secondary materials, helping in turn to stimulate the development of a domestic market.

### Recommendation 4

In recognition that End of Waste criteria for metals were developed in the spirit of creating a straightforward means of declassifying scrap metal waste, and in order to allow the industry to access valuable overseas markets through exporting scrap as a 'secondary raw material', the Environment Agency should, with input from industry, conduct a review of End of Waste approaches across the UK to help improve dialogue with industry and maximise the benefit that End of Waste offers.

### Recommendation 5

Defra, through WRAP, should provide detailed information to Local Authorities on the range of glass separation options available, including cost-benefit analysis.

### Recommendation 6

i) The GIB should conduct an investigation into the barriers for investment in waste recycling and reprocessing infrastructure, using the AD market report as a template.
ii) HM Treasury, Defra and BIS should then consider implementing fiscal instruments, for example raising the capital allowances threshold, to support businesses developing infrastructure in line with the ambition of increasing domestic capacity for the recycling and reprocessing of different materials streams.

### Recommendation 7

Defra should explore the potential for the reinterpretation of current EA Packaging Guidelines and the introduction of a 'PRN Offset' system to provide the strongest possible incentive for the use of recycled content in packaging produced in the domestic market.

### Recommendation 8

BIS, as part of its industrial strategy, should develop and complete research and economic analysis into areas where more of the waste materials supply chain, including the reprocessing 'cycle', can be re-shored, in order to achieve maximum value to the UK economy.

### Recommendation 9

Defra should continue to set ambitious packaging recycling targets over the long-term, but only in the context of a number of other economic and policy drivers designed to promote high quality recycling in the UK.

## Section Three: Export of Waste-Derived Fuels

### Recommendation 10

The waste and resources sector, with support from local government partners, should work to raise awareness of the inherent energy value of residual waste and its potential contribution to local, low-carbon electricity and heat generation.

### Recommendation 11

Defra and DECC should build on the 'Guide to the debate' project to develop a clear long-term position on the development of EfW in the UK, to provide certainty to the domestic market.

### Recommendation 12

Government and industry should work together to ensure that C&I waste data is updated and made as accurate as possible in order to underpin strategies for future treatment of this waste stream.

### Recommendation 13

Defra, working in partnership with DECC, should commission a systematic assessment of RDF and SRF production capacity and potential markets and outlets (including location) in the UK, in order to provide greater confidence to waste management investors and businesses in the UK looking for alternative fuels.

### Recommendation 14

Government should ensure that all new build 'heat sink' plans consider the potential for the use of district heating. Infrastructure foundations should also be included in the build considerations of these new build locations.

### Recommendation 15

DCLG, BIS and the Department for Transport (DfT) should encourage the Local Enterprise Partnerships (LEPs) to carry forward the work of the Regional Development Agencies in relation to EfW development, and identify opportunities for co-location and heat use.

## Section Four: Quality, Enforcement, Innovation and Collaboration

### Recommendation 16

WRAP, working with Local Authorities and the materials-specific trade bodies, should develop further targeted communications campaigns around the area of materials capture and quality.

### Recommendation 17

Defra should set a minimum processing level for the production of RDF, to make a clear distinction between 'waste-derived fuel' and untreated municipal solid waste.

### Recommendation 18

The waste and sustainable resource management industry should highlight illegality to the Environment Agency whenever they have any information which may point to such activities. The EA should then act quickly and decisively to stop those illegal operators.

### Recommendation 19

Government should consider imposing more severe penalties for waste crime, particularly where criminal acts are repeated.

### Recommendation 20

The waste and sustainable resource management industry and the Environment Agency should work together to provide enhanced training and expertise to staff involved in the inspection of waste sites and shipments.

### Recommendation 21

Working across departments, Government should deliver a 'resources strategy' as part of industrial policy, with a focus on the best economic and environmental uses of primary and secondary resources across the supply chain, and in combination with pre-existing industrial applications.

# 1 INTRODUCTION

## 1.1 Key questions

The global waste and sustainable resource market represents a significant financial opportunity. With a current annual estimated worth of $1 trillion, its value is growing due to increasing export volumes and rising materials prices, with some estimates suggesting this global value could double to $2 trillion within seven years.[1]

With this in mind, this report will aim to provide an informative overview of the practice of waste exports as part of the UK economy. The research will examine a range of materials streams and waste-derived fuels, and will provide a comprehensive policy background to different export activities. In doing so, this report will aim to address a number of fundamental questions about the export of waste, the most important of which is:

- Why are we exporting our waste?

A risk in any discussion of waste exports is the potential for polarity in the debate. Such extremes range from the idea that exports are simply a reflection of global trade and should not be curtailed under any circumstances, to the idea that the UK should deal with all of its own waste domestically. It is important to answer this basic question, and to acknowledge the variety of factors in the debate. A nuanced approach is therefore necessary, in order to provide a background to a range of more complex issues which the inquiry chose to examine. These were:

- Is the export of different materials and waste-derived fuels a problem or an opportunity for the UK? If there are problems, what are the resulting issues? And, if these exports represent an opportunity for UK industry, how can this best be exploited?
- Following on from this, where does the UK see itself in the future in terms of resource management, economic circularity and energy production? What strategy is required for the UK waste and resources industry to achieve these aims?
- Are there domestic barriers to development evident behind some export practices?
- What is the relative impact of policy and regulatory drivers on waste exports, as compared to other external factors such as fluctuating energy and materials prices? And is current policy providing a clear and strong enough steer to the market?

Throughout the report, exports will be examined on a stream-by-stream basis, recognising that where policy or strategy may need alteration in some regards, this will

1 Bank of America, Merrill Lynch, 2013. *No Time to Waste – Global Waste Primer*. [Online] Available at: www.longfinance.net [Accessed 9 October 2013]

not be true across the board, and that a 'one size fits all' approach in relation to waste exports of any kind is not appropriate given the range of drivers influencing decision making at all points in the waste supply chain.

## 1.2 Background: UK waste market and policies

In the United Kingdom, the waste and recycling sector was valued at over £12 billion in 2010-11, and at that time employed between 104,000 – 150,000 people. UK growth in the recycling and recovery sectors has been forecast at 3.1% for 2013, rising to 4.0% in 2014.[2] This is in contrast to the forecast of UK economic growth of 1.4% for 2013, and 2.2% in 2014.[3]

UK waste management policy, which is devolved to the four nations, is governed by a range of influences, with much of the key legislation affecting the industry drafted at a European level. The EU Waste Framework Directive (WFD) provides the legislative framework for the prevention, collection, transport, recovery and disposal of waste, and also includes its legal definition (Article 3 of Directive 2008/98/EC and paragraph G3.38 of Defra's August 2012 'Guidance on the legal definition of waste and its application'), stating that the term 'waste' does not exclude, and indeed often refers to, materials 'which are capable of economic reutilisation'.

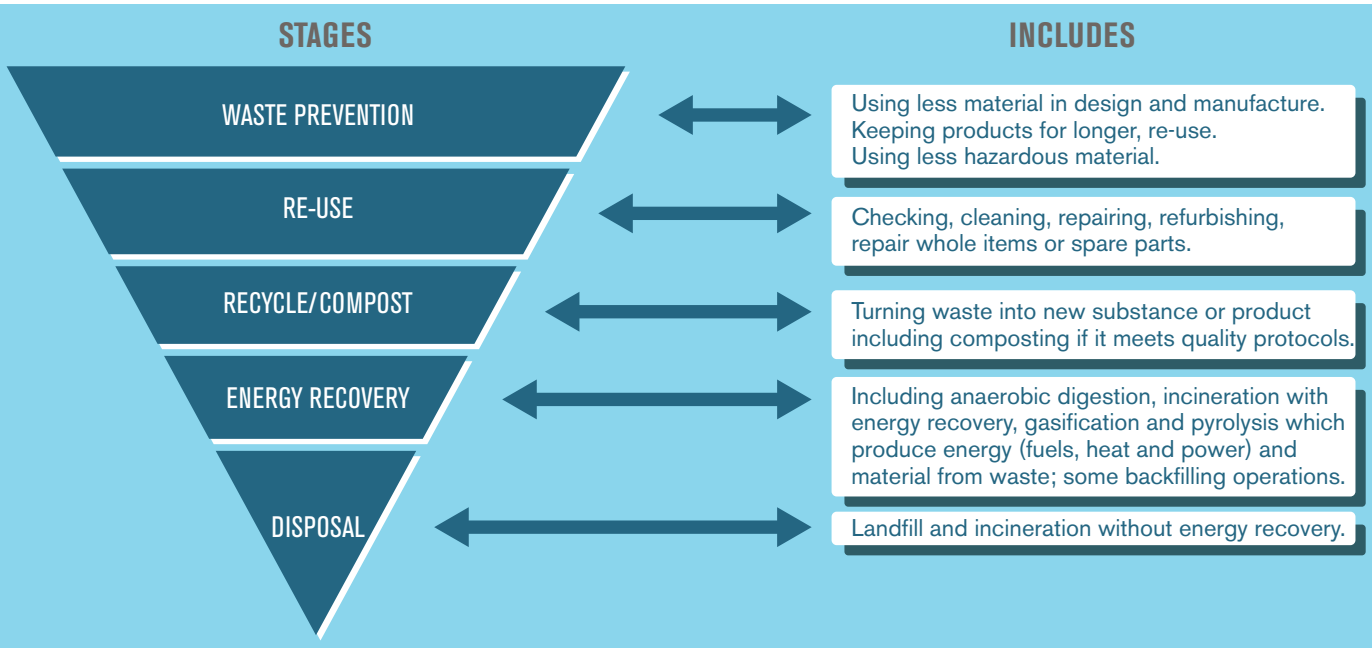
Alongside a range of EU and UK policies designed to promote the view of waste as a sustainable resource, it is this economic value of waste materials that is beginning to re-shape the way in which waste management is viewed as an activity. There has been a shift in focus from disposal to finding new and different ways to optimise the value of waste materials collected from households and businesses. Waste materials unsuitable for re-use have the potential to be traded as commodities, re-manufactured into valuable products or subjected to a basic treatment and used as a fuel to produce renewable heat and power.

The waste hierarchy is at the heart of guidance on how best to manage waste as a 'sustainable resource'. A binding requirement for any EU Member State's waste management (as set out in Article 4 of the WFD), the hierarchy functions as a guide on how to ensure the best environmental outcomes in relation to the management of waste.

In the UK, the Landfill Tax (introduced in 1996) has incentivised and drastically improved environmental outcomes for the handling and treatment of waste. Through the 'Landfill Tax Escalator', the option to landfill waste has become increasingly expensive, driving waste up the hierarchy towards options which are simultaneously less environmentally damaging and more likely to create jobs and value for the economy, such as recycling.

2 Defra, 2012. *Hansard, Written Answers* [online]. Available at: www.parliament.uk/pa/cm201213/cmhansard/cm [Accessed 8 August 2013]
3 HM Treasury, 2013. *Forecasts for the UK economy: a comparison of independent forecasts*, No.318. October 2013. [Online] Available at: www.gov.uk/uploads [Accessed 15 October 2013] pp.3

## Figure 1 - Waste Hierarchy




Source: Department for Environment, Food, and Rural Affairs

In terms of employment opportunities associated with waste management, some estimates place landfill operation at a job creation rate of one, full-time employee per 50,000 tonnes of waste, whereas the job creation rate for recycling activities is significantly higher.[4] For example, in their 2011 report 'Driving Green Growth', SITA estimates that job creation per 1,000 tonnes of waste for recycling ranges from 0.75 to as high as 40, depending on the specific material. There is also a range of employment opportunities associated with waste recovery activities, such as Energy from Waste (EfW) operations: an estimated 15 direct jobs created per 10,000 tonnes of waste processed in this way per year.[5]

Beyond this, as technologies develop, the variety of highly skilled and long-term jobs is increasing in the sustainable resources sector.[6]

### 1.3 Why research waste exports?

The UK faces a number of key deadlines in terms of resource management, energy, and climate change policy within the next 10 to 20 years.

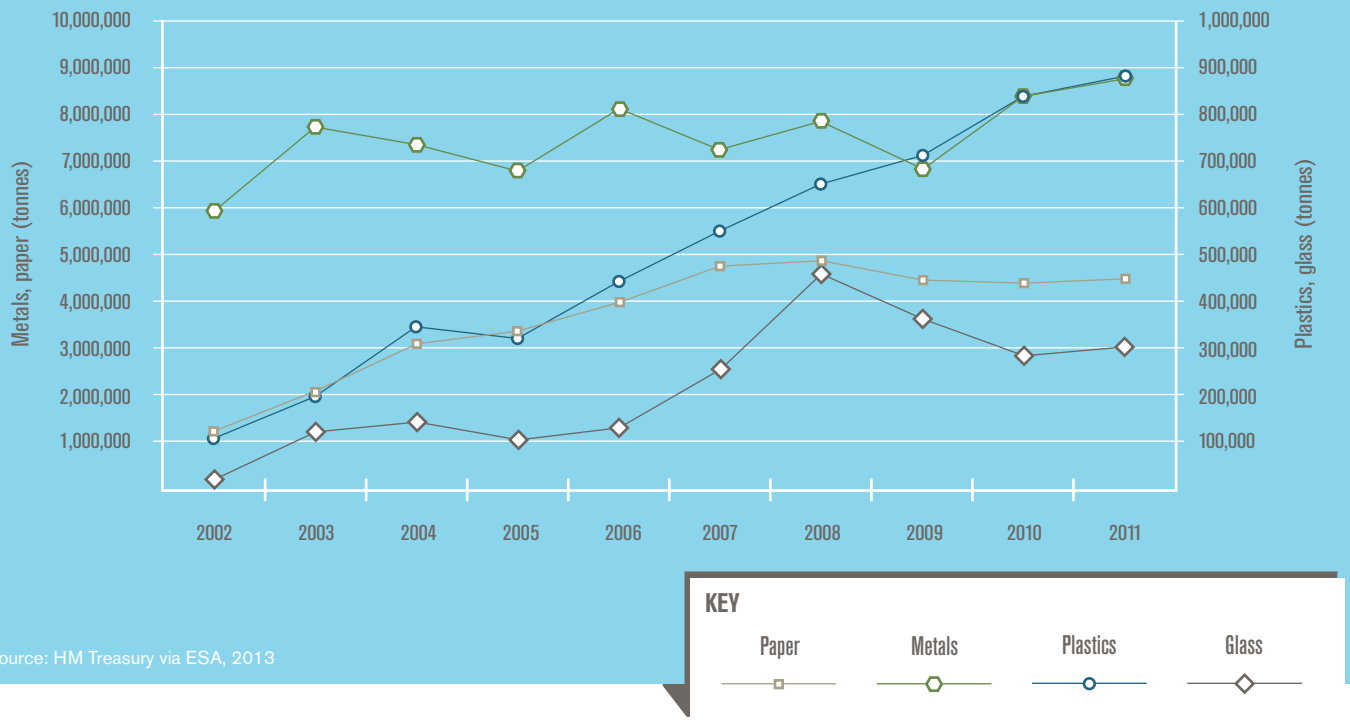
With a number of impending mandatory targets, and the benefits of improved waste treatment in line with the waste hierarchy clear, now is the time for the UK to establish a decisive, long-term policy in relation to the management of its resources, including exports.

4 Peter Jones OBE, 2012. *Future skills: Managing the transition to new technologies, 2012. Sustainable Skills: The Future of the Waste Management Industry.* Associate Parliamentary Sustainable Resource Group. pp.35-38.
5 SITA, 2011. *Driving Green Growth: The role of the waste management industry and the circular economy*. Suez Environnement. Maidenhead. pp.14-15
6 APSRG, 2012. *Sustainable Skills: The Future of the Waste Management Industry.*

For the purposes of this report, the 'export of waste' refers to materials streams such as waste plastics, glass, paper and metals, as well as the export of waste-derived fuels such as RDF (Refuse Derived Fuel) and SRF (Solid Recovered Fuel).

Waste exports have become a topic of increasing importance to the UK waste industry, particularly over the last five years, during which period volumes of waste-derived fuel exports have risen from 0 tonnes in 2008 to 887,465 tonnes exported from England and Wales in 2012.[7] Alongside this, growth in waste materials exports has also been marked, particularly when examining quantities of material exported to far-Eastern countries. Recyclate exports to China alone have increased tenfold since 2002.[8]

## Figure 2 - UK Recyclate Exports by Material Stream 2002-2011

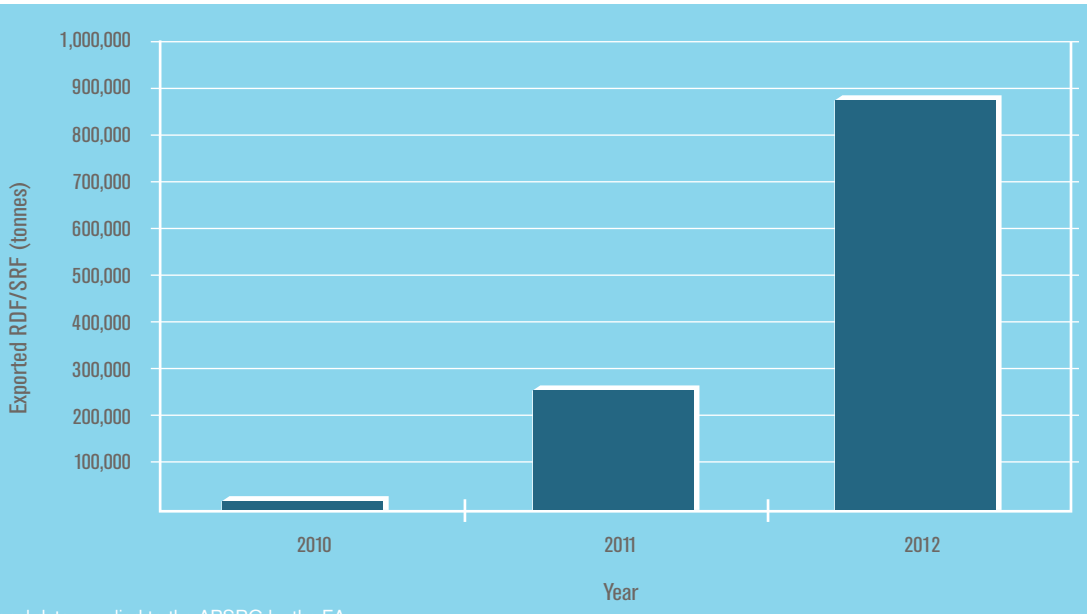



Source: HM Treasury via ESA, 2013

Against this backdrop of rising export volumes, the increasingly resource-led debate in the UK is beginning to focus on issues of materials scarcity and economic circularity. This is evidenced in Government policy, such as the 'Resource Security Action Plan', a joint publication by the Department for Environment, Food and Rural Affairs (Defra) and the Department for Business, Innovation and Skills (BIS), and even more widely in independent research conducted by organisations such as EEF, Green Alliance and the Ellen MacArthur Foundation.[9] This is placing greater value on using exported materials domestically, to mitigate risk and carve out new economic opportunities.

7 According to provisional data provided by the EA to the APSRG during the inquiry process
8 Environmental Services Association, 2013. *Overseas options: the importance of exports to UK recycling*. p.3
9 See: EEF, 2012. *Resource efficiency – Business benefits* from sustainable resource management; Green Alliance 2013. *Resource Resilient UK*. Dustin Benton & Jonny Hazell; Ellen MacArthur Foundation, 2012 & 2013. *Towards the Circular Economy Vol.1&2*.

## Figure 3 - RDF/SRF Exports 2010-2012




Source: Provisional data supplied to the APSRG by the EA

This philosophical shift in the approach to waste management will have fundamental implications for how the UK views and manages resources in the future. However, this is dependent on addressing key issues through long-term policy, consistent with the vision of a more resource efficient, economically and environmentally resilient, sustainable resource management industry.

