

Making Things Last

A Circular Economy Strategy for Scotland



I am proud to present “Making Things Last”: Scotland’s first circular economy strategy.

In a world of finite resources, where global population and consumption growth are driving increased volatility and vulnerability in the supply of raw materials, the circular economy offers a new and exciting perspective. This creates a variety of opportunities from making goods to last longer, ready to be upgraded and repaired, to reducing our need for raw materials and helping us get smarter at recycling. For me, the circular economy is about the environment, the economy, and people. And above all it is about the moral imperative to reduce our demand on the planet’s resources.

For example, between now and 2020, we’ll import about £50 million worth of gold into Scotland hidden away in our TVs, mobile phones and computers, but we’ll recover just a tiny fraction of that.

From an environmental perspective, the opportunities of a more circular economy are fundamental to the Scottish Government’s approach to tackling emissions arising from the consumption of goods, to help tackle climate change. Zero Waste Scotland estimate that, by 2050, a more circular economy could reduce carbon emissions by 11 million tonnes per year.

Scotland’s Economic Strategy, and our new strategy for manufacturing - *A Manufacturing Future for Scotland* launched by the First Minister in February 2016 - clearly set out the economic opportunities of a more circular approach. From a business perspective, the circular economy agenda is one of innovation, seeking new ways to reduce our call on natural resources and keeping materials flowing through the economy at as high a value as possible for as long as possible. Remanufacturing alone has the potential to create an additional £620 million turnover and 5,700 new jobs by 2020.

But it is the choices made by consumers – the public – that will ultimately determine success. At the forefront of my mind is the idea of “Making Things Last”, and the potential for the reuse of goods and materials to help protect the environment, and deliver social and economic benefits to our communities.

The opportunities of a more circular economy seem endless, and the concept can be daunting. This strategy does not attempt to cover everything that might be possible,

and as we understand more about the dynamics of a circular economy in the light of experience, we will update our approach. But this strategy sets out our early priorities for action, in the areas where Scotland is in a position to make rapid progress, such as remanufacturing; and the areas where we have the scope to deliver the most significant environmental and economic benefits, such as in the food and bio economy sectors, energy infrastructure and construction.

Whether it be designing complex products in a way that enables them to be remanufactured, or simply empowering people to repair household items instead of throwing them away, the concept of making things last makes sense for business, industry, public organisations and individuals.

There are two key elements of this strategy that will bring together all sectors, and individuals, to work together towards a more circular economy. Our ideas on a better approach to producer responsibility – ensuring that provision for dealing with products at the end of their lives is fully taken into consideration when they are placed on the market – are intended to stimulate debate. And our food waste reduction target of 33% by 2025, the first such target in Europe, will act as a catalyst for action along the whole supply chain, from farm to plate.

This strategy takes the targets and ambitions in our Zero Waste Plan and in Safeguarding Scotland's Resources and places them firmly in the context of our action for a more circular economy. And this strategy has been developed, and will be delivered, in partnership with Zero Waste Scotland, the enterprise agencies and SEPA. Our action towards a more circular economy, together with the Manufacturing Action Plan, will be supported by over £70m of investment, including £30m of European Structural Funds; and we see a number of opportunities in the European Commission's Circular Economy Package.

Our recent work on the Scottish Household Recycling Charter reflected a truly collaborative approach to policy making between national and local government, with support from business, industry and the third sector. I want to continue and extend that partnership, in particular to work with environmental NGOs, to help people understand that our resources are finite, and that we cannot continue our patterns of consumption. We need the concept of a more circular economy, and its benefits to the environment, to become better understood by a wider range of people. It is only through this collaborative approach that we will make a difference.

Initiatives like the tool library on Leith Walk in Edinburgh or Mackie's gearbox remanufacturing in Glasgow help bring to life just how sensible a circular economy is.

