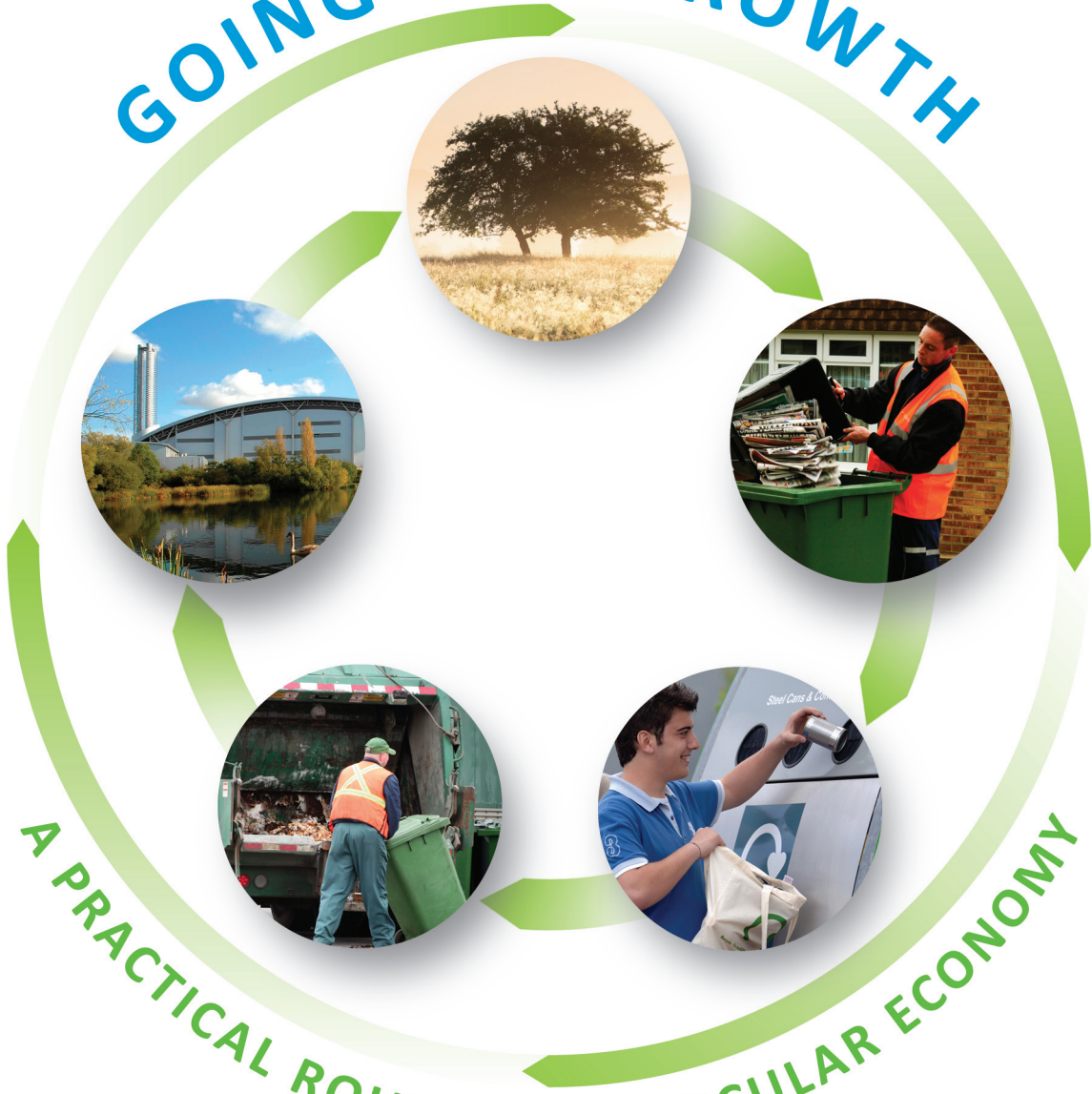


GOING FOR GROWTH



A PRACTICAL ROUTE TO A CIRCULAR ECONOMY

## Foreword

The global economy has followed a linear pattern of production and consumption for the past 150 years and in that time has lifted hundreds of millions of people out of poverty. But this model has reached its limits as ever greater pressure is put on the Earth's resources. A linear economy simply can no longer provide the growth to sustain rising living standards across a global population which continues to expand apace.

A circular economy, where the UK increasingly re-uses and recycles the resources it already has, could help generate 50,000 new jobs with £10 billion investment, boosting GDP by £3 billion. The circular economy is the best long-run approach to return the UK to sustainable growth.

The waste and resources industry can deliver this new economy. It is the means through which materials and energy can be returned into other productive parts of the economy. Its expertise can help redesign the UK's supply chains to maximise material recovery and the economy's resilience to the resource crunch of the future.