Parallel to the deadlines facing the UK in terms of waste and resource management, the country is also approaching mandatory renewable energy targets, and is currently experiencing sharply rising energy prices.

It is a combination of these factors: the rising volume of materials and waste-derived fuels exports from the UK; the tangible shift in the direction of the waste debate; and the impending 'energy crunch', that means that the topic of waste exports is a necessary consideration in how the UK will shape its economic and industrial future.

### 1.4 Considerations: UK economic growth and resilience

As outlined in 1.1, the waste market is interconnected and global, and cannot be scaled down and viewed in absolute isolation for any one nation where the import and export of materials is common practice.

With this in mind, and as with any issue of such complexity, the inquiry recognised that there are a broad range of perspectives from which the topic of the export of waste can be viewed. Therefore, several different options for the 'prism' through which this research could be viewed were considered.

In order to provide a report of the most possible relevance to the UK Government and at a time when economic recovery is, though fragile, becoming more apparent, the inquiry has viewed its chosen topic through the lens of 'UK economic growth and resilience' and will make recommendations appropriate to this theme.*

* Whilst this report makes recommendations with a UK-wide relevance, it should be highlighted that the APSRG is a Westminster-based organisation, and the overwhelming majority of responses to the Call for Evidence issued as part of the inquiry process focused around waste operations and policy in England, or England and Wales. It should therefore be noted that the final report reflects this, and centres around England as the UK's largest generator of waste.

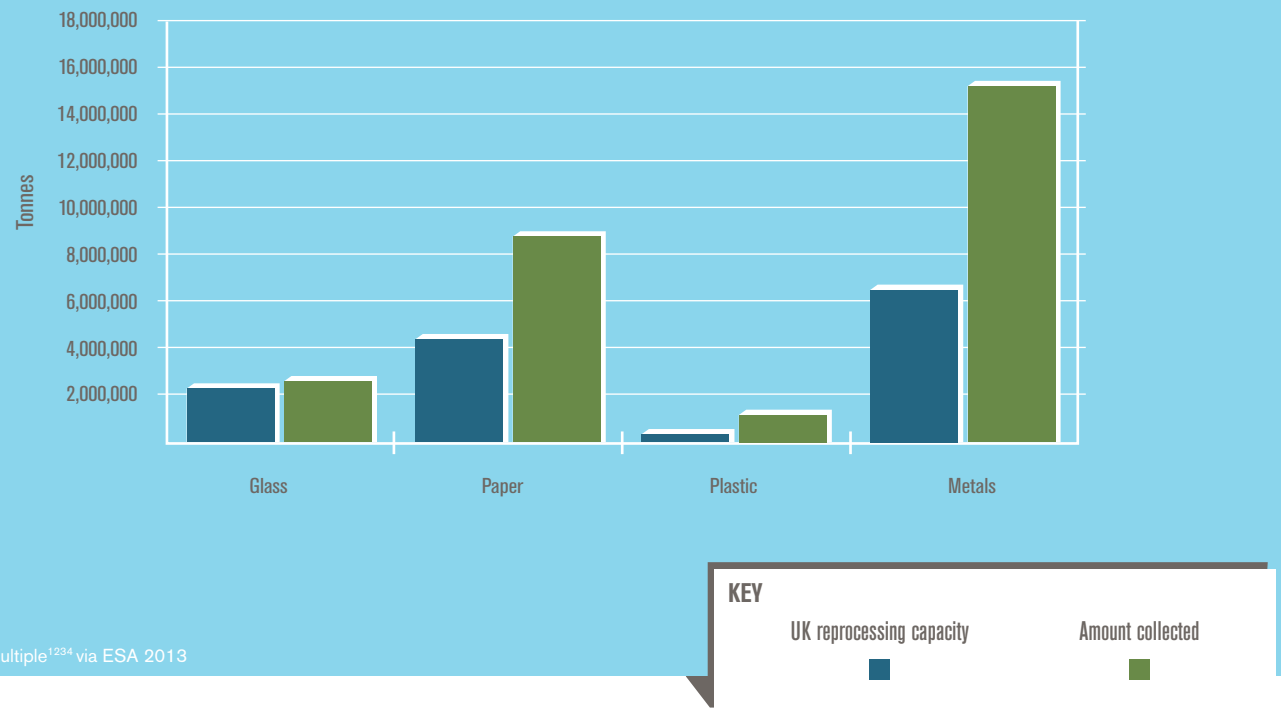
# 2 EXPORT OF RECYCLATE

## 2.1 Background: Why do we export recyclate?

The collection and treatment of recyclable materials from UK households has been a major success story for the waste and resources sector. In the past ten years, the percentage of municipal solid waste (MSW) collected and recycled in England alone has risen from 11% to approximately 43%.[10] However, against a backdrop of plateauing local authority recycling rates and impending EU targets, the UK is in a position where increasingly more material is collected than can be reprocessed domestically.

This gap between volumes collected for recycling, and domestic recycling and reprocessing capacity, is filled with exports. These exports represent a positive contribution to the UK net balance of payments: the country sends materials abroad, and payments come in.

### Figure 4 - Materials Tonnages vs. Domestic Capacity




Source: Multiple[1234] via ESA 2013

1. FEVE, the European Container Glass Federation, glass packaging and statistics, 2011
2. Confederation of Paper Industries, '2011 Annual Review', 2011
3. WRAP, 'Realising the value of recovered plastic – an update', 2010
4. British Metals Recycling Association

10 Defra. See: www.gov.uk/defra

In its 2011 'Review of waste policy in England', Defra estimated that recyclate exports from the UK amount to 15 million tonnes annually.[11] By volume, this represents approximately one sixth of all non-fossil fuel exports. In comparison to this, the UK imports 315 million tonnes of goods and products a year, with many of these coming from the main 'end destination' for the UK's recyclable materials: China.[12]

This indicates the UK's role in a huge, interconnected, global economy. In this global economy, one third of all profit warnings issued by FTSE 350 companies were linked to resource risks in 2012.[13] In this context of 'resource insecurity' it is important to examine the practice of exporting these resources, and whether more value can be extracted domestically from the materials streams we send abroad in order to create a range of jobs, secure a range of feedstocks to the UK's manufacturing sectors, to promote green skills and to improve UK economic resilience to resource risks.

A complex range of factors beyond waste policy also determine whether more recycled materials are used in the domestic market; including tax regimes, the cost of energy, and the cost of labour.

### 2.1.1 Materials streams

For the purposes of this inquiry, the materials streams that will be examined in this section are, broadly: plastics, metals, glass and paper, which are those commonly understood by the term 'dry recyclables'.

Organic waste, textiles and Waste Electrical and Electronic Equipment (WEEE) are all waste streams not explored within this inquiry, but which merit further discussion in the context of the 'export debate'.*

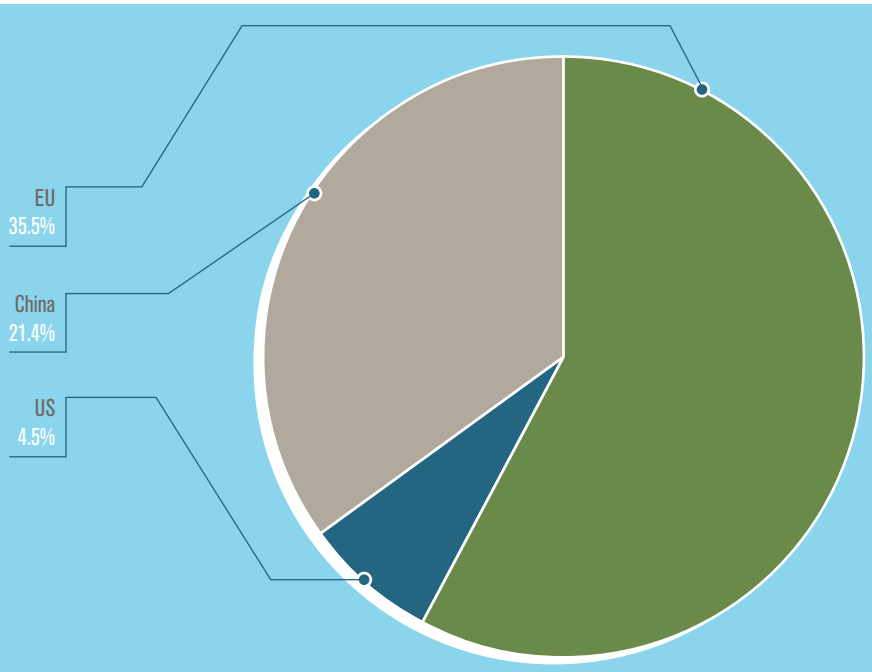
### 2.1.2 Policy overview

The EU is the world's biggest exporter, as well as importer, of non-hazardous waste destined for recovery (defined in Article 3 (15) of the Waste Framework Directive as 'any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy').[14]

11 Defra. *Review of waste policy in England*, 2011. pp.22
12 Department for Transport. *Statistical Release – Quarterly Port Freight Statistics*, September 2013, pp.2
13 Ernst & Young, 2012. *Q1 Analysis of profit warnings issued by UK quoted companies*. London. pp2
14 European Commission, 2011. *Trade and waste shipment in a nutshell*. [Online]. Available at: www.ec.europa.eu/trade/import-and-export-rules. [Accessed 19 August 2013].

* The APSRG will undertake further research in the area of WEEE exports, as this is an area of particular risk from the perspective of economic 'resilience', given rare earth content in many WEEE streams. However, this was beyond the scope of this inquiry.

## Figure 5 - EU Global Import/Export Share



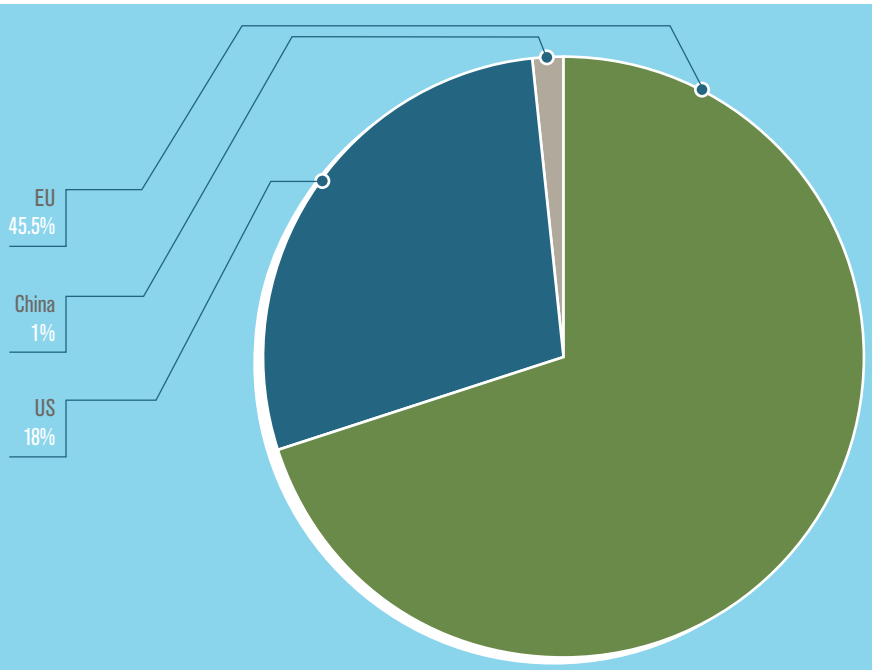

**DATA**

EU: 35.5% of the world's exports arrive in EU countries

China: 21.4% of the world's exports arrive in China

US: 4.5% of the world's exports arrive in the US

Source: EC 'Trade and Waste Shipment in a Nutshell', 2011




**DATA**

EU: 44.5% of materials imported has arrived from EU countries

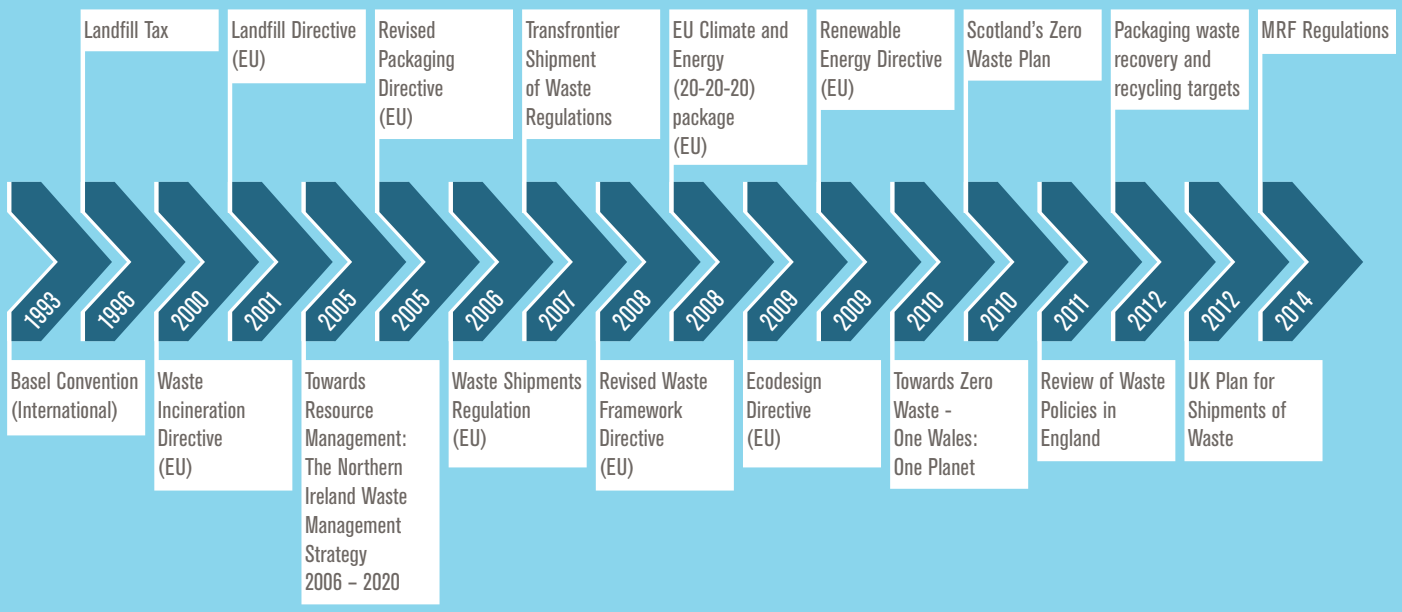
China: 1% of materials imported has arrived from China

US: 18% of materials imported has arrived from the US

Source: EC 'Trade and Waste Shipment in a Nutshell', 2011

The shipment of waste is governed by international legislation. The 'Basel Convention' on the control of transboundary movements of hazardous and non-hazardous wastes and their disposal provides the framework for a global system for controlling movements of hazardous wastes and other wastes, and ensuring these wastes are managed in an environmentally sound manner.[15] The Basel Convention was developed by the United Nations Environment Programme (UNEP) in 1989, and entered into force in the EU in 1993.

## Figure 6 - Policy Timeline




Source: European Commission, UK Government, Basel International

The legislation governig this trade in the EU, and from the EU to non-OECD (the Organisation for Economic Co-operation and Development) countries, is the 'Waste Shipments Regulation' (WSR). This is supplemented by the UK 'Transfrontier Shipment of Waste Regulations' (TFS), which outlines the relevant enforcement authorities for the WSR across the UK, as well as the size of the penalties for offences listed in the WSR.

In addition to this, the 'UK Plan for Shipments of Waste', updated in May 2012, outlines UK obligations in relation to waste shipments under international, EU and national law and sets out two priorities for the shipment of waste for recovery:

> To encourage international trade in waste for recovery where this is of environmental benefit in driving up levels of recovery at national, EU and global levels.
>
> To prevent damage to human health or the environment occurring as a result of this international trade.[15]

### 2.1.3 'Green list' exports

Under Annex III of the WSR, different types of wastes are listed on one of three lists: red, amber or green. The green list includes entries for most commonly recycled wastes, as long as they are sorted and uncontaminated. This means that these materials are subject to significantly fewer controls than hazardous waste, or waste being shipped for energy recovery.* Green list recyclate can be exported under a lower level of control to EU, OECD and some non-OECD countries for recycling.[16]

Generally speaking, unsorted or untreated waste cannot be exported from the UK. Shipments of such material are illegal under the WSR, unless they are exported under extremely strict 'red list' controls.

### 2.1.4 MRF Regulations

The increased focus on the importance of waste as a resource has resulted in a quality drive for recycled materials. To that end, the Government has developed a proposed regime of quality testing for Materials Recovery Facilities' (MRFs) inputs and outputs. The MRF Regulations will stipulate frequency and sample size of testing and the resulting data will be made public, revealing the comparative performance of the 112 MRFs across the UK. The Regulations are due to be published in 2014, and should be made available as soon as possible to provide certainty to industry.

### 2.1.5 Waste policy across Government departments

Waste is a disparate policy area, spread across a number of Government departments. Defra is responsible for overarching waste policy in the UK, however other Government departments, including the Department for Communities and Local Government (DCLG), the Department for Business, Innovation and Skills (BIS), HM Treasury, and the Department of Energy and Climate Change (DECC), focus on different specific aspects of waste policy.

The Environment Agency (EA) is the executive non-departmental public body responsible to the Secretary of State for Environment, Food and Rural Affairs for enforcement of environmental regulations in England. The EA therefore serves as the

15 Defra, 2012. *UK Plan for Shipment of Waste.* pp18
16 Environment Agency. *Transfrontier Shipment; Green list waste.* [Online]. Available at: www.environment-agency.gov.uk/business/sectors/37182.aspx [Accessed 19 August 2013]

* Regulations in this regard will be discussed in detail in Section 3

enforcer of waste policy across England. It monitors waste shipments, runs all waste permitting schemes and inspections, and prosecutes 'waste criminals'.[17]

This spread of policy responsibilities in relation to waste and resources across a number of departments is widely perceived to lead to a lack of 'joined up' or 'long-term' thinking in policies affecting the sector.

To dispel this perception, it will be important that, where possible, Government produces cross-departmental research and policy projects to help provide confidence across the domestic and export industry (see Recommendation 21, Section 4.5).

## 2.2 PRN/PERN system

The Packaging Waste Recovery Note and Packaging Waste Export Recovery Note (PRN/ PERN) system is an example of where equalisation of treatment and regulation affecting waste exports can be achieved.

Under the EU 'Packaging and Packaging Waste Directive', the UK has a statutory producer responsibility regime for packaging, which places a legal obligation on businesses which make or use packaging (such as manufacturers, converters, packers/ fillers and retailers) to ensure that a percentage of the total packaging they place on the market is recovered and recycled.[18] This is known as 'obligated tonnage'.

Within this system, PRNs or PERNs act as certificates of evidence to demonstrate when packaging waste has been recycled.

This system enables packaging producers to cover their legal recycling 'obligation' by purchasing the right amount of evidence (or PRNs) to match their 'obligated tonnage', which should add up to the Government's total mandatory recycling target for packaging materials. This obligation is shared across the supply chain.

This inquiry found that it is widely considered that there is an inconsistency in the PRN system, related to an imbalance in the treatment between the production of recycling evidence in the form of PRNs (evidence of recycling in the domestic market) versus PERNs (evidence of export for recycling).

Using plastics as an example, perceived issues with the current PRN system become clear. The amount of usable material in a tonne of collected plastics can vary significantly, depending both on the collection and sorting methods used to produce the recyclate and on the reprocessors' own technology.