A more circular economy, where we make things last, is an economic, environmental and moral necessity. It will help conserve our finite resources, help support jobs in our communities and improve our quality of life. It just makes good sense.



RICHARD LOCHHEAD

EXECUTIVE SUMMARY

This strategy sets out our priorities for moving towards a more circular economy – where products and materials are kept in high value use for as long as possible. It builds on Scotland’s progress in the zero waste and resource efficiency agendas. A more circular economy will benefit:

- the environment – cutting waste and carbon emissions and reducing reliance on scarce resources;
- the economy – improving productivity, opening up new markets and improving resilience; and
- communities – more, lower cost options to access the goods we need with opportunities for social enterprise.

Realising these benefits will mean rethinking our approach to how goods are supplied, how they are used, and what happens at the end of products’ lifetimes. In this strategy, we are prioritising four areas, although we will also take action elsewhere:

- **Food and drink, and the broader bio-economy:** food waste is a significant source of carbon emissions; and a more circular approach to the beer, whisky and fish sectors, for example, could lead to potential savings of half a billion pounds per year;
- **Remanufacture:** remanufacture is already contributing £1.1 billion per year to Scotland’s economy with potential to grow by a further £620 million by 2020;
- **Construction and the built environment:** construction accounts for about 50% of all waste in Scotland and is a major influence on efficient use of resources;
- **Energy infrastructure:** there are considerable opportunities such as the reuse of equipment from wind turbines and decommissioned oil and gas platforms.

Our ambition for **waste prevention** and using resources more efficiently is fundamental to achieving a more circular economy. We are setting a new target to cut food waste by a third by 2025 and will develop actions to help both businesses and households achieve these savings.

We want more products to be **designed** for longer lifetimes, ready to be disassembled, repaired and eventually recycled; with more companies keeping hold of valuable products and components through leasing, servicing, repair and re-sale. Scotland’s enterprise agencies will make circular economy approaches a new focus for their innovation support and Zero Waste Scotland will establish a new support service, working closely with the enterprise agencies, to help businesses adopt these approaches.

We want second hand goods to become a good value, mainstream, option - helping reuse-businesses and community organisations to thrive. We will improve the capture of items for **reuse**; clarify the regulation of reuse activities; and build on the *Revolve* standard for reuse organisations to improve consumer confidence. We want

major industrial sectors to learn from best practice to optimise the value of used equipment, and will pursue opportunities including reuse of energy infrastructure.

We want to empower Scotland's **repair** sector to grow, both business and community organisations. We want repair to be the first choice when items develop a fault, with an expectation of quality, reliability and value. We are looking at potential for a repair-finding service to make it easy to find where items can be repaired; alongside actions to expand repair skills in communities; and to engage more companies in offering repair services for the products they make or sell.

We want Scotland's strategically important **remanufacturing** sector to fulfil its potential for growth. The Scottish Institute of Remanufacture is already working to increase collaboration and innovation among remanufacturing businesses – with wider support led by the Scottish Manufacturing Advisory Service and Zero Waste Scotland as an integral part of Scotland's new Manufacturing Action Plan.

We want **recycling** to be routine in every business and household; with more consistent local services; more packaging designed for recyclability, and every household having access to a food waste service. We are working to improve recycling rates, collaborating with the waste and packaging industries; reviewing the exemption from the requirement for food waste collections in rural areas; and learning from experiences abroad, including deposit return schemes. We also want to see higher quality recyclate, and will examine how best to minimise contamination in household and commercial recycling to maximise both quality and value.

We want to stimulate debate on a more comprehensive approach to **producer responsibility**, through a single framework for all product types that drives choices for reuse, repair and remanufacture, while more fully exposing and addressing the costs of recycling and disposal. On individual products, we will focus on new schemes for tyres, furniture and mattresses.

We want Scotland to be an international leader in the efficient use of **biological resources**. While reducing waste is our priority, we want to maximise the value from biological resources which would otherwise end up in lower value uses or as waste.