This report explains the waste and resources industry's role at the heart of the circular economy. It highlights some of the barriers

preventing the take up of greater circularity and offers solutions along the supply chain.

We believe that the circular economy can only be built if all parts of the supply chain work together. To that end we have worked with a range of other organisations in preparing this report and I would like to thank the Royal Society of Arts, manufacturers organisation the EEF, B&Q plc, the Local Government Association, iESE, the Chartered Institution of Wastes Management, Coca-Cola Enterprises Ltd, Marks & Spencer Plc and the Resource Association for their valuable input into the project.



David Palmer-Jones  
Chairman, ESA

YOUR M&S

B&Q

eeef

The  
manufacturers'  
organisation

Local  
Government  
Association



The Chartered Institution  
of Wastes Management

*Coca-Cola Enterprises Ltd*

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Your transformation  
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RESOURCE  
ASSOCIATION

RSA  
Action and Research Centre

# What would a circular economy look like?

At a high level, the ‘circular economy’ concept is easy to understand. At the moment the economy mostly consumes resources extracted from our natural environment (such as fossil fuels, aggregates, minerals and forest products), and then disposes of these resources back into the environment as used products or as emissions that contribute to pollution. In a ‘circular economy’ rather than material being thrown away after use, it is reclaimed and reused or recycled as secondary raw materials for new products (or for organic waste – as soil nutrients), with energy being generated from any residual waste that cannot be recycled.

A circular economy like this would reduce the pressure on the UK’s natural resources and international supply chains, and hence contribute to sustainable economic growth.

Forward-looking businesses are already exploiting the opportunities that a circular economy can bring<sup>1</sup>. Policy makers<sup>2</sup> and other stakeholders<sup>3</sup>

are starting to appreciate the scale of the opportunities available by switching to a circular economy.

The waste and resources industry will play a key role in this transition. It provides the infrastructure and logistics to collect materials at the end of use and to process and return them to the economy as secondary resources. These secondary resources will heat our homes, power our businesses, fuel our vehicles, and, above all, provide valuable raw materials for our industries.

But there is a need to be clearer about what a circular economy would mean in practice, to better understand both what is stopping the UK achieving it, and the practical measures that would get us there.

The best way to understand the circular economy is to break it down into the different stages of the cycle.

**Exhibit 1: The waste industry at the heart of the circular economy**



Source: ESA

<sup>1</sup> <http://www.ellenmacarthurfoundation.org/business/ce100>

<sup>2</sup> <https://www.gov.uk/government/publications/resource-security-action-plan-making-the-most-of-valuable-materials>

<sup>3</sup> <http://www.green-alliance.org.uk/grea1.aspx?id=6571>

# What would DESIGN be like in a circular economy?

## The vision:

80 per cent of the environmental impact of products is determined at the design stage<sup>4</sup>. By providing expertise and early input at the design stage of products, the waste and resources sector helps to ensure that all products and their packaging are designed to be easily reused, dismantled and recycled. The use of difficult to recycle composite materials is minimised. The same will also be true for packaging. For example, designers will wherever possible avoid using packaging with different materials (e.g. plastic and card) fused together, which makes them difficult to separate during processing.

Just as importantly, designers will aim to use as much recycled material as possible in their products, as a substitute for virgin raw materials.

## The economic benefit:

Designing for material recovery would increase the proportion of the waste stream that is

recyclable. Between now and 2020, 395 million tonnes of potentially recyclable material will pass through England's waste management sector. On current trends, we expect only 255 million tonnes to be successfully returned to the economy. But if we could capture the remaining 140 million tonnes of recyclable resources there would be £1.4 billion in extra recycle revenues for the UK economy.

## The example: The Google Nexus

The Google Nexus can be easily disassembled for material recovery or repair, partly because it is screwed together unlike the iPad which is glued together. Repair website ifixit.org rated the Nexus 8/10 for repairability, compared to 2/10 for the iPad.

*Source: ifixit.org*

<sup>4</sup> Cited in German Federal Environment Agency (2000) "How to do ecodesign: a guide for environmentally friendly and economically sound design"

# What would MANUFACTURING be like in the circular economy?

## The vision:

New goods and packaging have been designed to maximise recycled content. The waste and resources industry provides raw materials into the manufacturing process, reducing the need to import materials from overseas. While the recovery of materials is maximised and fed into production processes, some residual wastes are processed into fuels and used as energy, providing heat and power to manufacturers around the country.

At the same time, manufacturers seek to maximise their resource efficiency, thereby minimising their own waste production. Waste which is produced is then fed back to the waste and resources industry for processing and returned to production.