If a UK reprocessor receives a consignment of material, which following further sorting and cleaning by the reprocessor exceeds 25% of unusable material, the reprocessor will

17 Environment Agency. See: www.environment-agency.gov.uk
18 Defra, 2013. *Packaging waste – producer responsibility regimes*. [Online] Available at: www.gov.uk/defra [Accessed 30 October 2013]

only be able to produce and sell a PRN based on the actual material produced from the bales received.

A PERN, however, is not currently linked to the equivalent 75% output yield threshold, meaning that a 100 tonne shipment would produce 100 PERNs, where an equivalent amount sent for domestic reprocessing may only produce 75 PRNs.

As PRNs are based on the amount of usable material within any given consignment supplied to a reprocessor, and PERNs are based on the weight of a consignment prior to shipment, an unintended consequence of the current system may be to incentivise exports.

Whilst the export of recyclate is an accepted and valuable practice for the waste and resources industry, this should not be incentivised to the detriment of the domestic reprocessing industry.

Therefore, a level playing field between the issuing of PRNs and PERNs should be supported. It should be ensured that all recyclable material, whether for use in domestic or overseas markets, is held to the same standard with regards to contamination.

This level playing field could be developed through a system of 'deeming' exports for recyclate to be at a specific yield of target material, reflecting that of domestic reprocessing.

This 'yield rate' would then need to be adjusted to reflect differences in materials streams, recognising that potential contamination rates in glass and metals, for example, would typically be much lower than in plastics or paper.

As a first step towards this, the current system should be reinforced, and address concerns surrounding equality of treatment, by implementing a policy whereby no export consignments receive a PERN based on an assumption of 100% target material, without proof that this is an accurate reflection of the shipment.

### Recommendation 1

In order to support a 'level playing field' between the issuing of PRNs and PERNs, Defra and the EA should ensure that PERNs are only issued for 100% of material exported if this is supported by evidence provided by the exporter.

## 2.3 'Operation Green Fence'

Whilst the export of waste materials offers resilience to exporters against changes in demand in the domestic market, it also equally exposes UK businesses to volatility due to changing economic circumstances or policy changes in end markets for exported waste materials.

Uncertainty in relation to enforcement of environmental policies affecting key end destinations has recently become an influencing factor in the export of recyclable materials, due to a policy instrument increasingly being enforced by the Chinese Government, known as 'Operation Green Fence'.

Since February 2013 there has been a marked increase in the policing of 'Operation Green Fence' in ports in Hong Kong and China. The aim of the operation is to substantially reduce, and in many cases prevent, the import to China of contaminated waste shipments.

A contamination threshold of 1.5% was set for all green list exports to China. It should be highlighted that this contamination threshold broadly reflects standards demanded of exporters within the UK, although anecdotally it does not reflect Chinese standards before the enforcement of Operation Green Fence, when China was in some cases used as a 'sink' for lower quality material.

The new Operation Green Fence regime includes random, on-the-spot inspection of all waste materials shipments.

The International Solid Waste Association (ISWA) has estimated that in the first three months of the Operation, 55 shipments destined for China were halted and returned.[19]

Although this represents a relatively small percentage of total exports to this market, it sent a powerful signal to UK recyclers about the future of recyclate exports to China, making the drive for quality in UK materials captures even more pressing.

Operation Green Fence and its effect on domestic business has underlined the UK's vulnerability to policy changes in Asia, a vulnerability largely caused by the lack of domestic reprocessing capacity and the UK's dependence on exports to maintain high recycling rates, but made more severe due to low quality materials being exported from the country.

In order to address the vulnerability on the demand-side of global waste supply chains, and to create a more stable and resilient waste and resources economy in the UK, increased materials quality will be of key importance (see Section 4.2).

19 ISWA via Guardian: Resource Efficiency Hub. '*Could China's "Green Fence" prompt a global recycling innovation?*', August 2013. [Online]. Available at: www.theguardian.com/sustainable-business [Accessed 30 October 2013]

## 2.4 The Circular Economy across borders

The notion of a 'circular economy' has become prevalent in the 'waste debate' over recent years, and this resources-led approach has the potential to transform the way in which waste is regarded and managed, if sufficient support is provided from both industry and Government.

With regards to waste exports, it is important to consider the idea of resource circularity in terms of a range of scales.

For example, whilst a plastic bottle used, collected, recycled and reprocessed in the domestic market represents a 'circle' or a 'closed loop', it is also true that a plastic item produced in China, consumed, discarded and collected in the UK, and then exported for recycling or reprocessing in the Chinese market, is part of the 'circular economy'.

In this sense, whilst benefits can be gained from keeping some materials in the domestic market, industry and policy makers should also consider, and apply long-term thinking to, the larger, transfrontier 'circles' afforded by waste exports.

The Chinese Green Fence crackdown can be seen as a step towards a transfrontier circular economy, as such 'resource loops' can only be underpinned by high-quality exports.

In recognition of the value of high-quality exports, and to show long-term thinking is being applied to the future of the resources economy, research should be undertaken to identify and develop new robust markets for recyclate export, reducing current risk to UK plc.

**Recommendation 2**

Industry and Government should undertake research into the identification and development of a range of opportunities to supply high-quality recyclate to manufacturers, including those abroad.

# 2.5 ECOTRAX

## CASE STUDY

Ecotrax is a recycled polymer composite railways sleeper, manufactured from a blend of recycled materials. Incorporating locally sourced recycled plastics such as polyethylene, polypropylene and plastic composites, Ecotrax is an example of where a waste stream that was generally exported is now being used for high quality applications.

A considerable amount of waste plastics – packaging and non-packaging – are exported to markets across Asia, particularly China. The Chinese market for waste plastics export has been restricted following the increased enforcement of Operation Green Fence earlier this year.

While the export of recycled plastic clearly generates export revenue for the UK, far greater value is added by the importers in turning recyclate into products, representing a possible economic opportunity for UK plc where these value-added processes could be completed in the domestic market.

Against this background, and from this waste stream, Sicut Enterprises has developed 'Ecotrax'.

Sicut Enterprises estimates the potential European demand for composite railway sleepers as a replacement for timber to be worth over €500m per annum.

Ecotrax is in use or trial in over 15 countries. It is now an accepted commercial solution in North and South America and Canada. It is on full scale trial in France, Russia, Australia and New Zealand with further trials planned in the UK and Belgium later this year and in early 2014.

Products like Ecotrax have the potential to enable the UK to convert a plastic waste stream that is traditionally exported in to a high value product, creating jobs and wider social and economic benefit for the UK.

Ecotrax is 100% recyclable and therefore can be returned at the 'end of life' and converted into new products, which in turn can be exported again to make a positive contribution to the UK net balance of payments. This is an excellent example of the potential to create unique 'closed loop economy' domestic business models from export streams, and to provide environmentally and economically advantageous solutions through recycling and product innovation.

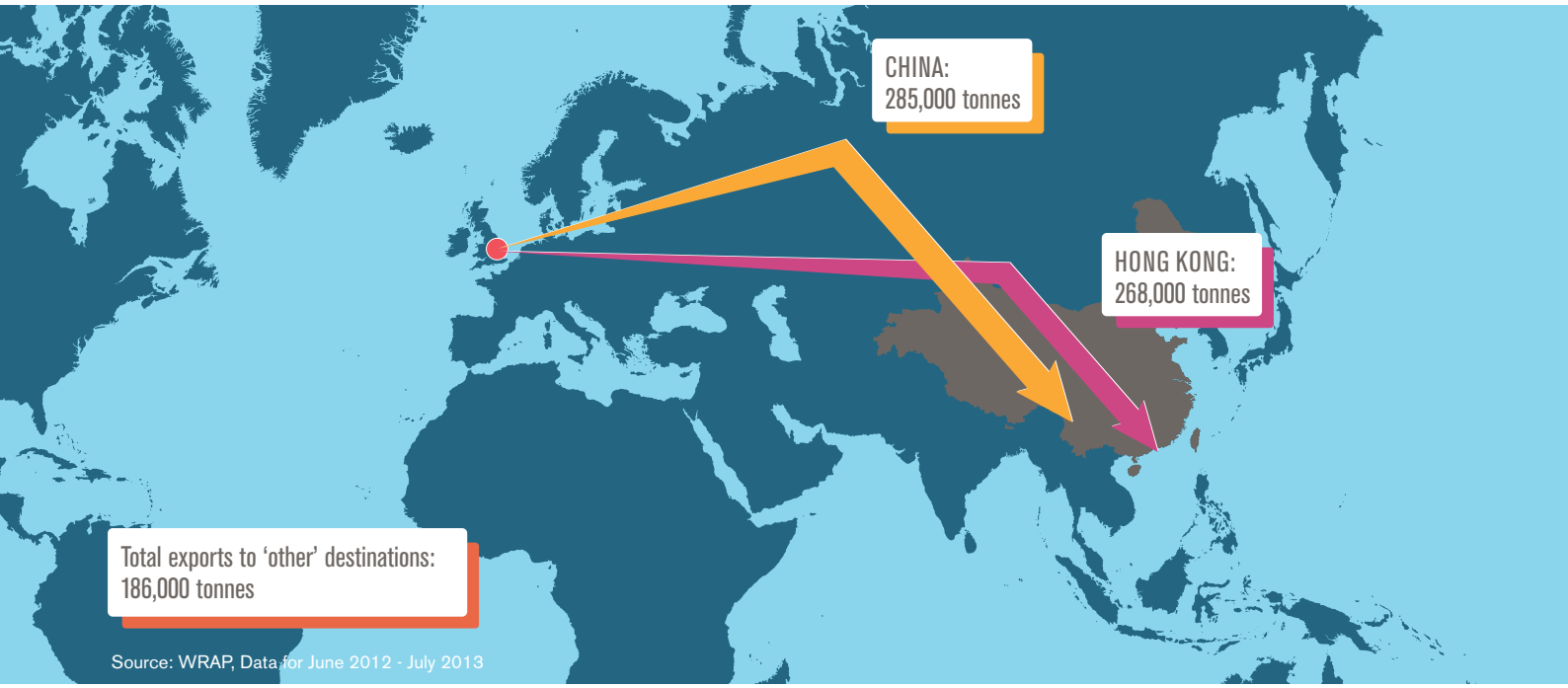
The development of Ecotrax was supported by a loan from WRAP's 'Accelerating Growth Fund', which invests in companies operating within the recycling field that demonstrate rapid growth potential. The fund supports higher 'added value' recycling processes, and waste plastics is a particular focus.

## 2.6 Plastics

- The export of recovered plastics has increased substantially over the last decade, rising from 100,000 tonnes to 900,000 tonnes per year between 2002 and 2011[20]
- An average of approximately 63,000 tonnes of recovered plastics was exported from the UK to destinations across the EU and Asia each month in 2011-2012
- Approximately two-thirds of plastics waste exported from the UK is comprised of used packaging[21]
- The UK imports between 5,000 – 10,000 tonnes of recovered plastic on average each month[22]

Robust economic growth, and an established manufacturing base in China and other parts of Asia has led to high demand for recovered materials, including plastics. Asia, and particularly China, has therefore become a key 'end destination' for plastic recyclate from the UK. Approximately 70% of plastics collected in the UK are exported for recycling, and of these, 90% are now sent to China.

### Figure 7 - Plastics Export Map




20 ESA, 2013. *Overseas options: the importance of exports to UK recycling* (UK recyclate exports by material stream 2002 – 2011, HM Revenue and Customs). pp.3
21 WRAP, 2010. *Realising the value of recovered plastic – an update.* [Online]. Available at: www.wrap.org.uk. [Accessed 23rd August 2013]. pp.2
22 HM Revenue and Customs

The high volume of plastics exported for reprocessing to some extent reflects under-development in the domestic market, as the amount of plastics collected is around four times greater than the volume of UK plastics reprocessing capacity. However, as referenced above, this is also a natural by-product of the overall balance of trade between the UK and Asian countries such as China, due to the UK's position as a 'net importer' of goods linked to its comparatively small manufacturing sector.

### 2.6.1 The potential for growth in the domestic reprocessing market

Nonetheless, with high-quality plastic recyclate representing a valuable commodity, the development of further capacity for treating and reprocessing plastics in the domestic market is an important consideration for both Government and industry.

Alongside key concerns such as the cost of energy and labour, rising export volumes, and an associated effect on waste feedstock security within the UK, may be affecting the development of a domestic reprocessing capacity for some key plastics.

WRAP has highlighted the increasing demand for food-grade recovered plastics in the UK, driven partially by voluntary initiatives such as the 'Dairy Roadmap' and WRAP's 'Courtauld Commitment', but notes that issues of capital expenditure and risk, such as the security of feedstock, is deterring some reprocessors from moving into the UK market.

With the proven success of voluntary agreements which stimulate demand for specific materials streams within the UK – for example the increase in demand for recycled HDPE seen as a result of the Dairy Roadmap's ambition to include 50% rHDPE in milk bottles by 2020 – Defra, through WRAP, should explore how this work stream could be built on to provide greater certainty to reprocessors looking to develop in the domestic market.

**Recommendation 3**

In line with the current Government's support for voluntary agreements, Defra should explore, through WRAP, how future voluntary schemes, such as the Dairy Roadmap, could stimulate demand for key secondary materials, helping in turn to stimulate the development of a domestic market.

Plastic is an extremely versatile 'growth' material that is being used in an increasing range of applications in different industries. Whilst it is broadly highly recyclable, there is substantial room for improvement in plastics collection (36% of all plastic bottles, for example still go to landfill each year, and these are amongst the most recycled plastic items on the market) and recycling in the domestic market.[23]

23 Valpak, 2013. *PlasFlow 2017 Data: Business as Usual* 2017

With this in mind, and the impact of the Chinese Green Fence policy resulting in a drive for higher quality recyclate, UK Government and industry should develop concrete ways in which greater value can be extracted from how plastics recyclate is handled. This may involve greater investment in processes such as shredding and baling, or pellet production, of plastics, for example (see Recommendation 8, Section 2.13).

Improvements to the PRN and PERN system, as outlined in 2.2, would also help to stimulate the domestic market for plastics reprocessing.

## 2.7 Paper

- The paper industry in the UK has an aggregate annual turnover of £5 billion and over 125,000 direct and indirect employees
- China is the largest importer of used UK paper fibres
- The UK is the largest exporter of paper within the EU
- The UK's overall paper recycling rate, including exports for recycling, is 79%[24]
- In 2012, 3.8 million tonnes of recovered paper were delivered to UK mills for reprocessing, and approximately 4.3 million tonnes were exported[25]

Whilst there has been some rationalisation of UK paper-making capacity over the last decade, substantial amounts of waste paper is still recycled in the UK, with a particular emphasis on the production of lightweight packaging papers and newsprint grades.

Alongside this there remains a significant export market for recovered paper, with approximately 55% of what is collected in the UK exported for recycling. Of these exports, 80% go to China.

Including exports, the UK's current paper recycling rate is high, at approximately 79%, and the overall reutilisation of paper fibres arising is even higher, at 87%.

Of the 8.2 million tonnes collected annually, approximately 4.3 million tonnes are exported and 3.8 million tonnes are consumed by domestic mills.

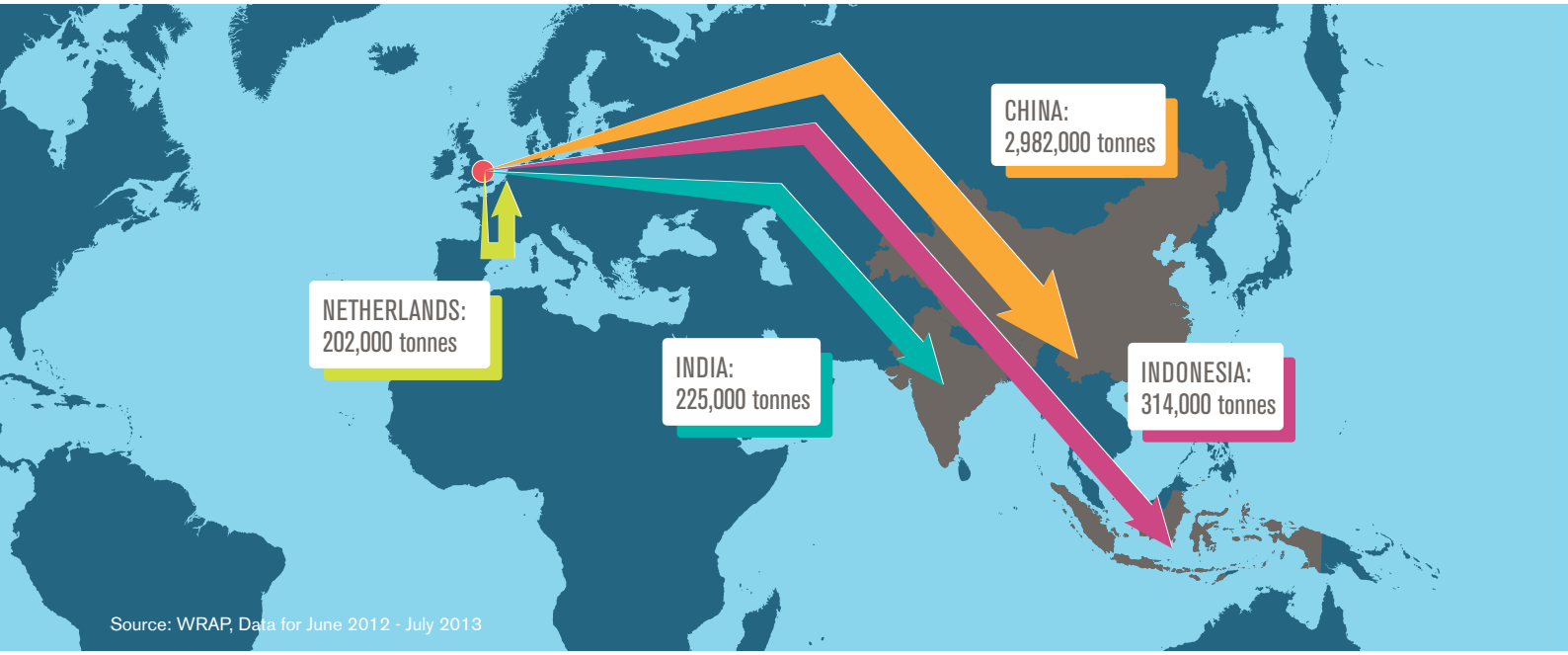
### 2.7.1 Impact of Green Fence policy

As China is such a key end market for paper recyclate exports, exporters of recovered paper are being noticeably affected by the increased enforcement and implementation of Chinese Green Fence policy.

Although a British Standard (BS EN643) exists for recovered paper, applying a limit of 1.5% to the non-paper component of bales, in line with the requirements of the Green Fence, studies show that non-target material in recovered paper may be as high as 11%.[26]

24 Confederation of European Paper Industries (CEPI). See: www.cepi.org
25 Confederation of Paper Industries, 2012. [Online] Available at: www.paper.org.uk [Accessed 29 August 2013].
26 WRAP, 2009. *MRF Quality Assessment Study*. [Online] Available at: www.wrap.org.uk [Accessed 11 November 2013]

## Figure 8 - Paper Export Map




As Chinese standards are now in line with the British Standard, shipments which evidence a higher rate of contamination are now at risk of being turned away from ports in Hong Kong and China.

The impact of the Green Fence 'signal' on the recovered paper export industry has been clearly borne out in export statistics for the sector: in 2013 export figures for the six months up to June 2013 show a decline of 8.5% in volumes sent abroad for reprocessing.

In the same period exports to Indonesia (the second largest export market for paper) rose by 4% and exports of paper to India (the third largest export market) rose by a significant 40%.

This appears to show that exports of lower quality paper are continuing to flow to export markets with less robust inspection regimes than Europe and China. The fact that alternative end markets (without stringent quality regimes) are being found may disguise the full scale of low quality recovered paper leaving UK ports.