We want the behaviours that support a circular economy to be seen as commonplace in Scotland – ending our 'throwaway culture' and **communicating** with people in a way that helps them see the true value in the products and materials they use. We will broaden understanding and encourage change among businesses, particularly, through the Scottish Circular Economy Business Network.

We want to embed the development of new **skills** and thinking in the next generation of designers, business leaders and innovators. We want to make sure Scotland's workforce has the right skills to take advantage of opportunities from a more circular economy.

We want to improve our range of indicators to better understand how products and materials flow through our economy, both to **measure progress** and to identify opportunities. To support this, we intend to move towards mandatory use of the electronic 'edoc' system for waste in Scotland.

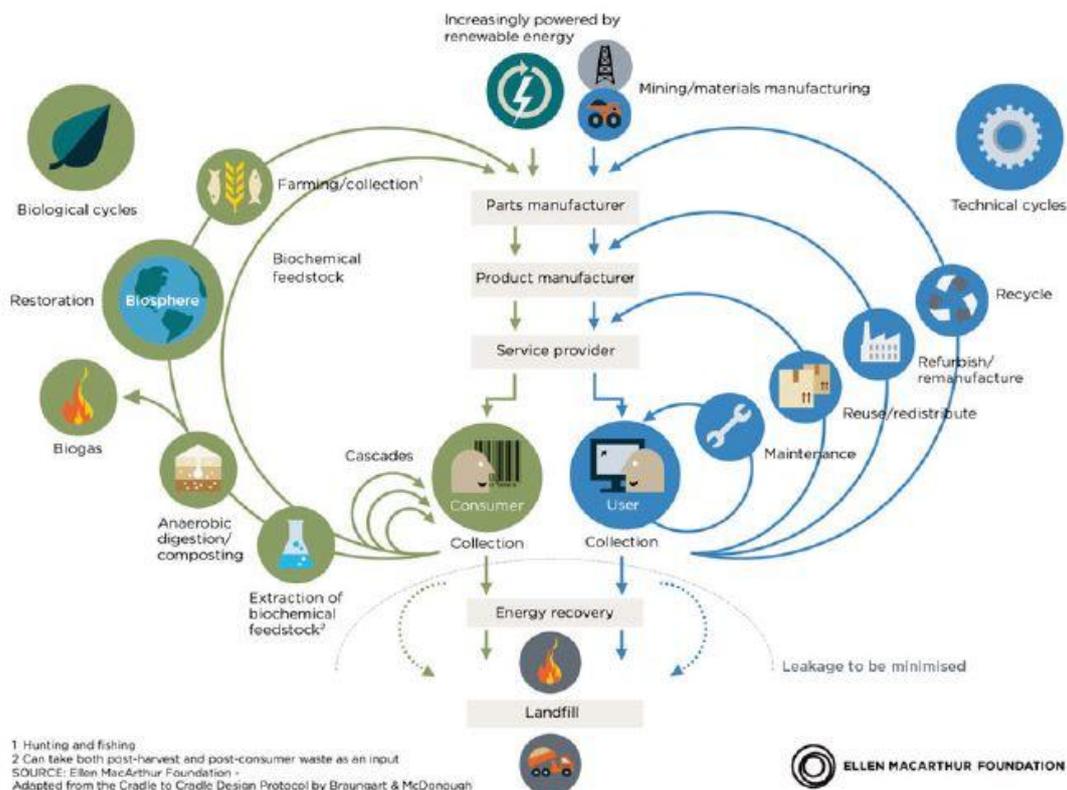
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INTRODUCTION - THE CASE FOR A CIRCULAR ECONOMY

In our existing economy, we “*take, make and dispose*”. We take resources from the ground, air and water; we make them into products and structures; then we dispose of them.

In a circular economy, systems are designed to make better use of valuable products and materials - changing the way they are produced and managed to have less impact on finite natural resources, and create greater economic benefit. The following diagram from the Ellen MacArthur Foundation sets out the concept.