## The economic benefit:

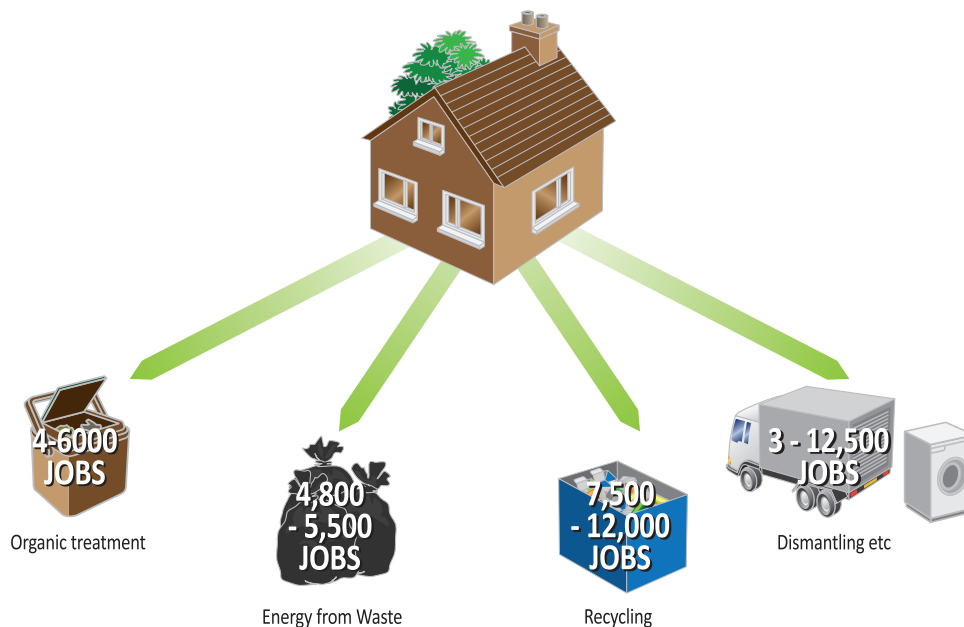
Implementing a number of quick win strategies in manufacturing could enable manufacturers to reduce the raw materials needed by over 38 million tonnes by 2020<sup>5</sup>, with potential savings to the economy of £23bn<sup>6</sup>.

### The example: Unilever

Unilever factories opened in 2012 have been designed to create 50% less waste than the average of all Unilever factories operating in 2008.

Source: [www.unilever.com](http://www.unilever.com)

**Exhibit 2: Creating new jobs in the circular economy**  
*Direct employment in new recycling/recovery facilities by type*



Source: ESA adapted from *Driving green growth*, SITA, 2012.

<sup>5</sup> "Securing the future – the role of resource efficiency", WRAP, 2010

<sup>6</sup> "The further benefits of business resource efficiency", Oakdene Hollins, 2011

# What would RETAILING AND CONSUMPTION be like in a circular economy?

## The vision:

Large retailers work in partnership with the waste and resources industry. Waste flows from retailers are minimised and then captured for recovery. Organic material is collected separately and sent through processes which can recover valuable nutrients (which can be used to improve soil quality) and also to generate energy.

The waste and resources industry provides recycling infrastructure for retailers, enabling their customers to return materials to the economy as they shop. Eco-labelling helps consumers to identify products with high recycled content and retailers help to shape consumers' preferences by switching to more readily recyclable products.

## The economic benefit:

ESA believes that if all retailers matched the recycling performance of the best, then 2.5 million tonnes of additional recyclate would be collected with an economic value of £250 million.

“ Increasing global price volatility for resources means business that are sustainable need to be looking at how they can control the costs of their materials to ensure economic stability through the recapture of materials or the development of alternative business models. Both are underpinned by developing better relationships with customers and increased transparency with suppliers. Closed loop is not an environmental agenda but a business sustainability agenda. ”



James Walker,  
Innovation,  
Kingfisher Plc

## The examples:

- **Courtald Agreement:**  
Under the Agreement between the retail sector and the Government, retailers cut food and packaging waste by 1.2million tonnes in Phase 1 (2005-10), and by a further 8.8% in the first two years of Phase 2 (2010-12).
- **Marks & Spencer Shwopping:**  
Under its sustainability strategy 'Plan A', M&S has committed, in partnership with Oxfam, to helping its customers recycle 20 million items of clothing a year by 2015. Customers can recycle old clothing items from any retailer by depositing them in Shwop Drop boxes at M&S stores and can enter a prize draw for M&S vouchers when they do so. This puts otherwise lost material back into the economy. In the last 12 months customers have 'schwopped' 38 million garments and helped raise £2.3m for Oxfam's vital work to tackle poverty.
- **The Co-operative Group:**  
In 2012, the food retailer radically improved the recycling rates at its stores by working with its waste management contractor. Waste is now collected or 'backhauled' by the delivery vehicles that had brought food items to the stores, and returned to depots. From there the mixed recyclate was taken to a MRF for sorting and sale to reprocessors, the food waste to an Anaerobic Digestion plant to generate biogas and the rest converted into fuel for energy from waste plants. Co-op stores now recycle about 84% of their waste.