### 2.7.2 Domestic paper recycling industry

As with the development of any industry in the UK, high energy and labour costs – when compared to foreign markets such as China – should be noted as a key consideration for the development of paper recycling infrastructure, which is energy intensive.

Despite this, data shows that the paper industry has invested over £1 billion into paper recovery and recycling infrastructure in the UK since 2009, equating to the retention of over 1 million extra tonnes of recovered paper within the domestic market.

The paper recycling 'loop' will undoubtedly continue to include a substantial proportion of exports to external manufacturing economies. This is due to the overall success of UK paper recycling, meaning that surplus fibres collected in the domestic market can be sold abroad to feed into global fibre markets. It should be highlighted that paper sent to China for recycling does not return to the UK for use due to the relative low value of paper materials making such shipping distances financially impractical.

The level of investment in UK-based recycling capacity is a signal from the paper industry that it sees opportunities for further development in the domestic market.

Two key issues that were raised by the paper industry throughout the inquiry, pertaining to the long-term future of paper recycling were: the need for collection systems which provide a material stream of consistent quality; and the concern that declining number of paper fibres available in the domestic market may be incorporated into the Energy from Waste (EfW) feedstock stream. (See Recommendations 5 and 17; Section 2.11 and Section 4.3.2, respectively).

## 2.8 Glass

- Glass can be infinitely recycled without any loss of quality
- Recycled glass is known as 'cullet'
- The use of 'cullet' within glass packaging has substantial environmental benefits, reducing the overall carbon footprint of the packaging item
- It takes 1.2 tonnes of raw materials, but only 1 tonne of cullet, to make 1 tonne of glass[29]
- Glass is more commonly reprocessed within the UK than exported: between January and March, 2013, approximately 260,000 tonnes of glass was reprocessed domestically, in comparison to approximately 60,000 tonnes sent for recovery abroad
- However, export volumes of glass recyclate are increasing
- Glass is the only material subject to a 'split PRN target', which mandates that a certain percentage of glass recycling each year is met through the production of new glass containers, as opposed to the production of low-value aggregates

29 British Glass. *Glass is infinitely recyclable*. [Online]. Available at: www.britishglass.org.uk. [Accessed 28 August 2013].

The glass sector in the UK has seen a marked increase in export volumes over recent years, which, unlike with other materials streams, has not been matched by a parallel increase in volumes collected for recycling.

With increased export not attributed to greater arisings in the glass sector, a number of other key economic factors have played a role in driving export trends.

### 2.8.1 PRN/PERNs and glass exports

As with other materials streams, such as plastics and paper, the PRN/PERN system is perceived by the glass sector to have strongly influenced recyclers, favouring export. There is a non-legislated quality threshold of no more than 5% non-target material for glass being exported for remelt applications. However, this inquiry has found, anecdotally, that contamination may occasionally reach levels of 10-15%, for which a PERN is still issued as if that 10-15% were quality glass recyclate.

Although examples such as this are likely to be fringe activities they do detract from responsible producers of quality recycled materials, and would be rewarded by the PERN system as currently operated and enforced.

The economic incentive created by PERNs issued by weight, assuming purity (as opposed to PRNs issued by yield), has since been compounded by the high PRN/PERN prices for glass in the current market, at least in part due to some past inaccurate reporting of glass arisings, as evidenced in a 'GlassFlow' report published on October 17 2013, creating a surplus, followed by a shortage, of available recycling evidence.[30] This high price point makes the 100% yield of a glass PERN even more attractive when compared to the variable yield of a domestic PRN.

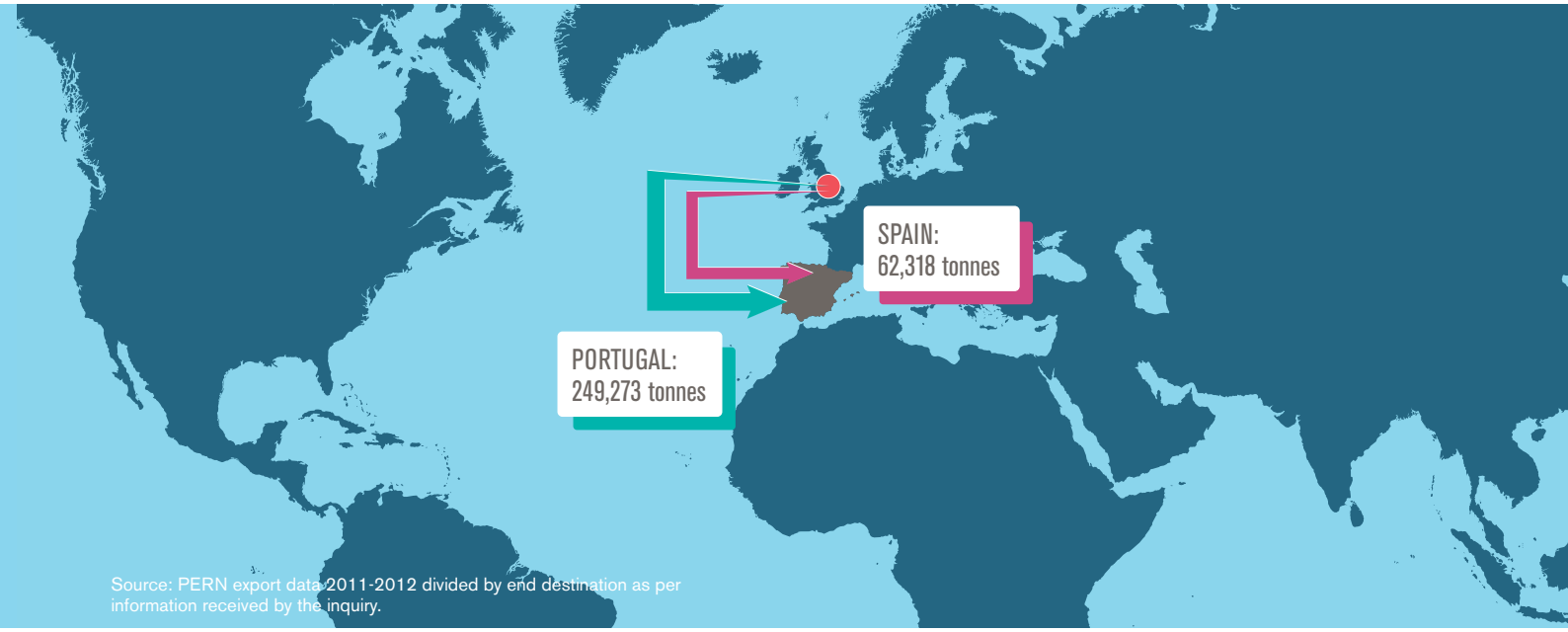
### 2.8.2 Other economic factors

In addition to the economic value of the PERNs themselves, the option to export a lower-quality material also opens up the potential for savings across the glass supply chain. Where the UK has specific quality requirements for glass recyclate, overseas markets do not. Therefore, from collection through to export, economic margins can be saved at the expense of the quality of the recyclate and an end market can still be found.

This begins with the collection system, where the more cost-efficient option of commingling represents a greater challenge in terms of securing consistent quality glass recyclate, and ends with the export of the glass, where recyclers can save on the overheads and capital expenditure of treating the material in the domestic market by sending a material with a higher level of contaminant abroad.

30 Valpak & WRAP, 2013. *GlassFlow Report 2012*. [Online]. Available at: www.valpak.co.uk/GlassFlow [Accessed 30 October 2013]

## Figure 9 - Glass Export Map




### 2.8.3 Domestic glass production vs. export

The key end markets for exported glass cullet for remelt, Portugal and Spain, both mainly produce green glass. This green glass can be produced from mixed glass shipments.

UK container glass production focuses around clear glass, requiring colour-separated glass cullet.

This represents the principal source of competitive disadvantage for domestic reprocessors, and work has been completed by WRAP in this area to try and address the potential to develop use of green glass in the domestic market.[31]

The UK's appetite for clear glass is one reason why the UK still imports glass from abroad, as the level of quality and separation in the domestic market cannot fully service its own glass production. This also plays a role in incentivising export to markets who will accept and use mixed glass cullet.

### 2.8.4 The future of glass exports

One key differentiation between glass and other recyclate streams is the lack of inherent value in the material. Whilst glass currently achieves 'high' PRN/PERN prices of £60-£70 per tonne, this is in reality beyond the value of the material itself. Other recyclate exports achieve a value of hundreds of pounds per tonne. This means that the value of the material is too low to allow for extra shipping costs.

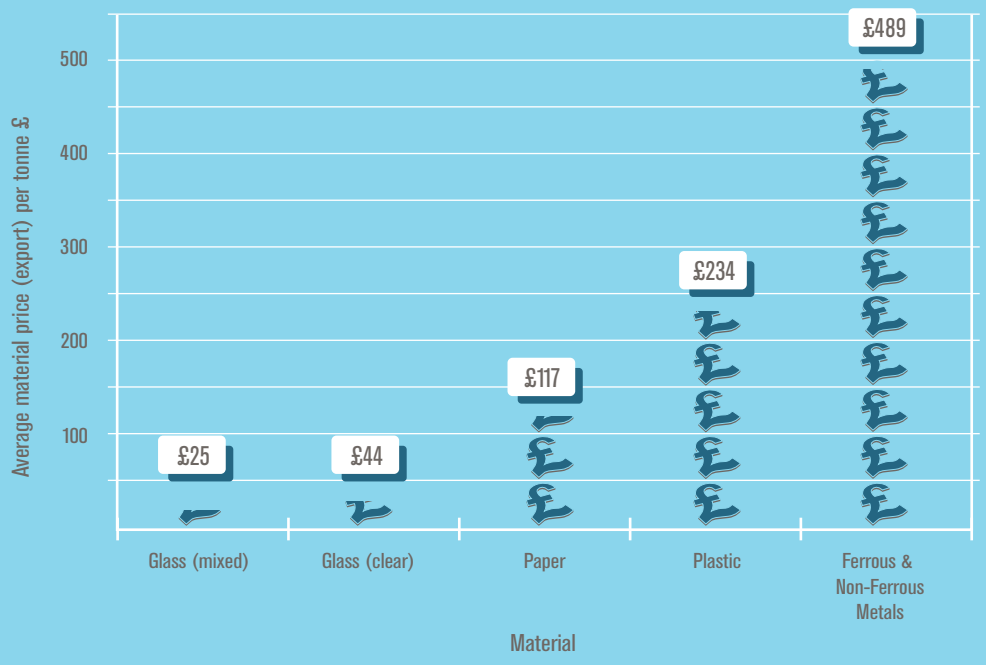
31 See: WRAP, *Bulk wine importation: The advantages and Going Green: Bottling Wines and Spirits in a Changing Climate*

Therefore, the glass export sector has not suffered as a result of Operation Green Fence, with China being too distant as an end destination for glass cullet shipments to be financially viable. Nonetheless, exports of cullet are still vulnerable to policy change in external markets, as more Member States increase their quality and recycling rates.

This means that glass exporters would have fewer options for suitable end markets in the event that Portugal or Spain tighten quality controls or start to receive material from other EU Member States seeking to meet 2020 recycling and landfill diversion targets.

In this sense, glass is more vulnerable to external market changes than other materials streams, which may divert their exports more easily to alternative end destinations. This represents both a risk and an opportunity. With increased quality in collection and sorting in the domestic market, the UK could export glass cullet and become more resilient to market changes.

## Figure 10 - Material tonne £ comparison




Source: Averages taken from 2012 WRAP data

The separation of glass from commingled household waste streams, as endorsed by former Resources Minister, Lord de Mauley, in a letter to local authorities in October 2013, has the potential not only to improve consistency of glass cullet, but would also prove beneficial to other recyclate streams.[32]

This is because broken glass presents a problem for paper recycling, as many Materials Recovery Facilities 'struggle' to extract small fragments of glass from the paper material stream, and this inquiry found broad support from both the paper sector and the glass sector for the separate collection of glass packaging.[33] (See Recommendation 5 in Section 2.11).

## 2.9 Metals

- The UK metals recycling industry is worth £5.6 billion
- Metals are, generally speaking, highly recyclable and globally over 400 million tonnes of metals are recycled each year
- The UK recycles 13 million tonnes of scrap metal a year, of which around 40% is used in the domestic market, and 60% is exported[34]
- As a country the UK therefore produces considerably more scrap metal than can be used domestically
- The UK is in the top five countries in the world in terms of volume of scrap metal exports[35]

Exports of metal over the last decade have shown some growth, but having already been at a high level (6 million tonnes) in 2002, exports in this area have increased less sharply than with the other materials streams, such as plastics. In 2011 the British Metals Recycling Association (BMRA) recorded exports of 7.5 million tonnes. End destinations for metals recycling vary, depending on the exact type of metal. Broadly speaking however, the markets showing growth in imports of UK ferrous and non-ferrous scrap are: Turkey, Indonesia, India and China.

### 2.9.1 Changes in the domestic metals market

The profile of the metals recycling industry in the UK has changed significantly over the last 30 years. Traditionally, the UK has been home to thriving steel, copper and aluminium industries, which absorbed the majority of the scrap produced in the domestic market.

Since the 1970s domestic metals production has declined due to rising energy and labour costs, as well as competition from abroad. The market is expected to continue contracting over coming years. Meanwhile, the metals recycling industry has steadily

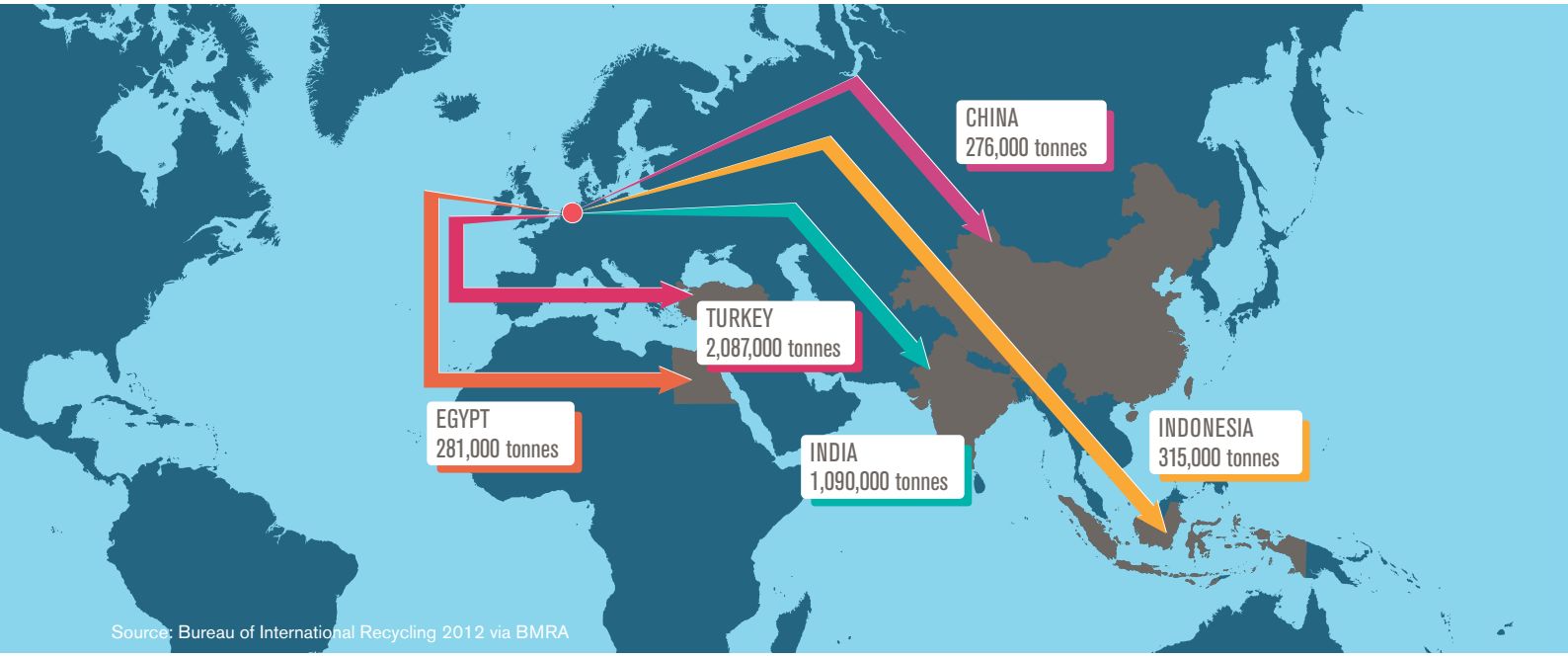
32 Defra, Lord de Mauley, Parliamentary Under Secretary. *Letter to local authority bodies on the separate collection of waste paper, metal, glass and plastic*, October 2013. [Online] Available: www.gov.uk/government/ [Accessed 31 October 2013]
33 Defra, Lord de Mauley, Parliamentary Under Secretary. *Letter to local authority bodies on the separate collection of waste paper, metal, glass and plastic*, October 2013. [Online] Available: www.gov.uk/government/ [Accessed 31 October 2013] pp.2
34 British Metals Recycling Association (Figures as of 2005) *About Metal Recycling* [Online] Available at: www.recyclemetals.org [Accessed 30 October 2013]
35 British Metals Recycling Association. See: www.recyclemetals.org

increased the volumes of metal recyclate extracted from households and post-industrial waste, reaching a recycling rate now beyond 85%. This means that there is substantially more scrap metal available in the UK market than can be used (see fig.4).

The metals recycling industry has had to adapt quickly to market changes abroad as it has exported increasing volumes of metal recyclate from the UK. An example of this has been exports to Spain, which was once the main recipient of UK scrap steel. However, Spanish steel production has now been radically reduced as a result of the EU-wide economic downturn.

The main end destination for UK exporters of this material is now Turkey, where advanced 'electric arc furnace' steel production incorporates up to 80% scrap steel into its process.

## Figure 11 - Metals Export Map




### 2.9.2 Technology and costs

Electric arc furnace technology (most commonly used across Southern Europe and Asia) has acted as a key driver in determining flows of ferrous materials, as the process allows for a much higher percentage of scrap steel to be used in production: 80% in comparison to 25% used in the 'blast furnace' system more common in Northern Europe.

The preference for blast furnace technology in Northern Europe is due to a number of contributing factors, largely the fact that this is an established, traditional technology and furnaces represent assets worth billions of pounds, thereby making them incredibly costly to replace.

This indicates that the export of scrap is a long-term solution for UK metal recyclers. The high value of the material and long life-cycle of metal-based products such as cars means that appetite in end markets remains strong, especially in nations developing their own consumer markets, such as China and Turkey.

In addition to this, the cost of export to destinations such as China as opposed to EU destinations is comparable. Additional costs incurred by shipping are marginal, as the overall trade balance with China, and other Asian markets such as South Korea, means large numbers of containers which would otherwise return empty can be used in this way, at low cost to the exporter.

### 2.9.3 Impact of Operation Green Fence

Implementation of Operation Green Fence has had minimal effect on metal exports, which are shipped at a 'furnace-ready' level of quality, making this recyclate stream much less vulnerable to external policy or enforcement changes when it comes to export destinations.

This quality level is in part due to the ease with which heavy or magnetic metals can be sorted from a mixed waste stream.

In this sense, there are fewer opportunities to extract further value than is currently being gained from the metals recyclate supply chain, to the benefit of the UK, in the absence of resurgence in domestic metals smelting industry. This inquiry found a consensus that a significant domestic market redevelopment would not occur, due to prohibitive energy and labour costs when compared with other markets.

Whilst ongoing export of metals, as with other materials, will continue to add to the UK balance of payments, even greater value to the UK export market for metal recyclate could be achieved through opening doors to new end markets for recyclers.