The left hand side of the diagram represents the flow of biological materials in a circular economy. The right hand side represents the flow of materials and products such as metals, plastics etc. Similar principles apply to both sides of the diagram, and there are multiple interactions between them.

The most desirable actions are in the smallest, inner loops, such as maintenance and reuse. Value is lost as the loops become larger and when materials “leak” from the system. A more circular economy aims to protect that value by keeping products and materials circulating at the highest value for the longest time; with a systematic approach to designing out negative impacts such as waste.

There are many reasons why a more circular economy presents a compelling proposition:

- mitigating risk to business;
- retaining value in our economy;
- creating jobs and growth;
- tackling climate change and preserving natural capital; and
- building on Scotland's advantages.

There are significant environmental benefits to a more circular economy: from reducing greenhouse gas emissions, relieving pressure on water resources, virgin materials and habitats, and limiting pollution of air, soils and watercourses.

Zero Waste Scotland has estimated a potential greenhouse gas saving of around 11 million tonnes per annum by 2050 from moving to a circular economy¹.

There is a growing body of evidence on the scale of the economic opportunity from a more circular economy. Analysis by the Ellen MacArthur Foundation and McKinsey suggests there could be a trillion dollar opportunity globally².

Early analysis has suggested that action across 8 manufacturing sub-sectors could result in annual cost savings of £0.8-1.5 billion³ in Scotland. This equates to around 5 to 9% of total turnover of these manufacturing sub-sectors. Likewise an analysis of 10 consumer goods categories, such as clothes and food, revealed potential annual cost savings of £1.5 billion³.

The shift in focus from using resources more efficiently towards re-using resources across the economy not only boosts productivity (by reducing demand and cost of raw materials) but also stimulates innovation, in terms of product re design, re use and re manufacture. It is a key policy priority in leading economies including Denmark, Sweden, Netherlands, Japan and China.

A more circular economy incentivises companies to innovate through re-using products and materials; and creates jobs by revolutionising logistics and collection systems. It is also viewed as a strategic opportunity by many global companies who see it as a key lever to improve competitiveness.

Scotland is in a strong position to move quickly and take advantage of our scale and connectedness. This strategy sets out our priorities for action.

¹ The Carbon Impacts of the Circular Economy, Zero Waste Scotland (2015):
<http://www.zerowastescotland.org.uk/CarbonImpactsOfTheCircularEconomy>

² Towards the Circular Economy (Vol 1 and 3), Ellen MacArthur Foundation, 2012 and 2014:
<http://www.ellenmacarthurfoundation.org/business/reports>

Towards the circular economy - McKinsey & Company. (December 2012)

³ <http://www.zerowastescotland.org.uk/content/scotland-and-circular-economy-report>

Making the transition

A truly circular economy is a long term ambition, given the complexity of existing supply chains, the changes in approach required by a range of players, and the as yet unknown technological and research developments that lie ahead. It is important to take steps now to set the direction of travel and support the journey.

The case for a more circular economy is clear from an environment perspective. From a business perspective, a move to a more circular economy supports Scotland's Economic Strategy and the four priorities identified within: Innovation, Inclusive Growth, Internationalisation and Investment, and the Manufacturing Action Plan⁴.

The global economy is still at the early stages of this transition and the EU Circular Economy Package⁵ will influence the direction and pace of Scotland's journey. This transformation will also require societal change, so there are key roles for business leaders, for Government, its agencies and the wider public sector, and for people and communities across Scotland.

To consider what a circular economy would look like, we first need to understand the specific changes required across society. The diagram below illustrates the different ways in which the use of goods and physical assets can be increased, prolonging their life and shifting resource use from finite to renewable sources.