# What would WASTE COLLECTION be like in a circular economy?

## The vision:

The sterile debates about the number of bins and weekly vs alternate collections would be a thing of the past. Local authorities work in collaboration with their waste and resources contractors. Household collection systems are optimally designed to maximise the capture of quality recyclate. The waste and resources industry invests in new technology and new collection systems to enable the capture of new material streams from the household waste sector. Separate food waste collections allow investment in new processing infrastructure (such as for anaerobic digestion) and residual material is diverted from landfill to energy recovery.

The business sector has widespread take-up of recycling services as overall recycling rates across all waste producers are pushed up. Energy recovery from residual material provides electricity and heating both to householders and businesses.

## The economic benefit:

If current local authority best practice was replicated across the UK it would lead to an extra 5 million tonnes of household recyclables being collected. This material could potentially have a value in the region of £500 million.

“ Now is the time for the public sector to grasp the mantle and enter the circular economy fray. ”

*David Greenfield,  
Director –  
Waste and Resources, iESE*

## The example: Tandridge Council

Tandridge Council worked with its waste management contractor to drive up its recycling rate from 33% to 63%.



# What would RECYCLING and REPROCESSING be like in a circular economy?

## The vision:

The recycling of all waste streams is maximised. This either takes place at multi-stream Material Recovery Facilities (MRFs) which operate under the MRF Code of Practice, using innovative machinery to sort materials into high quality streams, or at smaller single-stream facilities. Less glass is collected in fully co-mingled collections and most of what is collected in this way is sorted by advanced optical sorters to re-melt quality.

The UK develops a strong domestic reprocessing and manufacturing sector which receives the material generated across the UK economy. This means we are less reliant than currently on export markets to sustain higher recycling rates (Exhibit 3).

Most food waste is sent to Anaerobic Digestion plants to be turned into biogas and a nutrient

rich digestate which in turn helps tackle soil erosion/degradation. The volume of non-recyclable, residual waste is slowly declining and is sent for energy recovery.

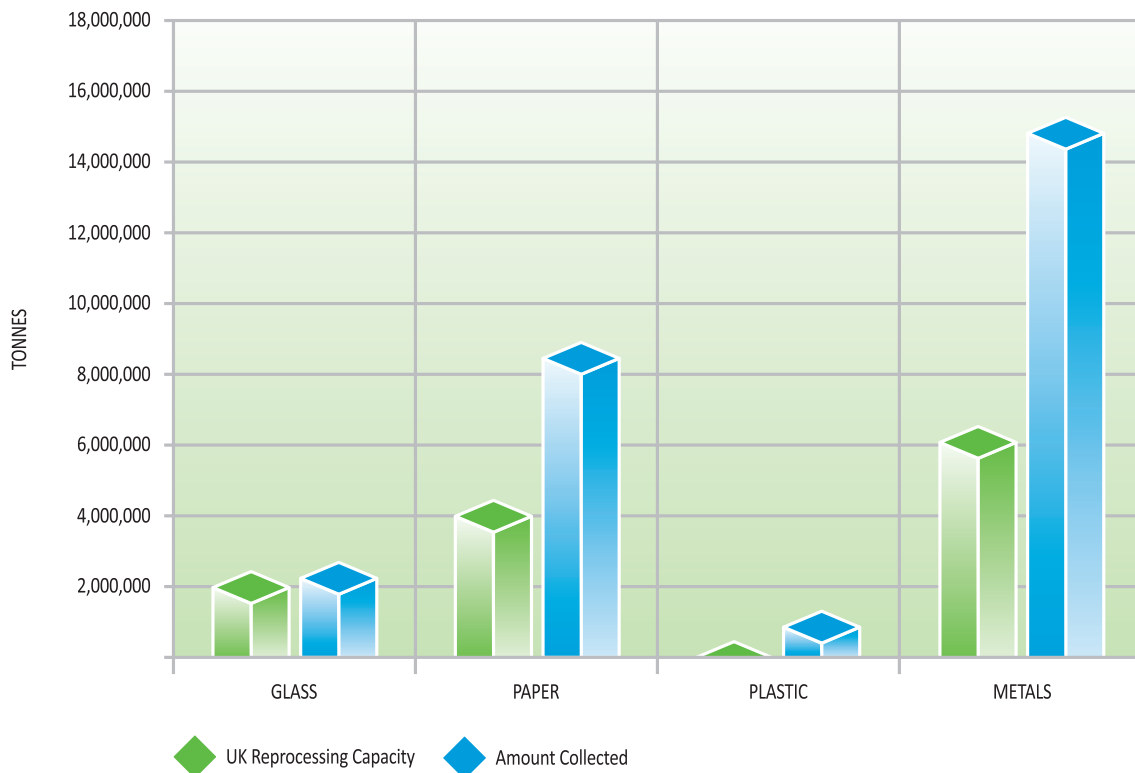
## The economic benefit:

The number of new jobs in recycling and energy from waste facilities (including composting and Anaerobic Digestion plants) could total over 30,000. These jobs will be spread across the UK.

### The example: MRF Sorting Technology

The latest generation of automated infrared sorting equipment being introduced in UK MRFs can identify, and separate, selected types of plastic polymer from a co-mingled waste stream at a throughput of 6,500kg/hour.

**Exhibit 3: Material collected compared to domestic reprocessing capacity**



Source: WRAP, BMRA, CPI, European Container Glass Federation



# How do we build a circular economy?

The economic and business case for moving towards a circular economy is overwhelming. The McKinsey report for the Ellen MacArthur Foundation gives a global economic benefit of \$2 trillion<sup>7</sup>. There is also cross party political support, with the recent Labour Party document on resources policy reinforcing the statements by current Ministers<sup>8</sup>.

Yet this growing policy and political support is not matched by progress on the ground. The steady increase in household recycling rates has levelled off. Half of total UK waste still goes to landfill. WRAP research has shown that businesses are slow to take up resource efficiency measures, even those with short payback periods and large potential savings.

There are three core reasons why progress remains slow:

- **Demand for recycled content in products made in the UK remains limited.** This is partly due to the decline in UK manufacturing, partly because retailers have focused initially on making sure the waste they generate is recycled rather than on the recycled content of products they sell, and partly because public procurement standards don't do enough to specify recycled products.
- **Many of the 'easy wins' in recycling have been taken:** Much of the recyclable material (recyclate) which appears in large quantities and homogenous form in waste streams is now recycled (eg about 2/3 of waste paper is recycled, and 50% of plastic bottles). There is much more potential recyclate in the waste stream (eg only 10% of plastic pots tubs and trays are recycled) but its dispersion or composition makes it harder to aggregate cost-effectively.

- **Recyclate markets are volatile:** The combination of limited UK demand and the challenge of extracting new sources of saleable recyclate from waste streams contributes to recyclate markets which are more volatile than standard commodity markets. This in turn contributes to recycling and reprocessing facilities being risky to investors (Exhibit 4).

Action is needed in five areas to address these challenges and help the circular economy lift off:

- 1 Designing products,** for dismantling/ recycling operations or for incorporation of recycled materials.
- 2 Optimising collection systems,** both for homes and businesses, to maximise the recovery of quality material streams.
- 3 Incentivising the uptake of recyclate** amongst UK manufacturers which have established supply chains for primary commodity inputs
- 4 Creating resilient markets for recyclates,** leading to a reduction in exposure to risk along the management chain. Recyclate markets currently tend to follow primary commodity markets but feedstock volumes and price swings are far more volatile.
- 5 Providing a stable policy framework,** to remove the current layer of political risk to circular economy investments – such as in processing infrastructure – particularly in a post-2008 economic climate.

<sup>7</sup> "Towards the circular economy (volume 1)", McKinsey, 2012

<sup>8</sup> <http://www.yourbritain.org.uk/agenda-2015/policy-review/resource-security>

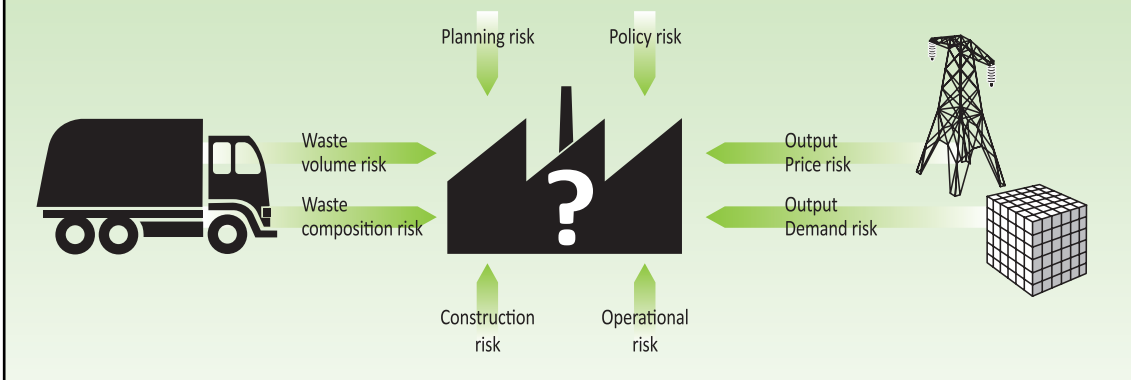
### Exhibit 4: Investment Risks in the Circular Economy

A key difference between a traditional linear production process and one which relies on a secondary resource stream is that the latter is inherently less stable. Waste feedstocks are heterogeneous and changing consumption and production patterns change waste stream composition over time. This can be difficult to manage, as facilities are often only efficient within certain composition margins.