### 2.9.4 End of Waste criteria for metals

EU End of Waste Regulations on scrap iron, steel and aluminium came into effect in the UK on the 9 October 2011. The regulations were made under the revised Waste Framework Directive, and determine when these materials cease to be waste, and can therefore be handled without waste management controls.

Metals (iron, steel and aluminium) were the first materials to achieve EU End of Waste status, with requirements and a declassification process for scrap metal to cease being waste published in October 2011. Following an agreement within the European Commission (EC), the UK Environment Agency published 'Regulatory Guidance 333/2011' outlining the process for End of Waste accreditation in the UK.

36 Environment Agency, *Regulatory Guidance: End of Waste Regulations (No 333/2011) for scrap metals*. [Online] Available at: www.environment-agency.gov.uk/business/regulation/ [Accessed 30 October 2013]

# 2.10 SONOCO ALCORE CARTON RECYCLING FACILITY

## CASE STUDY
## HALIFAX, YORKSHIRE

### Key features

- A new dedicated carton recycling facility is the first of its kind in the UK
- It has therefore created a domestic market for carton recycling where previously none existed, diverting a percentage of cartons from export
- The plant will be capable of recycling 40% of cartons placed on the UK market each year
- Over 54% of Local Authorities now collect cartons at kerbside
- Partnership working between ACE (Alliance for Beverage Cartons and the Environment)UK, Sonoco Alcore and Local Authorities has been key to developing a UK-based recycling solution for used cartons

The Sonoco Alcore recycling facility is an example of how the creation of a discrete domestic market can successfully capture materials that have otherwise been destined for export. The development of the plant is also an excellent example of the benefits of collaborative activity between the waste, recycling and reprocessing sectors, and Local Authorities.

The plant is a joint venture between the Alliance for Beverage Cartons and the Environment (ACE) UK and paper and packaging producer Sonoco Alcore, and running at capacity will be capable of recycling 40% of all cartons placed on the market in the UK each year.

Carton recycling focuses primarily on the capture of the strong wood fibres used to make the main body of carton packaging, which the Sonoco Alcore plant then turns into 100% recyclable core-board, used in tubes at the centre of reels of paper, fabric and plastic film.

The fine polymer and aluminium layers used in beverage cartons, to prevent leakage and provide a protective barrier to oxygen (respectively), are also separated as part of the recycling process and baled ready for reprocessing, once a solution is in place in 2014.

The plant was developed through the partnership between ACE UK and Sonoco Alcore, which was encouraged by Local Authority feedback that cartons were not widely collected for recycling for two key reasons: there was no ‘price per tonne’ available for used cartons in the UK; and there was no UK reprocessing available for the material stream.

The development of the plant was therefore linked to increased capture of used cartons from the waste stream – from households, businesses, prisons and schools – building the appropriate ‘economies of scale’ for the capital investment in domestic recycling infrastructure.

Local Authorities have responded to the development. 220 (54.2%) Local Authorities (LAs) now collect cartons at kerbside out of a total number of 406. Of these, 26 have begun to send cartons directly to the Sonoco Alcore facility (this represents 6.4% of the total). On top of this, 141 LAs run 'bring bank' schemes operated by ACE UK, and all of the cartons delivered to these bring bank facilities are also sent to the plant in Halifax. This is a further 34.7% of the total number of LAs.

### The changing value and supply chain

The availability of a carton recycling facility in the UK has changed the value chain for cartons collected in the domestic market. Fundamentally, the plant means that export is no longer the only option for carton recycling.

The plant also offers improved environmental outcomes for carton recycling. In terms of $CO_2$ reduction, cartons which were previously exported for recycling to a plant in Sweden 'cost' 122 tonnes more, per year, in terms of transport $CO_2$ than cartons which will be recycled at the Halifax facility.

Also, in providing a 'price per tonne' for cartons in the UK, the plant will further incentivise the collection of cartons, as a value chain is created.

### Developing domestic infrastructure

The Sonoco Alcore facility encapsulates several key elements necessary in the development of UK infrastructure for specific materials streams.

In this example, the diversion of the export stream required the development of a dedicated plant, which in turn required volume and security of feedstock. Securing the right kind of feedstock – in this case, used cartons – and sufficient volume, was dependent on collaboration with LAs in order to develop a range of collection options.

This highlights the importance of a cross-supply chain approach in any plans for future development of the UK recycling or reprocessing industries.

End of Waste legislation comes from the European Commission, but the way in which it is facilitated in the UK is under the authority of the EA.

Since the Regulatory Guidance was published in 2011, no metal recycling business in the UK has been accredited under the End of Waste scheme. Such results suggest that there is scope for improved communication between the metals recycling sector and the Environment Agency, to ensure that facilitation of End of Waste policy in the UK does not create further barriers, beyond requirements within the original EU legislation, to achieving End of Waste status.

**Recommendation 4**

In recognition that End of Waste criteria for metals were developed in the spirit of creating a straightforward means of declassifying scrap metal waste, and in order to allow the industry to access valuable overseas markets through exporting scrap as a 'secondary raw material', the Environment Agency should, with input from industry, conduct a review of End of Waste approaches across the UK to help improve dialogue with industry and maximise the benefit that End of Waste offers.

## 2.11 Cross-sector recommendations

Considering the range of opportunities, at home and abroad, presented by each different recyclate stream examined by this inquiry, a nuanced approach to exports policy is required from Government.

One primary area of for potential focus, highlighted in Section 2.8.4, is the issue of cross-contamination affecting the quality of different materials streams. This reflects the importance of a cross-supply chain approach in ensuring materials quality, and the role that collection systems can play in determining outcomes further down the supply chain.

Commingled collection systems, where all recyclables are collected from one container or bin, offer excellent results in terms of total volume of capture of materials, and cost-effectiveness to local collection authorities. Opinion is still divided on whether the output quality of commingled collections is adequate in all cases for domestic or export reprocessors. The UK paper and plastic industries in particular have strong concerns about the commingling collection method delivering quality of the required standard.

Beyond 2015, as set out in the WFD, the four materials examined in this inquiry will have to be collected separately, where it is 'technologically, environmentally and economically practical' (TEEP) to do so.[37]

37 Article 11(1), Revised Waste Framework Directive

Whilst further guidance is anticipated on what will be considered 'TEEP', this should be made available as soon as possible in order to offer as much planning time as possible to waste management companies and Local Authorities affected by the forthcoming requirement to separate dry recyclables.

With Local Authorities' budgets affected by cuts in Government spending, it is understood that in some Local Authorities separation of all materials in all circumstances may not be a practical solution. However, the inquiry found a consensus around the potential impact that the separation of glass from the household waste stream could have on the quality of glass cullet, and other recyclables, particularly for the waste paper stream.

**Recommendation 5**

Defra, through WRAP, should provide detailed information to Local Authorities on the range of glass separation options available, including cost-benefit analysis.

### 2.11.1 Opportunities for investment

Improved understanding of where the greatest opportunities for job creation and boosting economic resilience lie is key to developing targeted investment strategies that will support the UK-wide waste and resources industry.

**Green Investment Bank**

The Green Investment Bank (or GIB) is a flagship green initiative of the current Government, aiming to drive private investment into identified 'priority areas' in the sustainability field, with a focus on infrastructure development. The GIB aims to partially de-risk such projects through its own investment.

The bank was initially capitalised with £3 billion for investment in identified projects. It now has £3.8 billion in available funds.

The priority areas for investment are: offshore wind, energy efficiency, and waste. The GIB aims to invest 80% of its capital into priority area projects, with the remaining 20% available for projects in other sectors.

In the waste sector, the GIB has a stated ambition to invest funds in both small and large-scale merchant projects, as well as to provide funding support to the remaining PFIs/PPPs.

The Green Investment Bank, though not a 'silver bullet' for investment issues in the sustainable resource sector, is one possible mechanism through which to create greater investment in targeted areas of the waste supply chain in the UK.

Government should also use research into investment barriers to provide an indication to the waste management industry as to where further opportunities for investment exist in dry recyclables recycling and reprocessing. Beyond this, Government should explore the use of new concrete investment incentives to help remove barriers and stimulate infrastructure development.

**Recommendation 6**

i) The GIB should conduct an investigation into the barriers for investment in waste recycling and reprocessing infrastructure, using the AD market report as a template.
ii) HM Treasury, Defra and BIS should then consider implementing fiscal instruments, for example raising the capital allowances threshold, to support businesses developing infrastructure in line with the ambition of increasing domestic capacity for the recycling and reprocessing of different materials streams.

### 2.12 Other tools to drive investment

Further measures could also be implemented to drive demand for recycled material in the domestic market, thereby building a stronger incentive for the development of infrastructure and improvement of materials quality.

One such possible measure would be the introduction of a 'PRN Offset system', designed to effectively provide a financial incentive for the use of recycled content in packaging. This would target packaging producers, packer/fillers and retailers obligated under the Producer Responsibility regime.

The incentive would come in the form of a reduction in the financial cost of their packaging obligation, proportionate to the amount of recycled material used in the products they place on the market. This reduction in cost would be achieved through the issuing of cost-neutral 'RPNs', or 'Recycled Packaging Notes' proportionate to the percentage of recycled content used in packaging produced.

At the same time, this would create a parallel data-capture system through which Defra could monitor packaging recycling for submission to the European Commission.

The remainder of the 'obligated tonnage', not covered by 'RPNs', would be evidenced as usual through the PRN system, with each PRN incurring a cost reflecting its market value at the time, as with the current system. This system reduces the cost of obligation rather than the amount of obligated tonnage, as RPNs function as evidence of recycling but do not incur a cost.

### 2.12.1 EA guidance on producer responsibility

The spirit of the PRN Offset system is already present in text pertaining to producer responsibility obligations in the UK published by the Environment Agency. EA guidance on packaging producer responsibility, states that producers should not include in their obligation 'any packaging that has been used before unless it has been imported'.

This supports the introduction of an Offset, in which context 'packaging that has been used before' would be understood as including 'waste packaging'. This would allow an obligation to become smaller proportionate to the amount of 'used packaging' incorporated into 'new packaging' by an obligated business, as outlined above.

This system could prove a real driver to a circular economy, incentivising the movement of materials from domestic recyclers into domestic manufacturing, and raising the value of recycled materials proportionate to the increased demand.

### 2.12.2 Packaging arisings and the PRN Offset

Despite this, it should be considered that the original intention of the Producer Responsibility regime was to reduce packaging arising to the market, rather than to improve recycling rates. Concern has been raised that this scheme may encourage packaging producers with high recycled content in their products to place extra material on the market, as their costs related to obligated tonnage would reduce.

However, this concern is somewhat mitigated by the fact that the reduction in weight of many packaging products has associated economic benefits, as cost efficiencies are made through the production of packaging items which use less material.

This applies equally to packaging made from high-recycled content materials: cost efficiencies are still made through minimising the amount of material in any given item. Therefore a reduction in obligation may not prove such a powerful incentive to produce more packaging.

Alongside this is the unarguable economic and environmental benefits of greater recycling in the UK and greater use of recycled materials across the board, including substantial job creation as outlined in Section 1.2.

This 'PRN Offset' system has been developed by a dedicated group of plastics businesses and recyclers and is currently only proposed for use in the plastics sector. However, the inquiry also found interest in the proposal from the paper sector.[38]

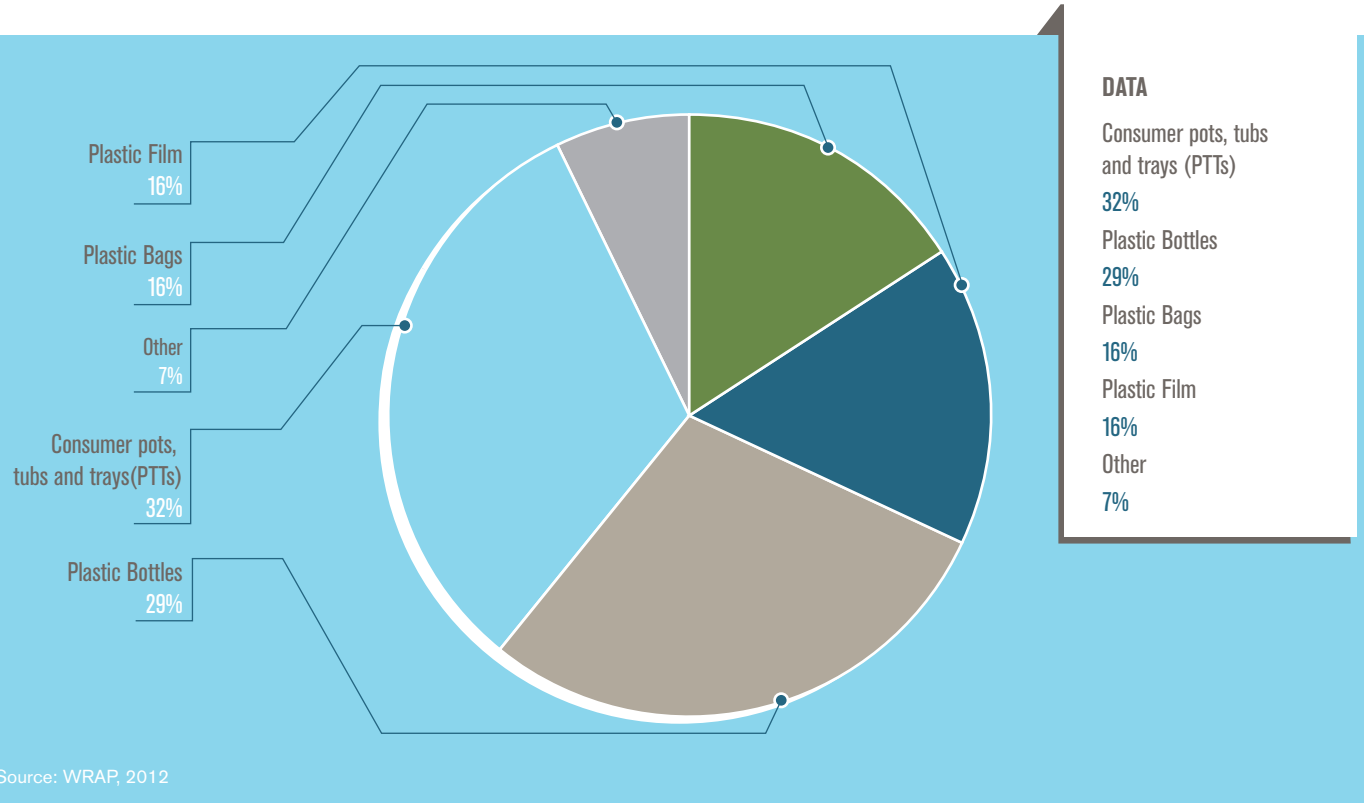
38 British Plastics Federation, 2013. *BPF Proposal: To encourage and incentivise the use of recycled plastics in UK manufacturing*. See: www.bpf.co.uk

## Recommendation 7

Defra should explore the potential for the reinterpretation of current EA Packaging Guidelines and the introduction of a 'PRN Offset' system to provide the strongest possible incentive for the use of recycled content in packaging produced in the domestic market.

An additional benefit of the proposed PRN Offset for plastics recycling is the potential for this measure to boost development of different types of plastics reprocessing.

### Figure 12 - Snapshot of Plastic Packaging Waste Stream in the UK




Source: WRAP, 2012

The UK is currently well-served by plastic bottles reprocessing facilities, but there is a key gap in the market for further plastic films and 'pots, tubs and trays' (PTTs) recycling. As producers of such items would see a reduction in their obligated tonnage should they incorporate recycled film or PTT content into their product, this would effectively help to close this capacity gap, as demand for different types of recycled plastics increases.

Feedback to the inquiry indicated that several parties favoured the idea of plastics-specific PRNs: whereby, for example, a one obligated tonne for a PTT producer could only be covered by a PRN produced from PTT recycling. The benefits of this proposed system are effectively reproduced by the incentive to recycle a variety of plastics types created by the PRN Offset.

### 2.13 Potential to extract greater economic value from the supply chain

The number of jobs in the UK waste industry has increased dramatically in recent years, and the sector now provides 150,000 direct jobs to the economy.[39] Every opportunity should be taken to encourage this growth trend in employment to continue, and new avenues for job-creation should be sought out by both Government and industry.

There are a number of stages in the recyclate supply chain between collection of some materials, especially plastics, and shipment which may present opportunities for waste-sector growth. Higher standards of cleaning, separation, sorting and baling – and in some cases dismantling, shredding, or pelleting – completed within the UK could produce higher prices for the material at point of sale, whether that is in the domestic market or for export, as well as creating jobs and value across the supply chain.

China, importing so much material from other nations, has seen a huge boost in waste-sector employment, with 440,000 jobs along these lines.[40] Research by SITA suggests between 3,000 and 12,500 specialist or dismantling jobs could be created over the next decade within the UK market, alongside up to 12,000 further direct jobs created at MRFs.

However, these valuable potential jobs are not guaranteed to the marketplace, and will require continued development of the sophistication and quality of the domestic waste supply chain.

That these opportunities currently remain untapped within the UK represents an opportunity for Government intervention to support the industry in identifying and accessing greater supply chain value prior to materials export.

**Recommendation 8**

BIS, as part of its industrial strategy, should develop and complete research and economic analysis into areas where more of the waste materials supply chain, including the reprocessing 'cycle', can be re-shored, in order to achieve maximum value to the UK economy.

39 SITA UK. *Driving Green Growth: The role of the waste management industry and the circular economy*. Suez Environnement. Maidenhead, 2012. pp.9

40 SITA UK. *Driving Green Growth: The role of the waste management industry and the circular economy. Suez Environnement.* Maidenhead, 2012. pp.5

## 2.14 Influence of mandatory recycling targets

In 2012 the UK Government set new, significantly more ambitious recovery and recycling targets for packaging waste.

Previous targets had remained at a constant level for the preceding two years, reflecting the minimum requirements of the EU Packaging Waste Directive and had resulted in recycling rates beyond the targeted level, but which had flat-lined.

The new recovery and recycling targets, set for 2013-2017, include yearly increases, differentiated by material stream.

This includes a particularly ambitious recycling target for plastic packaging, involving a 5% annual increase in mandated recycling rates.

Feedback to the inquiry has indicated that packaging recycling targets set over the long-term, with annual increases to drive the industry forward, are generally considered a positive step. The more ambitious targets promote investment in recycling infrastructure and, due to being set over a five-year period, provide more certainty for industry.

However, with the gap between available domestic recycling and reprocessing capacity and collection volumes already clear, there remains concern that the targets may not be met.

The high targets may also drive further increases in volumes of recyclate being sent abroad, as producers seek to meet their obligated tonnage through recycling in external markets.

With this in mind, ambitious targets which provide certainty and drive to industry are to be embraced, but will only be deliverable alongside a suite of other economic drivers and policies – along the lines of those recommended in this section of the report – to incentivise improved collection, domestic recycling and export regimes.

### Recommendation 9

Defra should continue to set ambitious packaging recycling targets over the long-term, but only in the context of a number of other economic and policy drivers designed to promote high quality recycling in the UK.

# 3 EXPORT OF WASTE-DERIVED FUELS

## 3.1 RDF and SRF – an introduction

Refuse Derived Fuel (RDF) and Solid Recovered Fuel (SRF) are two types of fuel which can be produced from the non-recyclable fraction of different waste streams, including municipal solid waste (MSW), and commercial and industrial (C&I) wastes.

These fuels can be used in different types of energy-from-waste (EfW) facilities, or industrial processes, to produce energy.

Although the terms 'RDF' and 'SRF' are often used interchangeably, each one is a different type of waste-derived fuel.