⁴ Manufacturing Action Plan. (February 2016)

<http://www.scottish-enterprise.com/knowledge-hub/articles/insight/scotlands-manufacturing-action-plan>

EU Circular Economy Package. (December 2015) - ⁵ http://ec.europa.eu/priorities/jobs-growth-and-investment/towards-circular-economy_en

This strategy identifies our priority areas for Scotland, articulating our aspirations and proposing a number of actions to take us towards those goals. It focuses on actions which make tangible progress over the short to medium term and creates the conditions for longer-term change.

This strategy builds on the progress that has been made on the zero waste and resource efficiency agenda, but scopes out ambition and action into a much broader set of business and industry opportunities. We have also integrated the key elements of the Zero Waste Plan (2010) and Safeguarding Scotland's Resources (2013) into this strategy. The intention is that this strategy, and the actions that will flow from it, will in due course supersede both of those documents.

In setting out our priorities and aspirations for a circular economy, we are leading by example and will collaborate with other countries to address what will often be global or international challenges.

Through the Enterprise Agencies, SEPA, Zero Waste Scotland and other partners we will take a holistic approach to supporting innovation in delivering this strategy. We will offer support in integrated ways that recognises, for example, that companies may wish to consider opportunities in design, repair and remanufacturing at the same time. The Manufacturing Action Plan is an example of cross-agency collaboration, which provides integrated support for circular economy innovation across manufacturing sub-sectors.

Work will focus on **four priority** areas due to the resources that they use and their importance to the Scottish economy, tackling environmental and economic objectives in parallel. These are woven into different chapters of this document. These priority areas also align with the focus of Innovation Centres and the Scottish Institute for Remanufacture. The areas are:

- **Food and drink, and the broader bio-economy** – Zero Waste Scotland's report on beer, whisky and fish production identified potential savings of between £500 million and £800 million per year.
- **Remanufacture** – which contributes £1.1 billion to annual economic activity with potential to add an additional £620 million by 2020.
- **Construction and the built environment** - representing about 50% of all waste arising in Scotland; influencing the built environment has an impact on wider resource efficiency.
- **Energy infrastructure** - with the recent growth in renewables and £30-35 billion of oil and gas decommissioning spend expected by 2040, the potential for added value is significant.

The strategy also includes a new **Scottish food waste reduction target**, which is the first of its kind in Europe. This target, to cut food waste by a third by 2025, will put Scotland at the front of global action to tackle food waste and is in line with the UN Sustainable Development Goal 12 target⁶ related to food waste.

Goal 12: Ensure sustainable consumption and production patterns. (September 25th 2015)

⁶ <http://www.un.org/sustainabledevelopment/sustainable-consumption-production/>

The potential financial savings from this reduction in food waste are likely to be in the hundreds of millions per year; increasing the Scottish food & drink sector's competitiveness, offering savings for households across Scotland and cutting greenhouse gas emissions.

We will also explore a **new approach to Producer Responsibility**, through a single framework for all product types that drives choices for reuse, repair and remanufacture, while more fully exposing and addressing the costs of recycling and disposal. Over and above existing producer responsibility schemes for batteries, electronic equipment, end of life vehicles and packaging, we will also prioritise schemes for tyres, furniture and mattresses.

Producer responsibility has the potential to significantly influence producer and consumer choices, leveraging actions that would contribute to a more circular economy. Our proposals complement those in the EU Circular Economy Package, which highlight the greater and more powerful role that producer responsibility could play.

1. Waste Prevention

1.1 Our ambition

We want to reduce waste and use resources more efficiently in Scotland, delivering economic and environmental benefits. This principle is fundamental to all of the “loops” of the circular economy. We will focus in particular on preventing food waste and waste arising from construction and demolition.

1.2 Context

The first priority in a more circular economy is to avoid unnecessary waste and use fewer resources in the first instance. A more circular approach should therefore minimise the resources required in producing goods and services and minimise waste.