Waste volumes can also be unpredictable, and

are becoming less correlated with economic performance.

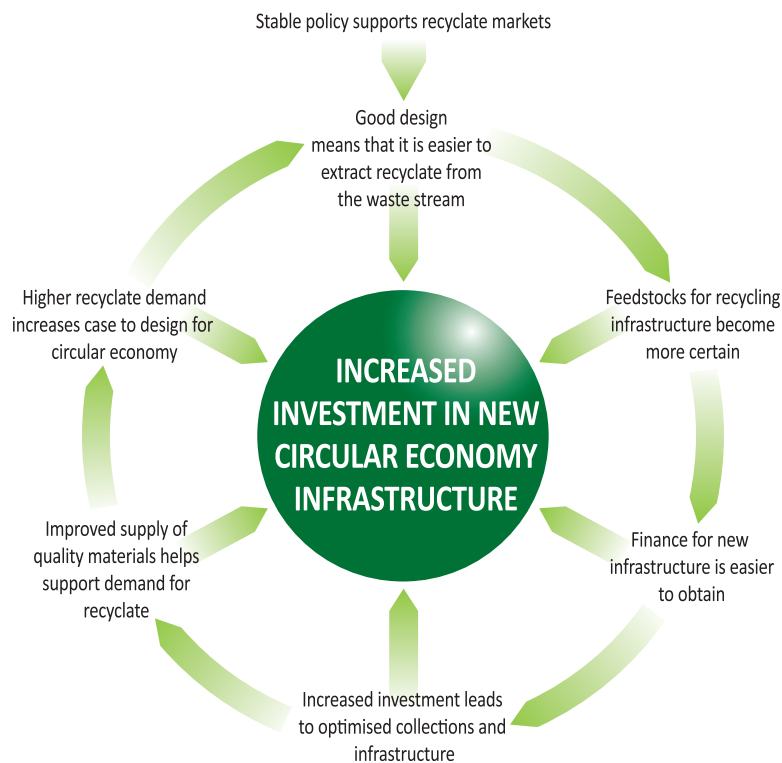
All these risks make investment in new waste infrastructure particularly challenging. There are feedstock risks in terms of both volume and composition, as well as technology risks in ensuring that a process operates as intended, and also offtake risks in terms of available markets and prices for the materials and energy produced by the industry.



To deliver the circular economy all of the key players along the supply chain must work together. Policy makers have a role to help

support the circular economy by de-risking different elements of the circle and helping to create the conditions for closing the loop.

### Exhibit 5: Derisking Investment



Source: ESA

# What do our circular economy PARTNERS say?

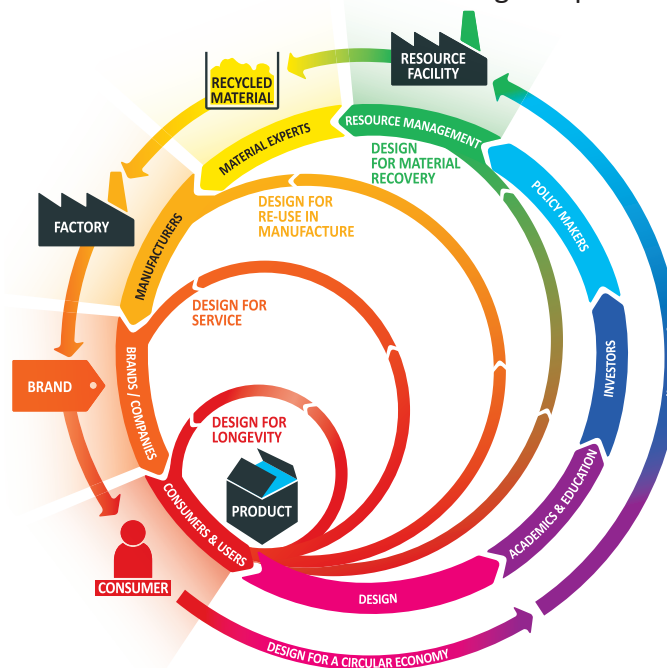
ESA has asked companies and trade bodies at each stage of the resource cycle what they think needs to be done to build a circular economy. Here, we set out their views on the changes needed.