RDF is a crude fuel, subjected to low levels of treatment in order to ensure it is no longer classified as solid mixed waste, and to marginally improve its fuel status. SRF is a much more refined fuel, often made to an exacting specification to meet clients' requirements. SRF functions as a fossil-fuel replacement in many applications, whereas RDF does not due to its lower calorific value (CV) and more variable composition.

### 3.1.1 Classifications

**RDF**

Refuse Derived Fuel is a crude fuel for use in EfW facilities. It is usually produced from residual material from the MSW stream, after extraction of recyclables. This left-over fraction is then put through a basic process, such as drying and shredding, or even simply the removal of large pieces and metal elements, to create a more consistent material that produces improved environmental outcomes when compared to the incineration of untreated MSW. The calorific value (CV) of RDF is generally between 8-14 MJ/kg.[41]

**SRF**

Solid Recovered Fuel is a much more tailored and high-quality fuel, commonly derived from pre-sorted commercial and industrial waste. SRF is often made to the specification of the receiving plant, but a European standard specification also exists (CEN/TC 343 Solid Recovered Fuels: 2002+ BS EN 15359 : 2011).[42] This standard outlines various ranges for acceptable content of chlorine and mercury, as well as a specified CV.

SRF is commonly used in cement kilns, which require a consistent fuel with a higher CV than typical RDF, and can replace coal in power generation facilities. This produces fewer emissions when compared to the fossil fuel it is replacing, and is cheaper.

41 CIWM, 2013. *Research into SRF and RDF Exports to Other EU Countries, Final Technical Report.* AMEC Environment & Infrastructure UK Ltd. pp.iv

42 European Committee for Standarization, *CEN/TC 343 Published Standards.* [Online] Available at: www.cen.eu [Accessed 11 October 2013]

### 3.1.2 Export recovery regulations

Waste-derived fuels such as RDF and SRF exported for thermal treatment are only legal if they are exported to an 'R1' classified facility. R1 is defined in Annex II to the Waste Framework Directive as a recovery operation, consisting of the thermal processing of waste being used '*principally as a fuel or other means to generate energy*'.[43] Whilst RDF is usually exported to overseas EfW facilities that also accept untreated household waste (from within their own country), SRF is typically exported to cement kilns and power stations, often replacing brown coal. Although both RDF and SRF are used in some industrial applications and cement works in the UK, and proposals exist for the construction of further RDF and SRF usage plants in the country, currently the main market for these waste-derived fuels is export.[44]

Any plant burning RDF or SRF as a fuel must be compliant with Directive 2000/76/EC, the 'Waste Incineration Directive' (WID), which sets certain limits on particular emissions as well as outlining specific operating conditions.[45]

The export of SRF and RDF is classed as shipment for 'recovery' as part of the WSR's system of classification, which covers: green list (see 2.1.3), 'recovery' and 'disposal'.

## 3.2 Rising exports

The amount of RDF produced in, and then exported from, the UK each year has increased in line with the rising Landfill Tax Escalator. This reflects both the effectiveness of the Landfill Tax in driving material away from landfill, and a current lack of domestic capacity for treatment of residual waste materials.

As the cost of landfill has risen, local authorities and waste management companies have been obliged to explore alternatives to landfill, one of which has been the production, and now the export, of a basic waste-derived fuel from residual materials inappropriate for recycling.

Exports have risen especially dramatically since 2010, with provisional data from the EA suggesting a total increase in RDF exports of over 874,000 tonnes between 2010 and 2012.[46]

With the sharp rise in exports of RDF and SRF evidenced over the last three years, and with landfill tax set to rise to £80 per tonne next year, export volumes are expected to increase again in 2013.

Therefore, as the UK currently lacks sufficient residual waste energy recovery capacity to treat this waste stream exclusively in the domestic market, and insufficient appropriate industrial applications for SRF use, the export of these waste-derived fuels is a trend which will continue at least in the short term.

43 Tolvik Consulting Ltd, 2011. 2011 *Briefing Report: UK Waste Exports: Opportunity or Threat?* London. pp.5
44 For a full list, see: Eunomia, 2013. *Bi-Annual Residual Waste Infrastructure Review Issue 3*. Available at: www.eunomia.co.uk/product.php/113
45 Europa. *Summaries of EU legislation: Waste Incineration.* [Online] Available at: www.europa.eu [Accessed 28 October 2013]
46 Unpublished provisional data supplied to the APSRG by the EA during the inquiry process

## Figure 13 - RDF/SRF Production Supply Chain


Source: Information submitted to the inquiry

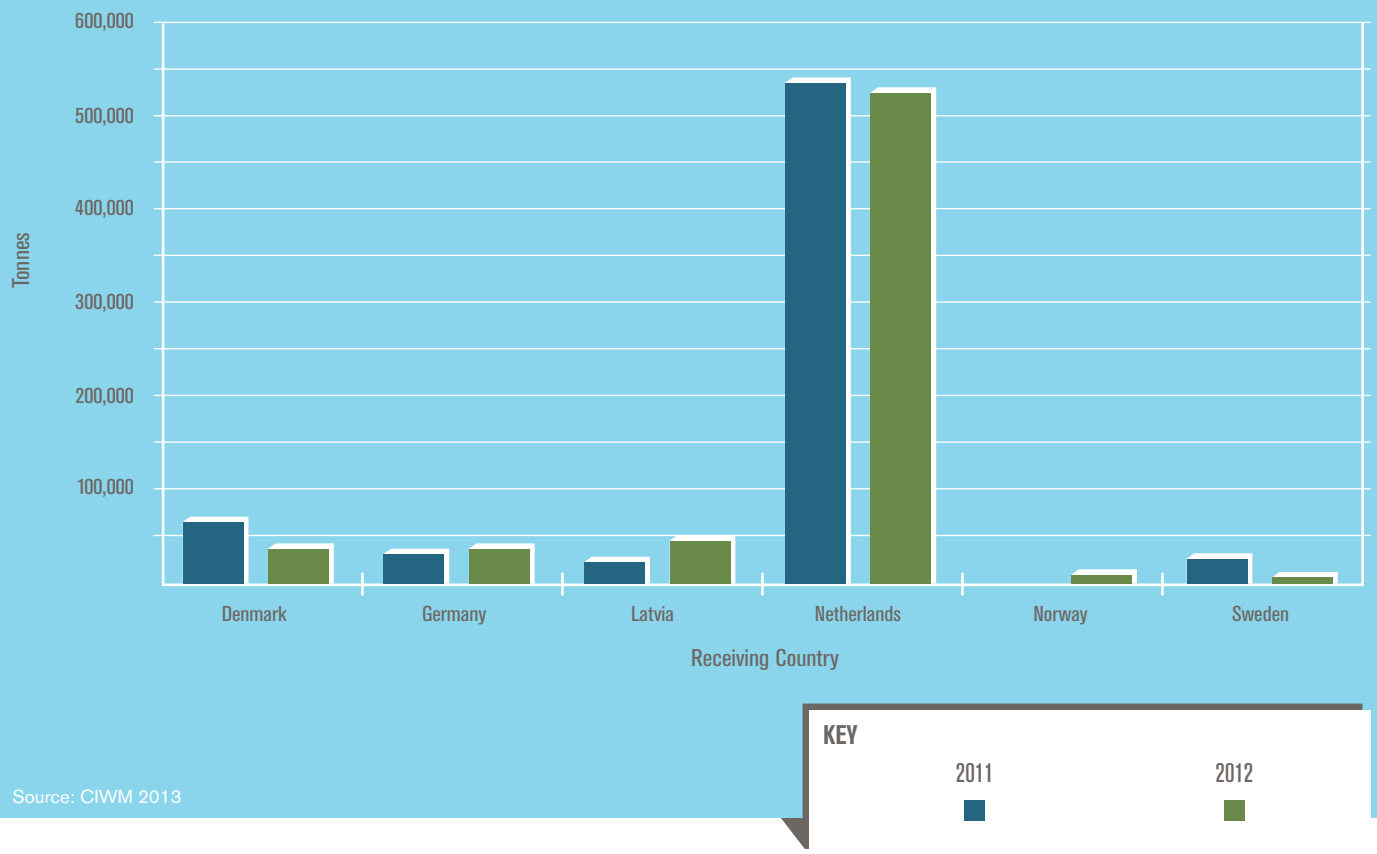
### 3.2.1 Key end markets for RDF/SRF

The key end destinations for UK-exported RDF, in terms of volume, are currently the Netherlands and Denmark, with other export destinations including Germany, Norway and Sweden. The primary export end destinations for SRF from the UK are cement kilns in Latvia and Estonia.[47]

With a total incineration capacity of 7.2Mt (as of 2009), and domestic feedstock of 6.3Mt, the Netherlands has an estimated 15% 'over-capacity' in its EfW market. This, coupled with its proximity to the UK, makes the Dutch market particularly attractive to exporters.[48]

Exports from England to this end market totalled over 500,000 tonnes in 2011/2012.[49]

**Figure 14 – Export Volumes and End Destinations**




Source: CIWM 2013

47 Ricardo-AEA for CIWM, 2013. *Commercial and industrial waste in the UK and Republic of Ireland.* [Online] Available at: www.ciwm.co.uk [Accessed 28 October 2013] pp.39

48 CIWM, 2013. *Research into SRF and RDF Exports to Other EU Countries, Final Technical Report.* AMEC Environment & Infrastructure UK Ltd. pp.7

49 CIWM, 2013. *Research into SRF and RDF Exports to Other EU Countries, Final Technical Report.* AMEC Environment & Infrastructure UK Ltd. pp.7

## 3.3 Over-capacity on the continent – a long-term situation?

The situation of 'over-capacity' in other EU member states is generally considered to be a result of a slump in waste arisings, which is linked to challenging economic conditions across the continent. Excess capacity in end markets for RDF and SRF exports may also be linked to poor waste forecasting and higher than anticipated recycling rates in these countries, meaning that the amount of residual waste available as EfW feedstock in their domestic markets is significantly reduced when compared to 'mid-table' recyclers such as the UK. (See fig.15 for a EU recycling league table).

The existence of excess capacity in easily accessible markets such as the Netherlands has driven down the cost of sending RDF to be incinerated in EfW facilities abroad. When accepting material for incineration, facilities charge a 'gate fee', which reflects the level of demand for material, or for EfW treatment, and the cost of alternative waste treatments, in the market at any given time.

### 3.3.1 Gate fees

With demand for RDF high in countries with excess capacity, gate fees have plummeted in order to attract feedstock from other nations.

The latest WRAP Gate Fee Report indicates that UK gate fees range from a median charge of £68 - £111 per tonne, depending on the size of the EfW facility.[50] This is in clear contrast to charges on the continent, where gate fees are reported as between €30 - €42 per tonne (£25.5 - £35.7*).[51]

Feedback to the inquiry suggested that EfW operators abroad, in countries with high electricity prices and over-capacity, may often be willing to take UK material at or below cost, in order to keep plants running to capacity and to fulfil contractual obligations in their own country.

### 3.3.2 Future of excess capacity overseas

If it is accepted that the current EfW over-capacity in countries such as the Netherlands and Denmark is at least in part due to depressed economic circumstances, it must be assumed that any economic upturn may reverse the situation, and accessible capacity abroad may reduce significantly for UK exporters.

This volatility in the export market is illustrated by the fact that EfW operators on continental Europe offer only relatively short-term contracts to UK exporters (of between three to five years). This suggests that EfW operators in these end markets do not view this feedstock as a long-term option, and that they may be prepared to cease accepting material at short notice, should their own indigenous waste production increase.

Another important consideration is that there is potential for large quantities of RDF and SRF to be produced in other EU member states as the deadline for mandatory landfill diversion targets approaches.

50 WRAP, 2013. *Annual Gate Fees Report*: *Waste treatment options: Table 1: Summary information on gate fees.* [Online] Available at: www.wrap.org.uk [Accessed 24 October 2013]. pp.1

51 CIWM, 2013. *Research into SRF and RDF Exports to Other EU Countries, Final Technical Report.* AMEC Environment & Infrastructure UK Ltd. pp.7

*Conversion rate as of 31 October 2013: £1 = €0.85

Whilst the UK remains in the middle of the EU recycling league table, with plenty of residual waste for RDF production, some countries are currently in a position of landfilling 90-100% of their municipal waste. This represents an almost insurmountable challenge in terms of achieving EU 2020 landfill diversion targets, and could potentially lead to a sudden influx of RDF from Eastern European Member States, towards the end markets currently exploited by UK exports, as they try to divert sufficient volumes of waste from landfill, without sufficient time to develop a comprehensive waste management infrastructure in their own nation.

Such an influx would undoubtedly push up gate fees in countries currently receiving RDF from the UK, as plants would no longer have to attract suppliers with artificially low costs.

### 3.3.3 Energy value and efficiency in Scandinavian markets

However, this potential instability in current EU and EFTA end markets may not be universal. Whilst much of the evidence submitted to this inquiry corroborated the idea that these waste-derived fuel export markets may 'close' to UK material in the future, differences in the profiles of the end markets were highlighted by exporters.

Feedback to the inquiry suggested a difference between exports to the Netherlands, which were seen as 'short-term', and linked to depressed Dutch waste arisings which would eventually recover, and exports to Scandinavia. In the case of the latter, the inquiry found that this is seen as a more long-term option, as recycling rates in Scandinavian nations are extremely high, the indigenous waste stream is 'exhausted' (see recycling performance and landfill rate in fig. 15) and plants in this area operate at almost 90% efficiency, due to scale and heat use, meaning much more energy can be derived from the same material.

The inherent energy value, effectively made greater by the higher levels of operating efficiency in Scandinavian EfW, is then reflected in gate fees charged. Fees are charged on a contract-to-contract basis and may vary, but according to confidential information received during the inquiry, some operators of EfW facilities in Scandinavia currently charge a gate fee of £0, with one Finnish facility charging -£20 and therefore paying for the imported RDF.

Responses to the inquiry indicated that at least one plant is being built in Sweden with the express purpose of using RDF imported from the UK market signalling that, in the Scandinavian market, this is seen as a much longer-term solution (although the opportunity is naturally limited in its size by the considerably smaller populations of Scandinavian nations when compared to the UK).[52]

With this in mind, the question arises as to whether UK EfW will reach high enough levels of operating efficiency to compete with the Scandinavian market, where the economics (and, by virtue of efficiency and heat use, the environmental benefits) are so favourable to export, and where it would seem long-term plans are being put in place to use UK resources for fuel.

52 MälarEnergi. See: www.malarenergi.se/sv/om-malarenergi/

## Figure 15 – EU Recycling League Table

| | | | Municipal waste treated % | | | |
|---|---|---|---|---|---|---|
| | MSW generated, kg per person | Total MSW treated, kg per person | Landfilled | Incinerated | Recycled | Composted |
| EU27 | 503 | 486 | 37 | 23 | 25 | 15 |
| Belgium | 465 | 460 | 1 | 42 | 36 | 20 |
| Bulgaria | 375 | 371 | 94 | 0 | 3 | 3 |
| Czech Republic | 320 | 319 | 65 | 18 | 15 | 2 |
| Denmark | 718 | 718 | 3 | 54 | 31 | 12 |
| Germany | 597 | 597 | 1 | 37 | 45 | 17 |
| Estonia | 298 | 257 | 70 | 0 | 20 | 10 |
| Ireland | 623 | 560 | 55 | 5 | 37 | 4 |
| Greece | 496 | 496 | 82 | 0 | 15 | 3 |
| Spain | 531 | 531 | 58 | 9 | 15 | 18 |
| France | 526 | 526 | 28 | 35 | 19 | 18 |
| Italy | 535 | 505 | 49 | 17 | 21 | 13 |
| Cyprus | 658 | 658 | 80 | 0 | 11 | 9 |
| Latvia | 350 | 292 | 88 | 0 | 10 | 1 |
| Lithuania | 441 | 387 | 88 | 1 | 9 | 2 |
| LuxemboUrg | 687 | 687 | 15 | 38 | 27 | 20 |
| Hungary | 382 | 382 | 67 | 11 | 17 | 5 |
| Malta | 584 | 536 | 92 | 1 | 7 | 0 |
| Netherlands | 596 | 502 | 1 | 38 | 32 | 28 |
| Austria | 552 | 528 | 3 | 35 | 28 | 34 |
| Poland | 315 | 255 | 71 | 1 | 11 | 17 |
| Portugal | 487 | 487 | 59 | 21 | 12 | 8 |
| Romania | 365 | 293 | 99 | 0 | 1 | 0 |
| Slovenia | 411 | 351 | 58 | 2 | 34 | 6 |
| Slovakia | 327 | 312 | 78 | 11 | 5 | 6 |
| Finland | 505 | 505 | 40 | 25 | 22 | 13 |
| Sweden | 460 | 460 | 1 | 51 | 33 | 15 |
| United Kingdom | 518 | 514 | 49 | 12 | 25 | 14 |
| | | | | | | |
| Iceland | 571 | 530 | 73 | 11 | 14 | 2 |
| Norway | 483 | 473 | 2 | 57 | 25 | 15 |
| Switzerland | 689 | 689 | 0 | 50 | 35 | 16 |

The Scandinavian markets' view of energy from waste as an integrated energy solution rather than a disposal method had underpinned the advanced development of these technologies in that market. For the further successful development of EfW within the UK to be possible, the broadest possible range of partners should be invested, including local communities, who stand to benefit from localised, low-carbon energy generation.

**Recommendation 10**

The waste and resources sector, with support from local government partners, should work to raise awareness of the inherent energy value of residual waste and its potential contribution to local, low-carbon electricity and heat generation.

### 3.3.4 Policy stability

Considering the potential variability and fragility of waste-derived fuel export markets, and the inherent energy value in the RDF and SRF that is exported from the UK at a time when energy costs and the importance of UK self-sufficiency are at the forefront of the national debate, a clearly articulated policy statement from Government is needed on how material for recovery might best be used to serve national interests, particularly examining the contribution RDF/SRF could make to UK energy needs and renewables targets.

Significant new EfW capacity is currently in build or about to be built, and support for these developments will not only increase domestic use of the fuel but also balance any potential risks presented by export markets.

Defra and DECC released 'EfW: A Guide to the Debate' in 2012, a document which outlined basic principles in the consideration of EfW development in the UK. The two Departments should now work together to develop an overarching strategy for EfW in the UK, in order to provide a stable framework based on which the waste industry and its investors may operate.

**Recommendation 11**

Defra and DECC should build on the 'Guide to the debate' project to develop a clear long-term position on the development of EfW in the UK, to provide certainty to the domestic market.

## 3.4 Infrastructure development

Respondents to the inquiry indicated that RDF export practices are having, and will continue to have, an effect on the development of waste management infrastructure in the UK. This is primarily linked to concerns over security of feedstock for EfW plants, and the associated risk of investment in such projects. This is particularly acute for the commercial and industrial waste market, which is inadequately served by existing and forthcoming EfW infrastructure.

This is already having an effect on current projects; for example the development of a UK EfW facility in Norfolk has been at least temporarily halted, with a study suggesting the economic benefits of export were more attractive than thermally treating the area's residual waste in the locality.[53]

Examples such as the situation in Norfolk underline the UK's current challenge in competing with foreign markets in recovering energy from its residual waste. With much of the, guaranteed and secure, MSW waste stream tied up in long-term PFI contracts, and the end of the PFI scheme meaning access to long-term, large-scale central government support is now limited, the picture for EfW investment in the UK becomes increasingly high-risk.

### 3.4.1 Commercial and industrial waste

This means that growth in energy recovery in the UK will largely come from the commercial and industrial waste stream.