## Design

The RSA through its 'Great Recovery' programme is studying the key issues around designing for a circular economy.

RSA recommends	ESA says
<p><b>1</b> Prepare the future generations: For design this means a requirement to embed circularity in the design education system and make sustainability a matriculation criteria in every creative arts and design degree, for business this means investing in design as a foundational approach and the system of design and build demand for business to invest in the re-design towards a circular economy.</p>	<p>We strongly support the design agenda set out by RSA and intend to work closely with the Society in taking this forward.</p>
<p><b>2</b> We need laws and accreditation fit for circularity with a review of regulations that hinder re-use or repair and we need to develop trusted certification of more recycled materials to boost the market.</p>	
<p><b>3</b> We need to create safe spaces for trial, error and progress through collaboration. Obstacles like Intellectual Property laws and business secrecy in supply chains and production methods allows bad social and environmental business practice to go un-noticed, holds up dialogue and progress towards circularity and hinders future repair services.</p>	

**Exhibit 6: The 'Circular design map'**



Source: RSA

## Manufacturing

Manufacturers' organisation the EEF has established a Material Security Working Group to address the resources challenge flagged by its

members. Last year, it wrote to Ministers making a number of recommendations to government, including the following.

EEF recommends	ESA says
1 Educate and engage the entire supply chain and those that influence it – including politicians, designers, manufacturers, retailers and consumers	We agree
2 Commit to gathering and utilising better data on material flow within the economy	We agree, poor quality data makes investment decisions harder
3 Review how public procurement and whole-life costing should factor in the environmental benefits and cost savings associated with the services offered by manufacturers with the products they sell	

## Retailing/consumption

B&Q is a founding partner of the Ellen MacArthur Foundation.

B&Q recommends	ESA says
1 Engaging businesses: the circular economy is a business agenda and not just a sustainability agenda and so we need to focus on the business value	Building a circular economy is all about building the successful economy of the future. The growth and business benefits are huge and must be the main focus
2 Delivering value: create value to all parties, from the supplier to the customer, if everyone gains value from a circular economy from the recapture of materials or delivering alternative business models	New approaches where leasing models are used and consumption is collaborative will be an important part of the circular economy
3 Creating better: focus on creating innovative solutions, products that deliver better outcomes offer more than sustainability, the circular economy should be a driver of innovation	Innovation will be a key element which helps circular solutions leave behind the old linear ways of the past

### Coca-Cola Enterprises

Coca-Cola Enterprises (CCE) has pledged to reduce the amount of material used across all packaging formats by 25% by 2020. 95% of their packaging is easily recyclable and their PET bottles include 25% recycled PET, making CCE the largest user of recycled

plastic bottles and cans in the UK. Partnering with Eco-Plastics, in 2012 CCE invested in the Continuum Plastics reprocessing site in Lincolnshire, adding significantly to the UK's recycling infrastructure while giving security of supply of recycled plastics.

## End of life/waste producers – collections and markets

The Local Government Association has just completed a review of waste policy in England. Among other options, it has commented on

collections, recycling infrastructure and end markets for recycle.

LGA recommends	ESA says
<p><b>1</b> The MRF Code of Practice should require full transparency of information and a robust system of sampling to enable price differentiation to drive higher quality, improve confidence in quality, and recover the associated value for local tax payers</p>	<p>We support data transparency for MRFs provided this is applied throughout the supply chain, including to reprocessors. We also support increased sampling compared to the original Defra proposals</p>
<p><b>2</b> Introduce targeted landfill bans in the UK on selected materials – potentially furniture, paints, and textiles – and link them to an increased producer contribution to encourage a thriving recycling and reuse industry</p>	<p>We have concerns over landfills bans but these are pragmatic not ideological – can such bans be effectively implemented without costly and bureaucratic ‘policing’?</p>
<p><b>3</b> Restore the principle of revenue neutrality with which the landfill tax was originally introduced. Tax receipts from local authorities should be redistributed to local taxpayers. One option for the proportion raised from the commercial sector is to provide underpinning capital for forward thinking waste infrastructure projects, e.g. by capitalizing the Green Investment Bank or local Waste and Recycling Boards for investment in recycling infrastructure</p>	<p>This is an interesting idea which should be explored</p>

The circular economy concept has not been top of the agenda for a lot of councils as they’ve had to concentrate on delivering efficiencies and improving services. iESE is coordinating

partnership working through the National Waste Resources Partnership Forum to increase demand and quality of materials.

iESE recommends	ESA says
<p><b>1</b> Councils should prioritise understanding the composition of material in the waste stream and aggregating the supply to reprocessors</p>	<p>ESA agrees. Improving composition data and tailoring household collections to maximise the capture of quality materials should be a priority</p>
<p><b>2</b> Using efficient procurement mechanisms for purchase, for example the iESE Waste Service Framework</p>	<p>Local authority procurement of services needs to be improved. Better risk transfer between the public and private sectors would deliver improved long term value for money</p>
<p><b>3</b> Working to facilitate procurement that can stimulate the circular economy</p>	<p>ESA agrees. Green public procurement should be adopted to give demand for recycle a boost</p>

## End of life/waste producers – reprocessing

The Resource Association represents the UK’s reprocessing sector.