Whilst it is generally accepted that there is a significant capacity gap in the market for treatment of C&I waste, the development of dedicated, or 'merchant', facilities to treat this waste stream has been slow.[54] This is at least in part due to the paucity of data on C&I waste, which Defra comments on in the methodology of its 'Forecasting 2020 Waste Arisings and Treatment Capacity' document, describing trends in this area as 'especially difficult to predict'.[55]

Without solid, reliable data upon which to project required future capacity, and on which to base investment decisions, the development of merchant facilities to handle the C&I waste stream is likely to continue to present a challenge.

As a consequence, the production of RDF and SRF from C&I waste, for export to facilities in continental Europe or elsewhere, is likely to continue and indeed increase until the uncertainty in the merchant EfW market, and therefore investor confidence, can be addressed.

Whilst the inquiry found that the export of SRF, with its higher energy value and greater range of applications, is generally considered a long-term trend, evidence gathered still overwhelmingly supported the idea that RDF exports are a 'short to medium-term' trend. This was linked to a number of factors: the short-term nature of contracts for RDF export and the potential fragility of some end markets on continental Europe; the 'proximity principle' and the principle of 'self-sufficiency' as outlined in the WFD (2008, article 16); and the rising cost of energy in the UK.

53 BBC News via CIWM, 2013. "*Exporting waste 'cheaper than King's Lynn incinerator*", BBC News Norfolk. [Online]. Available at: www.bbc.co.uk/news/uk-england-norfolk [Accessed 28 October 2013]

54 Ricardo-AEA for CIWM, 2013. *Commercial and industrial waste in the UK and Republic of Ireland*. [Online] Available at: www.ciwm.co.uk [Accessed 28 October 2013] pp.41

55 Defra, 2013. *Forecasting 2020 Waste Arisings and Treatment Capacity*. [Online] Available at: www.gov.uk/defra [Accessed 31 October 2013] pp.1

### 3.4.2 UK EfW capacity: the debate

Given over-capacity evident on the continent, the UK is now in the unique and advantageous position of being able to learn from miscalculations made in the development of EfW infrastructure in other EU markets. However, feedback to the inquiry revealed a division of opinion in relation to the EfW capacity issue in the UK.

Whilst there was a general sense that an indigenous fuel, such as RDF, should be used in the domestic market where possible in order to contribute to generation from renewables, greenhouse gas emissions targets and energy security, the question of whether a drive in EfW capacity development would be required to treat this resource was contentious.

Concern remains in some quarters that the UK risks over capacity in thermal treatment of waste, as is seen in the Netherlands and other receiving nations for UK-produced RDF. This concern is supported by research completed by the consultancy Eunomia, which suggests the UK risks up to 12 million tonnes of over-capacity (per annum), should the 21.3 million tonnes of waste treatment capacity with planning consent reach financial close and subsequent operation.[56]

Defra's most recent assessment of future capacity in the UK EfW market (linked to mandatory biodegradable municipal waste (BMW) waste diversion targets) predicts over-capacity for thermal treatment of MSW of 2.4 - 2.7 million tonnes, depending on various financial factors, but does not consider C&I arisings.[57]

In contrast, the research published by the Chartered Institution of Wastes Management (CIWM) projects a substantial capacity gap in the market, suggesting further development of EfW, particularly merchant facilities, would be vital to meet on-going landfill diversion targets.[58] This position was supported by a number of respondents to the inquiry.

Whilst each of the reports referenced above acknowledge considerable uncertainty in the ability to predict key influencing factors such as future waste arisings, future recycling rates, and exactly when each planned infrastructure development will come online, it remains clear that there is a division in 'schools of thought' on this subject matter.

More research and data is required in order to provide a foundation upon which the waste and resources sector can, alongside Government, strategise and develop clear ambitions for future waste treatment, to the best possible advantage of UK plc.

It will be vital that the overarching strategy recommended in 3.3.4 is underpinned by accurate data and a thorough investigation into the area of capacity vs. arisings for waste, and different waste streams, in the UK.

56 Eunomia Consulting, 2013. *Residual waste infrastructure review*, June 2013. [Online]. Available at: www.eunomia.co.uk [Accessed 28 October 2013]

57 Defra, 2013. *Forecasting 2020 Waste Arisings and Treatment Capacity*. [Online] Available at: www.gov.uk/defra [Accessed 31 October 2013] pp.2

58 CIWM, see: http://www.ciwm.co.uk/CIWM/MediaCentre/Current_pressreleases/Press_Releases_2013/Press_Release_151013.aspx

**Recommendation 12**

Government and industry should work together to ensure that C&I waste data is updated and made as accurate as possible in order to underpin strategies for future treatment of this waste stream.

This data gathering should be supported by a specific investigation into the production of RDF and SRF and their potential use in the UK market, to feed into the overarching strategy recommended in Recommendation 11.

**Recommendation 13**

Defra, working in partnership with DECC, should commission a systematic assessment of RDF and SRF production capacity and potential markets and outlets (including location) in the UK, in order to provide greater confidence to waste management investors and businesses in the UK looking for alternative fuels.

## 3.5 Environmental drivers and considerations

Whilst favourable economics were broadly considered the main driver of RDF and SRF exports, the inquiry found that environmental benefits associated with the use of the resource in a more efficient process were also of significance to many exporters.

### 3.5.1 Thermal efficiency

It is clear that the export of RDF can be used as a beneficial marketing tool for smaller, or often commercial, waste operators.

A recognised trend in this area is this guarantee of 'zero waste to landfill' to clients, and 'environmentally friendly' processing of residual waste: recovery in all circumstances, rather than disposal. This is often achieved through the production of RDF at, or in association with, a MRF, in order to ensure that all non-recyclable material is used as a fuel, rather than landfilled.

Exporting this fuel is then often not just the best economic option but also an attractive choice in terms of marketing the business as 'environmentally friendly': as plants on continental Europe typically operate to a much higher thermal efficiency than plants in the UK, effectively reducing the environmental/carbon impact of the operation and making the best use of the resource (as outlined in 3.3.3).

For an EfW treatment to be considered 'recovery' as opposed to 'disposal' under the Waste Framework Directive, the facility needs to be operating at an efficiency level of 0.6 for existing plants, and 0.65 for new plants, or higher.[59] In Northern Europe, where much of the UK's exported RDF is shipped, 97.2% of plants reach this threshold (R1≥0.6), and this is largely due to associated CHP production.[60]

59 The formula used to calculate these figures can be found in the first footnote to Annex II to the WFD
60 CIWM, 2013. *Research into SRF and RDF exports to Other EU Countries.* pp.7

The use of this as a marketing tool for businesses is an interesting signal of the increasing relevance of environmental concerns to 'reputational capital', adding an extra incentive – beyond the purely financial dimension – to landfill avoidance and, for the short-term at least, to export.

### 3.5.2 Heat use in the UK

As referenced in 3.3.3, the use of the heat by-product of EfW processes is much more advanced in many of the nations that currently receive UK RDF shipments than in the UK. Receiving plants in Europe tend to be built as part of an integrated energy solution, combining electricity, heat and steam, and are located alongside appropriate energy users, such as large-scale manufacturing, refineries or urban areas with a district heat network.[61]

Whilst there are some examples of accepted and functioning district heat networks in the UK (see 3.6), the public perception of EfW infrastructure as 'waste treatment/ disposal' as opposed to 'energy and heat production' has led to many facilities being located separate to urban developments, which could potentially have used any excess steam for heating.

EfW facilities built in the UK are required to be 'Combined Heat and Power (CHP) ready', but in practice this potential for CHP is rarely used, as heat network infrastructure is not common across the UK.

Not only does greater use of heat provide an improved environmental outcome for EfW processes, as the plant is therefore operating at a higher thermal efficiency, but it could also lead to wide-ranging economic advantages. For example, plant operators could sell the steam as a fossil fuel replacement to co-located industrial applications, and in developed urban areas, local communities could see a reduction in their heat bills. Opportunities should be sought to identify areas where such EfW development would be of particular economic and social benefit, with potential sites highlighted.

In other countries where such district heating is well established and embraced by communities, as it is in Scandinavia, heat networks were installed as far back as the 1920s and have long been part of their nations' energy strategies. As this has not been the case in the UK, and due to the disruptive and expensive nature of district heating network retrofit, the inquiry found that, broadly speaking, the best way to develop CHP in the UK would be to link this to new build developments.

This reflects and corroborates a recommendation made in previous APSRG research: 'Waste Management Infrastructure: Incentivising Community Buy-In' (2010). This report builds on Recommendation Eight from the 2010 report.[62]

61 CIWM, 2013. *Research into SRF and RDF exports to Other EU Countries.* pp.42
62 APSRG, 2010. *Waste Management Infrastructure: Incentivising Community Buy-In.* pp.9

**Recommendation 14**

Government should ensure that all new build 'heat sink' plans consider the potential for the use of district heating. Infrastructure foundations should also be included in the build considerations of these new build locations.

### 3.5.3 Local Enterprise Partnerships, co-location, and the potential for retrofit

At the time of the dissolution of the Regional Development Agencies (RDAs) in March 2012, a number of these agencies were developing co-located EfW plants delivering electricity, gas, heat and CHP alongside significant (2000 MwH) energy sinks. Examples included airports, docks, food manufacturing, refrigeration plants and hospitals. This kind of partnership work should continue, with Local Authorities and businesses working across regional boundaries to identify and develop new opportunities for heat use.

Such co-location strategies could reduce energy costs and improve security of supply for these regions, supporting economic growth and resilience.

The RDAs have been replaced by Local Enterprise Partnerships (LEPs), groups of local councillors and local business schemes with responsibility for identifying areas for investment in roads, buildings and facilities in different areas. So far 39 LEPs have been created.[63]

These LEPs, working across regional boundaries and alongside business could provide a useful vehicle for the investigation of future heat use in the UK.

**Recommendation 15**

DCLG, BIS and the Department for Transport (DfT) should encourage the Local Enterprise Partnerships (LEPs) to carry forward the work of the Regional Development Agencies in relation to EfW development, and identify opportunities for co-location and heat use.

Where existing EfW infrastructure is already in operation but not providing CHP to local communities, the model illustrated in the case study found overleaf as implemented in Coventry, should be considered.

This model levers public buildings as primary heat customers before subsequently expanding heat networks to include a wider range of existing infrastructure. With Local Authority owned buildings taking the lead in using low carbon heat off-take from energy from waste plants where possible, this could encourage further private connections to a district heating network.

63 Department for Communities and Local Government; Department for Business, Innovation and Skills; Department for Transport. *Supporting economic growth through local enterprise partnerships and enterprise zones*, January 2013. [Online] Available at: www.gov.uk/government/policies [Accessed 23 October 2013]

# 3.6 HEAT NETWORKS

## CASE STUDY
## COVENTRY & SHEFFIELD

### Coventry District Heating Network

The Coventry City Council network, operated and owned by Cofely District Energy, is the first private sector funded 'Heat Shipper' project in the UK where ownership of the generation assets has been decoupled from the supply network, providing heat to a range of consumers in an urban location.

The network recovers low-carbon heat from an existing EfW facility located at Whitley, 1.5 km outside the city centre. Heat is transported in the form of treated hot water, through buried, pre-insulated pipework, to a number of connections around the city, notably: six separate council buildings, including a sports centre and a gallery, and Coventry Cathedral.

Water travels out through the network at 120°C towards the city centre where the temperature is then stepped down, at a substation to 95°C before being distributed around the city. Heat loss during the distribution process is minimal (less than 0.5°C per kilometre) and the working life of the pipes used is greater than 50 years.

A 'thermal accumulator' located in the city centre stores excess low-carbon heat flowing around the network, allowing the system to meet peak demand and increasing resilience to sudden rises in heat use. This system is backed up by a gas-fired boiler, providing 100% security of supply, regardless of demand.

Cofely District Energy estimates that the network provides an annual $CO_2$ saving of 2,000 tonnes, when compared with conventional heating methods.

### What benefits to the consumer?

A consumer connecting to the network can expect to pay on average 10% less than the cost of installing a traditional boiler system. This saving is also reflected in long-term cost-benefit analysis for consumers connected to the heat network: bills are reduced by 5-10% per year on average, when compared to owning and operating a conventional boiler.

### Sheffield District Heating network

A further example of a successful heat network developed within the UK is the Veolia-run district heating system in Sheffield.

The development of the district heating network in Sheffield is even more advanced than the network in Coventry.

A 'district energy network' was created in the 1960s to provide heat to a number of flats using a central oil-fired boiler system. By the 1970s this was connected to an energy recovery facility (an incinerator), channelling waste heat around the network, which was subsequently expanded to service a number of other developments. The network was transferred to Veolia Environmental Services in the early 2000s, and now represents one of the largest integrated waste management contracts in the UK.

The district heating network now provides low-carbon heating to a variety of public and private developments, including universities, theatres, hotel, churches, private developments and corporate buildings.

In this sense, the Sheffield district heating network, serving such a range of public and private developments, is a best practice example of EfW heat use in the UK.

# 4 QUALITY, ENFORCEMENT, INNOVATION AND COLLABORATION

## 4.1 Areas of common concern

Having considered the export of recyclate and the export of waste-derived fuels separately, the inquiry found a number of areas of commonality between responses to the Call for Evidence in the two different areas.

It is apparent that a number of key issues concern the waste and resources sector in general, and that these are often the areas where changes in policy and practice could have the widest-ranging impacts on the sector's ability to contribute to its full potential to 'UK economic growth and resilience'.

Broadly speaking these 'common areas' were:

- Materials quality
- Illegal activity
- UK industrial and manufacturing policy

## 4.2 Materials quality

Improving the quality of material is crucial to ensuring it can be used to make high-value products, and that it remains longer in circulation; that it is used a number of times, thereby maximising its value and contribution to the economy. This applies whether for domestic consumption or export, and is vital in underpinning environmentally sustainable recycling.

The impact of Operation Green Fence on exports for recycling (outlined in Section 2.3) has been felt in the UK due to a relatively small number of low-quality recyclate exports which have been sold into that market in the past. China's drive to improve standards for the material it imports still only reflects what is generally considered to be a relatively standard minimum quality threshold.

China's desire to stop functioning as a 'sink' for low quality material from other nations simply reflects its ambition to encourage shipments of a more usable, saleable quality and to take on less of the burden of cleaning and sorting waste.

As such a dominating market force in global manufacturing and the treatment of recyclables, China is in a strong position to dictate such terms.

Clearly, the higher the quality of a bale of material, the wider the range of options for its use, and therefore, the higher the value of the material. High quality recyclate of any type can be sold to a much broader range of markets, and will be much less vulnerable to external market changes due to its worth as potential virgin material replacement.

Emphasis should therefore be placed on materials quality across the supply chain, incorporating customer segmentation, collection, sorting and recycling.

Government has outlined a number of measures to improve quality in the recyclate supply chain, the centrepiece of which is the MRF Regulations (see Section 2.1.4). Whilst the MRF Regulations are intended to drive up quality in the central part of the supply chain, through mandatory sampling of MRF inputs and outputs and data sharing, concern remains that a lack of a 'minimum' standard for MRF quality will lessen the impact of the regulations.

However, creating a higher quality through-put for a MRF operation, which is reflected in the quality of the MRF's outputs, is largely due to the way in which material is segmented by customers and collected prior to delivery to the MRF.

Whilst the inquiry found that there remains a division in the sector's view on 'commingling vs. separation' of household waste, a common response in this area was the need for better communications, leading to better engagement of consumers with the recycling process.

There are several examples of best practice in this area: an example being one, materials-specific, communications campaign which delivered a 64% increase in capture of metals in one borough council.[64] WRAP also offers support to local authorities in 'improving recycling through effective communication'.

This work could be built on, with materials sectors working together to provide expertise and deliver such improved results across the board in materials capture.[65]

## Recommendation 16

WRAP, working with Local Authorities and the materials-specific trade bodies, should develop further targeted communications campaigns around the area of materials capture and quality.

Funding for this could be sourced from a number of areas. Respondents to the inquiry suggested a proportion of funds accrued under the PRN system could be used to build on current recycling communications.

A further suggestion was that a percentage of the revenue from the Government's planned tax on plastic bags (to come into force in 2015) could be used to fund this.

64 MetalMatters, 2013. Case study: Sefton Borough Council. [Online] Available at: www.metalmatters.org.uk [Accessed 31 October 2013]
65 WRAP. See: www.wrap.org.uk

## 4.3 Illegal activity

Another key area of concern for respondents to the inquiry was the damage that illegal activity within the waste industry causes to both the quality of materials or fuels produced from waste, and the reputation of the sector as a whole.

As part of the effort to drive up quality in resources across the UK, and to promote an improved image for the waste sector, illegal operations must be tackled quickly and thoroughly through joint working across industry, Government and enforcement agencies.

The inquiry found that there was widespread concern over the enforcement of the Waste Shipments Regulation. Respondents believed the illegal activities of 'the few' are impacting heavily on 'the many' and causing reputational damage to an industry which has worked hard to improve public perceptions of its remit and ability to contribute to a green and growing economy.

Specifically in relation to the green list export of different recyclate streams, there remains concern that some shipments of material are being mis-described as being on the green list, when they are actually illegal shipments of mixed municipal waste disguised with thin layers of light recyclables such as paper or plastic.

### 4.3.1 External market regulations and illegal exports

With regards to recyclate export, these limited but damaging illegal behaviours could to some extent be reduced by China's greater enforcement of Operation Green Fence, as shipments which fall below their standards – which reflect minimum requirements in the UK, such as the British Standard for paper recyclate – are now likely to be halted and even returned.

As China represents the primary end market for the majority of UK paper and plastic exports, Operation Green Fence should have a significant impact on the quality of exports, although there are some indications that low-grade material is already flowing to alternative end markets with less rigorous standards (as referenced in Section 2.7.1). Evidence submitted to the inquiry indicated that Vietnam, Indonesia, Cambodia and Thailand may have already become the destinations of choice for poor quality material.

Linked to this is a concern that exports to such end markets which have less robust inspection regimes than in Europe, or the Operation Green Fence inspections in China, may disguise the full scale of the export of low-grade material leaving the UK market. As such material does find a market, it appears to be of saleable quality, however exports to 'sinks' for low-grade material are both extremely vulnerable to any policy or enforcement changes in the end market, and, more importantly, reflect 'worst practice' in terms of environment and economic concerns.

Eventually options for the export of very low grade material are expected to be extremely limited, or non-existent, as other nations follow China's example in raising standards and building their environmental credentials.

Taking these considerations into account raises the question as to whether the UK should rely on external forces, and Governments, to effectively tackle an issue of illegality, or at the very least a lack of best practice, within its own marketplace.

### 4.3.2 Illegality and RDF export

In terms of the export of RDF, issues with illegality, and a lack of clarity in the law, include the definition of the difference between what is considered MSW and what is considered RDF.

As there is no set specification for RDF, and as levels of processing to produce RDF vary, shipments of MSW may be destined for export without appropriate treatment.

Clarity on what does and does not constitute sufficient processing for MSW to become RDF is necessary in order to empower enforcement officials to detain shipments which are simply 'waste' and not 'waste-derived fuel'. This should potentially include an investigation into guidance around a 'maximum content' of recyclable materials – particularly paper/board fibres and plastics – in RDF production, to ensure materials are guided towards the best environmental outcomes in line with the waste hierarchy.

**Recommendation 17**

Defra should set a minimum processing level for the production of RDF, to make a clear distinction between 'waste-derived fuel' and untreated municipal solid waste.

### 4.3.3 The role of the Environment Agency

As outlined in 2.1.5, the EA is the enforcement body responsible for tackling 'waste crime' in England.

The inquiry found that there is genuine concern across the waste sector in relation to the severity of budget and staffing cuts being faced by the EA, following efficiencies made in Defra's departmental budget. Latest information suggests there will be a 15% cut in staffing levels at the EA over the next twelve months.[66]

With export volumes rising, as demonstrated in 2.1, and EA staff numbers and budgetary resources falling, there are increasing concerns that the EA's ability to police exports will be substantially reduced.

The scale of total exports from UK ports makes tracking potential illegal shipments extremely difficult, with 170 million tonnes of exports leaving UK ports on an annual basis.[67]

66 The ENDS Report, *Environment Agency job cuts bigger and quicker than expected*, 25 October 2013. [Online] Available at: www.endsreport.com. [Accessed 15 November 2013]

67 Department for Transport. *Statistical release – Quarterly Port Freight Statistics*, September 2013. pp.2

With the EA being intelligence-led in its tackling of waste crime, it is vital that those involved in the legitimate export of resources report as much accurate information on illegal activities as possible to the EA in order to allow it to operate to the best of its ability.

### Recommendation 18

The waste and sustainable resource management industry should highlight illegality to the Environment Agency whenever they have any information which may point to such activities. The EA should then act quickly and decisively to stop those illegal operators.

With industry working to highlight illegal activity whenever possible, Government should also consider ways in which enforcement can be strengthened, despite budget and staffing cuts.

### Recommendation 19

Government should consider imposing more severe penalties for waste crime, particularly where criminal acts are repeated.

In addition to increased penalties, such as higher fines, for waste criminals, industry and the EA should work together to disseminate best practice in inspection of waste sites and shipments.

By lending its expertise to the EA, industry can contribute resources in terms of knowledge and time, boosting the EA's inspection capabilities without financial contribution.

### Recommendation 20

The waste and sustainable resource management industry and the Environment Agency should work together to provide enhanced training and expertise to staff involved in the inspection of waste sites and shipments.

## 4.4 Design

Linked to the importance of capturing high quality recyclate from the domestic market, the role of design in the future of the waste sector was also of key interest to respondents to the inquiry.

This is because products designed with their entire life-cycle and, in particular, their 'end of life' in mind optimise the potential for reprocessing, by incorporating ideas of ease of disassembly and recyclability as key requirements in their original specification.

This is a concept being developed alongside research into the potential of the circular economy, with leaders in the field including WRAP, the Ellen MacArthur Foundation, the RSA and the Green Alliance Circular Economy Task Force.[68]

Integrating sustainable design into recyclable products will require collaboration between the waste, design and manufacturing sectors.

## 4.5 Policy to support a resources strategy

The development of the circular economy both as part of the domestic market and across international borders, as outlined in Section 2.4, could be supported through the implementation of the vital steps discussed above: the raising of quality standards across the supply chain for recyclate capture, the stamping out of illegal activity, and the collaboration between the waste, design and manufacturing sectors to develop fundamentally more sustainable products.

With these measures in place, the UK would be in a position to export a range of high-quality materials to a variety of end markets. It would also have the security and of quality feedstock required to build on and improve domestic manufacturing and reprocessing infrastructure, in order to make the best possible use of quality resources arising in the domestic market.

With this in mind, a cohesive and integrated resources strategy, as part of industrial policy in the UK, should then consider the various connections which could be made between the waste sector and other industries, to the overall economic and environmental benefit of the UK.

Such a policy could outline ambitions for connection between the resources sector and the future of UK manufacturing, providing certainty for suppliers of secondary raw materials in the domestic market and stimulating infrastructure development. Opportunities identified by LEPs, as is recommended in Section 3.5.3, for the co-location of EfW facilities and heat sinks could provide further support for industrial applications, reducing energy costs to industry and improving overall efficiencies in treatment of residual waste. Alongside this, the potential for RDF and SRF to provide

68 See: WRAP, *EU Vision 2020*; Ellen MacArthur Foundation, *Towards The Circular Economy 1&2*; RSA, *The Great Recovery Project*; 2013 & Green Alliance Circular Economy Task Force, *Designing Out Waste: Reinventing the Wheel: a circular economy for resource security*, 2011

fuel for industrial applications should be considered, given the potential benefits in terms of greenhouse gas emissions and cost efficiencies, as well as the potential for the use of these fuels to contribute towards renewable energy targets.

These issues need to be considered together, in order to provide a framework in which the waste and resources sector, including legitimate and economically and environmentally beneficial exports, may operate.

### Recommendation 21

Working across departments, Government should deliver a 'resources strategy' as part of industrial policy, with a focus on the best economic and environmental uses of primary and secondary resources across the supply chain, and in combination with pre-existing industrial applications.

# GLOSSARY OF TERMS

| | |
|---|---|
| Amber list | Non-green list exports, usually waste being sent for energy recovery abroad. |
| Arisings | Waste that occurs. |
| Basel Convention | An international convention, first adopted in March 1989, with the overarching objective of protecting human health and the environment against the adverse effects of hazardous wastes. |
| Blast furnace system | The process for steel production favoured in Northern Europe. Materials are supplied through the top of the furnace, and air is blown through the bottom of the furnace, resulting in chemical reactions taking place as the material moves downward. |
| Calorific Value | A way of measuring the energy value (in calories) inherent within different waste-derived fuels. |
| CHP ready | Combined heat and power ready; a plant, such as an EfW facility, with the capability to connect to a district heating network. |
| Circular economy | An economy that is restorative by design or by intention, where materials are designed, made and recycled continually, providing the best possible environmental and economic outcomes. |
| Commercial and Industrial Waste | Waste produced from businesses or industrial operations that is not collected by a local authority. |
| Cullet | Recycled, broken or waste glass used in glass-making. |
| District heating network | A subterranean network of pipes, transporting excess heat produced by an industrial facility around a town or other site, providing a lower-carbon alternative to traditional heating systems. |
| Electric arc furnace steel production | A particular type of advanced steel production favoured in Southern Europe, whereby material is heated by means of an electric arc. This process can incorporate a particularly high percentage of scrap steel. |
| End destination | The country or location where a load or shipment of waste arrives for further treatment. |
| Energy from Waste | The process of generating energy from waste through different methods of incineration. |
| Energy from Waste over-capacity | A situation whereby a nation has developed Energy from Waste capacity (measured in thousands of tonnes) disproportionate to the amount of residual waste available within that nation. |
| Feedstock | The supply of waste or materials used in a given treatment or process. |
| Ferrous metal | Metals with an iron content, such as steel. |
| Gate fee | The fee charged at the entry point of a waste treatment facility for accepting a waste load. This varies depending on the type of facility and by country. |
| Green List | Part of the Waste Shipments Regulation. A list of all materials that can be exported for recycling with little or no controls. |
| Heat sink | A potential user of waste heat, such as an industrial application or an urban development. |

| | |
|---|---|
| Industrial strategy | The idea of an overarching strategy for industry in the UK, including manufacturing, use of materials and energy production. |
| Landfill Tax Escalator | A policy which adds to the cost of the Landfill Tax on an annual basis, to make the landfilling of waste an increasingly unattractive option financially. |
| Local Enterprise Partnerships (LEPs) | Groups of local councillors and local business schemes with responsibility for identifying areas for investment in roads, buildings and facilities in different areas. |
| Materials capture | The amount/percentage of valuable materials/recyclables extracted from a waste stream. |
| Merchant facility | A waste facility designed specifically for the treatment of commercial and industrial waste. |
| Materials Recovery Facilities (MRFs) | A type of waste treatment facility, which separates out recyclable elements from a mixed waste stream. |
| MRF regulations | A forthcoming piece of policy being developed by Defra. This will stipulate a sampling regime for MRF inputs and outputs, and make the resulting data available to local authorities and other parties. |
| Municipal Solid Waste | Waste collected from households by local authorities. |
| Non-ferrous metal | Metals without an iron content, such as aluminium or copper. |
| Obligated tonnage | The number of tonnes for which a packaging producer/packer/filler/retailer will have to evidence recycling through the PRN system. Part of the Producer Responsibility regime. |
| Operation Green Fence | A Chinese import policy, aimed at preventing the shipment of contaminated waste to ports in China. |
| Packaging Export Recovery Notes (PERNs) | As with PRNs, but PERNs represent evidence of 'export for recycling'. |
| Packaging Recovery Notes (PRNs) | Part of the Producer Responsibility regime. Notes of 'evidence' which show when a tonne of packaging waste has been recycled. Issued by recyclers and reprocessors. PRNs have a monetary value which varies depending on material recycled and market demand for the particular type of recycling. |
| Private Finance Initiative (PFI) | A way of creating 'public-private partnerships' through funding public infrastructure projects with private capital. |
| Receiving nations | For the purposes of this report, nations which import materials or fuels from the UK. |
| Recyclate | Sorted recyclable material. |
| Refuse Derived Fuel | A crude fuel produced by basic processes applied to residual waste, used in Energy from Waste incineration. |
| Regional Development Agencies (RDAs) | RDAs were nine non-departmental public bodies established to support the economic development of regions across England. The RDAs were abolished in March 2012. |
| Remelt | The process of turning glass cullet into new container glass. |
| Residual waste | Waste remaining after recyclables and other elements have been removed. |

| | |
|---|---|
| Scrap | The term used for used metals. |
| 'Sink' | A term used for end destinations which accept low-quality or contaminated waste. |
| Solid Recovered Fuel | A waste-derived fuel used to replace fossil fuels in industrial applications. Has an EU-specified Calorific Value, and is often made to exact requirements of a client/end user. |
| Yield-rate | The amount of 'target material' within a particular consignment of waste. If 100 tonnes of plastic waste has 10% contamination, the 'yield-rate' is 90%. |
| Waste-derived fuel | A fuel made by applying processes to residual waste. |

# ACRONYMS

| | |
|---|---|
| BIS | Department for Business, Innovation and Skills |
| CHP | Combined Heat and Power |
| CIWM | Chartered Institution of Wastes Management |
| CV | Calorific Value |
| DCLG | Department for Communities and Local Government |
| DECC | Department of Energy and Climate Change |
| Defra | Department for Environment, Food and Rural Affairs |
| EA | Environment Agency |
| EFTA | European Free Trade Association |
| EfW | Energy from Waste |
| ESA | Environmental Services Association |
| EU | European Union |
| LEPs | Local Enterprise Partnerships |
| LGA | Local Government Association |
| MRF | Materials Recovery Facility (also known as Materials Recycling Facility) |
| MSW | Municipal Solid Waste |
| OECD | Organisation for Economic Co-operation and Development |
| PERN | Packaging Waste Export Recovery Note |
| PFI | Private Finance Initiative |
| PRN | Packaging Waste Recovery Note |
| RDA | Regional Development Agency |
| RDF | Refuse Derived Fuel |
| SRF | Solid Recovered Fuel |
| TEEP | Technically, Environmentally and Economically Practical |
| TFS | Transfrontier Shipment of Waste Regulations |
| WEEE | Waste Electrical and Electronic Equipment |
| WID | Waste Incineration Directive |
| WSR | Waste Shipments Regulation |

# METHODOLOGY, STEERING GROUP AND SECRETARIAT

## Methodology

This research project was conducted between June 2013 and November 2013. A range of steering group sessions were held between June and November 2013 to explore issues raised by the research.

The findings and policy recommendations in this report are based on evidence collected from steering group sessions, extensive in-depth interviews and written submissions to a call for evidence involving the waste sector, reprocessors, materials trade bodies, interest groups, local and central government representatives and other stakeholders.

## Steering group sessions

The findings from the research were scrutinised in a series of meetings led by the inquiry chair Rt Hon Caroline Spelman MP, former Secretary of State for the Environment.

The four sponsors, the British Metals Recycling Association (BMRA), Closed Loop Recycling, DS Smith Recycling and SITA UK, have supported this work with valuable expertise on the export of different types of wastes. The recommendations provided by this inquiry are those of the APSRG and do not necessarily reflect the opinions or positions of the sponsors or individual steering group members.

## Steering group members

| | |
|---|---|
| Susanne Baker | Senior Climate & Environment Policy Adviser, EEF the Manufacturers' Organisation |
| Professor Margaret Bates | Professor of Environmental Science, University of Northampton and Chair, Science & Technical Committee, Chartered Institution of Wastes Management |
| Chris Dow | Chief Executive, Closed Loop Recycling |
| Marcus Gover | Director of Closed Loop Economy, WRAP |
| Jacob Hayler | Economist, Environmental Services Association (ESA) |
| Stuart Hayward-Higham | Development Director, SITA UK |
| Stephen Hazleton | Director, Hazleton Advisory Ltd |
| Ian Hetherington | Director General, British Metals Recycling Association |
| Peter Jones OBE | Director, Policy Connect |
| Dr Jim Malone | European Sales & Purchasing Director, DS Smith Recycling |
| Cllr Clare Whelan OBE | Environment and Housing Board, Local Government Association |

## Secretariat

The Associate Parliamentary Sustainable Resource Group is powered by Policy Connect, the think tank that works with parliamentarians, business and the public sector to help improve policy in the health, education and skills, sustainability, design and manufacturing sectors.

| | |
|---|---|
| Laura Wilton | Manager, Associate Parliamentary Sustainable Resource Group |
| Katrina Borrow | Senior Researcher, Associate Parliamentary Sustainable Resource Group |

# CONTRIBUTORS TO THE RESEARCH

| | |
|---|---|
| Simon Aumonier | Principal Partner, ERM |
| Roger Baynham | Philip Tyler Polymers |
| James Beard | Valpak |
| Kirsten Berry | Partner, ERM |
| Nick Brown | Associate Director for Recycling, Coca Cola Enterprises |
| British Plastics Federation | |
| Graeme Carus | Business Development Director, EMR |
| Confederation of Paper Industries | |
| Rebecca Cocking | Head of Container Affairs, British Glass |
| Professor Chris Coggins | Independent Consultant |
| Dan Cooke | External Affairs Manager, Viridor |
| Mike Cox | Commercial Director, SITA |
| Fay Dashper | Recycling Operations Manager, ACE UK |
| Department for Environment, Food and Rural Affairs | |
| Dr Gev Eduljee | External Affairs Director, SITA |
| Ray Georgeson | Chief Executive, Resource Association |
| Ian Goodfellow | Ex-Chief Executive, Shanks |
| Dr David Greenfield | Director, iESE |
| Melville Haggard | Chairman, Quartermain Advisers Ltd |
| Adrian Hawkes | Policy Director, Valpak |
| Lisa Jordan | Business Manager – Bioenergy, Air Products |
| Dr Alan Kirk | Environmental Consultant, Bywaters |
| Paul Levett | Non-Executive Industry Director |
| LGA | The Local Government Association |
| Patrick Mahon | Government Affairs Analyst, WRAP |
| David Massingham | Independent Expert |
| Dan McCartney | Policy Adviser, LGA |
| Bob Mead | E&B Manager (Waste Crime and Exports), Environment Agency |
| Peter Mitchell | Head of Market Economics, WRAP |
| Jonathan Short | Managing Director, EcoPlastics |
| SITA UK | |
| David Seal-Yates | Managing Director, Sharp Recycling |
| John Twitchen | Executive Director, Copper Consultancy |
| Paul Vanston | Manager, Kent Resource Partnership |
| Hannah Woodrose | Policy Advisor, Valpak |
| Veolia Environmental Services | |
| Viridor | |

# BIBLIOGRAPHY

Associate Parliamentary Sustainable Resource Group (2010)
Waste Management Infrastructure: Incentivising Community Buy-In

Associate Parliamentary Sustainable Resource Group (2011)
Rubbish to Resource: Financing New Waste Infrastructure

Associate Parliamentary Sustainable Resource Group (2012)
Sustainable Skills: The Future of the Waste Management Industry

Bank of America, Merrill Lynch (2013)
No Time to Waste – Global Waste Primer

British Glass (2013)
Glass is infinitely recyclable

British Plastics Federation (2013)
BPF Proposal: To encourage and incentivise the use of recycled plastics in UK manufacturing

British Metals Recycling Association (2005)
About Metal Recycling

Chartered Institutions of Wastes Management & Ricardo-AEA (2013)
Commercial and industrial waste in the UK and the Republic of Ireland

Chartered Institution of Wastes Management & AMEC (2013)
Research into SRF and RDF Exports to Other EU Countries, Final Technical Report

Department for Communities and Local Government; Department for Business, Innovation and Skills; Department for Transport (2013)
Supporting economic growth through local enterprise partnerships and enterprise zones

Department for Environment, Food and Rural Affairs (2013)
Forecasting 2020 Waste Arisings and Treatment Capacity

Department for Environment, Food and Rural Affairs (2013)
Letter to local authority bodies on the separate collection of waste paper, metal, glass and plastic

Department for Environment, Food and Rural Affairs (2013)
Packaging waste – producer responsibility regimes

Department for Environment, Food and Rural Affairs (2011)
Review of waste policy in England

HM Treasury (2012)
Budget 2013: Chancellor's Statement

SITA UK (2011)
Driving Green Growth – The Role of the Waste Management Industry and the Circular Economy

EEF (2012)
Resource Efficiency – Business benefits from sustainable resource management

Ellen MacArthur Foundation (2012 & 2013)
Towards the Circular Economy, Vol. 1 & 2

Environmental Services Association (2013)
Overseas options: the importance of exports to UK recycling

Environment Agency (2011)
Regulatory Guidance: End of Waste Regulations (No.333/2011) for scrap metals

Environment Agency (2013)
Transfrontier Shipment; Green List Waste

Ernst & Young (2012)
Q1 analysis of profit warnings issued by UK quoted companies

Eunomia (2013)
Bi-annual Residual Waste Infrastructure Review, Issue 3

European Commission (2011)
Trade and waste shipment in a nutshell

European Committee for Standardization (2011)
CEN/TC 343 Published Standards

Green Alliance (2013)
Resource Resilient UK

Institute for Environmental Strategies (2004)
Definition of waste recovery and disposal operations

Materials Recycling World (2013)
Does the PRN system promote exports?

Materials Recycling World (2013)
EA job cuts bigger and faster than expected

Materials Recycling World (2013)
Green fence ruffles UK paper market

MetalMatters (2013)
Case Study: Sefton Borough Council

Tolvik Consulting Ltd (2011)
Briefing Report: UK Waste Exports: Opportunity or Threat?

Waste and Resources Action Programme (2013)
Annual Gate Fees Report

Waste and Resources Action Programme (2008)
CO2 Impacts of transporting the UK's recovered paper and plastic bottles to China

Waste and Resources Action Programme & Valpak (2013)
GlassFlow report 2012

Waste and Resources Action Programme (2010)
Realising the value of recovered plastics – an update

## Notes

## Notes

# ASSOCIATE PARLIAMENTARY SUSTAINABLE RESOURCE GROUP

The APSRG is the leading forum informing the debate between parliamentarians, business leaders and the sustainable resource community on the crucial policy issues affecting sustainable resource management in the UK.

Its mission is to provide an objective platform for effective communication between policy-makers, businesses and organisations with an interest in the sustainable resource management agenda and to raise awareness of sustainable resource issues within Parliament.

With special thanks to Peter Barrett, Jessica Bridgman, Professor Chris Coggins, Laura Owen, Lynva Russell and WRAP.

For further information please contact
Laura Wilton (Manager, Associate Parliamentary Sustainable Resource Group)
Katrina Borrow (Senior Researcher, Associate Parliamentary Sustainable Resource Group)
Rachel White (Head of Sustainability, Policy Connect)

Associate Parliamentary Sustainable Resource Group
Policy Connect
CAN Mezzanine
32-36 Loman Street
London SE1 0EH

020 7202 8570
apsrg@policyconnect.org.uk

www.policyconnect.org.uk/apsrg
www.policyconnect.org.uk

@apsrg

Printed on recycled paper

Sponsored by

BMRA
www.recyclemetals.org

closed loop recycling CLOSED LOOP

DS Smith

suez environnement SITA

a policy connect activity

Designed at Richard P Chapman Design Associates