Resource Association recommends	ESA says
<p><b>1 Stronger enforcement of TFS Regulations</b> to seek to eliminate illegal exports of waste and implementation of a robust regulatory approach for MRFs in which a ‘high bar’ approach to monitoring, sampling and data release drives out poor practice in the industry</p>	<p>ESA agrees. Illegal activity undermines legitimate investments in the circular economy and must be stamped out - we have also argued for a robust MRF regime</p>
<p><b>2 Full reporting of the end destination of recycle</b> which accounts back to householders and commercial customers for what actually happens to the recycling collected on their behalf</p>	<p>ESA supports improved transparency and measures to give the public confidence that their material is being recycled properly. However it needs to be recognised that there are some practical difficulties with providing detailed end destination information where material passes through several pairs of hands on route</p>
<p><b>3 Fiscal measures to incentivise domestic recycling</b> including PRN/PERN reform to provide a level playing field and an EfW tax</p>	<p>We agree that there should be a level playing field between PRNs and PERNs. We have doubts about whether an EfW tax would deliver environmental benefits, as explained in our recent report <i>Beyond Landfill: Using green taxes to incentivise the waste hierarchy</i></p>

The Chartered Institution of Wastes Management (CIWM) is the professional body which represents individuals working in the

waste and resource management sectors worldwide.

CIWM recommends	ESA says
<p><b>1</b> To engage with and inform consumers, politicians and business regarding the benefits of the circular economy and the need for future change</p>	<p>This is a task for all of us and ESA fully intends to play it’s part</p>
<p><b>2</b> That the eco-design of products will provide a trickle-down effect stimulating recycling, re-use, repair and remanufacturing of goods, which in itself will provide jobs and stimulate the economy</p>	<p>We agree - design is at the heart of the circular economy</p>
<p><b>3</b> Establish long-term stability via policy framework enhanced by more accurate data within the industry</p>	<p>We agree</p>

# Conclusion

Taking account of our partners' views and ESA's own member input and analysis, we propose the following:

## **ESA recommendation 1:**

**Waste management companies to contribute experts to the 'design for recyclability' spaces proposed by RSA.** This will help designers understand the practical impacts of design choices.

## **ESA recommendation 2:**

**EU to use powers within the Eco Design Directive to set recyclability requirements for selected products.** This will start to shape the design and investment decisions of manufacturers supplying the EU market.

## **ESA recommendation 3:**

**A BIS Ministerial post should be created to lead on Resource Efficiency across Government, linking the current emphasis on industrial policy with the material resources agenda.** This will mitigate the problem of waste and resources being a second-tier issue for multiple government departments.

## **ESA recommendation 4:**

**EU should consider adding products with high recycled content to the list of VAT reduced goods.** This would boost demand for recycle.

## **ESA recommendation 5:**

**Specifications for recycled products/content in Government Buying Standards (GBS) to be increased.** The existing GBSs contain some requirements, but are unambitious.

## **ESA recommendation 6:**

**Separate food waste collections to become widespread for households and businesses.** Organic waste is an important resource, and collecting it separately will help put it to best use.

## **ESA recommendation 7:**

**Business parks, Business Improvement Districts and other clusters of SMEs to facilitate collective long term contracts for recycle collections.** This will make it more economic to invest in collection and recycling infrastructure.

## **ESA recommendation 8:**

**Development of standard clauses in local authority collection contracts to enable better allocation of recycle price risk between partners.**

## **ESA recommendation 9:**

**Green Investment Bank to consider developing 'insurance products' that would underwrite elements of waste volume/recycle price risk.** This would make it easier to raise private finance for investment in waste treatment and recycling facilities.

## **ESA recommendation 10:**

**MRF Sampling proposals should be strengthened in line with ESA input to Defra.** This will ensure that all MRFs have and can demonstrate robust data on the quality of material entering and leaving the plant.

By implementing these recommendations we can start our transition to a circular economy and strengthen our competitiveness in the resource-hungry world of the future.

By doing so:

- 50,000 new jobs could be created
- £10 billion of new investment unlocked
- GDP boosted by £3 billion
- The balance of payments improved by £20 billion by 2020.



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