In 2013 we introduced a target to reduce Scotland’s waste by 7% by 2017 from 2011 levels, 15% by 2025.⁷ In the same year, we established Resource Efficient Scotland, delivered by Zero Waste Scotland, bringing together expertise and advice on energy, materials and water. This service helps businesses and organisations access support to use resources more efficiently.

In particular, tackling food waste is important in Scotland becoming a Good Food Nation⁸, in reducing environmental impact of food consumption and production in tackling climate change and in enhancing the productivity of Scotland’s Food & Drink manufacturing sector⁹.

Construction and demolition waste represents about 50% of all waste in Scotland and influencing the built environment has a significant impact on wider resource efficiency. The construction sector is our biggest user of materials and responsible for over half of our carbon emissions when the operation of buildings is included. This requires influencing not just new build and end of life stages but also maintenance, renovation, and expansion of existing building stock.

All of the priorities in chapters covering loops of the circular economy (design, reuse, repair and remanufacture) will also contribute to waste prevention, helping to decouple resource use from economic growth.

This strategy brings together in one place the targets and ambitions in our 2013 waste prevention plan, “Safeguarding Scotland’s Resources” and in the 2010 Zero Waste Plan, placing both in the context of a more circular economy.

⁷ Safeguarding Scotland’s Resources: Blueprint for a More Resource Efficient and Circular Economy. (October 2013) - <http://www.gov.scot/Resource/0043/00435308.pdf>

⁸ Good Food Nation (June 2014)
<http://www.gov.scot/resource/0045/00453219.pdf>

⁹ Recipe for Success: Scotland’s National Food & Drink Policy, Becoming a Good Food Nation - <http://www.gov.scot/Publications/2014/06/1195>

1.3 Priorities

We will continue to work towards our **waste reduction targets**.

We will influence **UK wide voluntary agreements** with key business sectors, such as the Courtauld Commitment¹⁰, to ensure that they deliver for Scotland, in particular in relation to food waste.

We will introduce a **new Scottish food waste reduction target**: “To reduce all food waste arising in Scotland by 33% by 2025 and work with industry to reduce on-farm losses of edible produce”. This target, one of the most ambitious in the world, will put Scotland on a path to deliver the UN Sustainable Development Goal 12 target related to food waste.

We will work with a variety of stakeholders to identify a package of actions to deliver these food waste reductions, and we will consult on whether the target will be voluntary or binding.

As an early step, Resource Efficient Scotland will support **SMEs** to both prevent food waste, and adapt to the new 5kg threshold for separate food waste which came into force in January 2016.

We will investigate the potential to develop **supporting indicators** to assess progress on the **food waste reduction** target:

- Carbon savings from solid and liquid waste;
- Reduction in tonnes of on-farm losses of edible produce; and
- Financial savings.

We will work with the construction sector to ensure **building designs** consider waste reduction in both new build and refurbishment, while also enabling more reuse and recycling at end of life.

This will include **supporting SMEs to deliver building projects** with the potential to deliver significant impact that can be scaled up and repeated.

We will also **build capacity to deliver change** in the construction sector in collaboration with the Construction Scotland Innovation Centre and other partners.

We will work to avoid depletion of primary aggregates and timber resources through **enhanced recycling of demolition materials**.

The Courtauld Commitment (2005) - ¹⁰ <http://www.wrap.org.uk/content/what-is-courtauld>

Good to Go Doggy Bag Scheme Tackles Food Waste

A hugely successful pilot scheme to offer diners doggy bags is being extended across Scotland.

The 16 restaurants that took part in the Good to Go trial saw dramatic reductions in food waste from customers' plates - an average of 42 per cent per restaurant. And 92 per cent of diners surveyed who took food home ate it.

Customers at participating restaurants were offered re-sealable take-home containers featuring the 'Good to Go' brand to provide an attractive, visible and convenient way to ensure they were able to enjoy all of the meal that they had paid for, even if they couldn't manage it all in one sitting. These are boxes made from sustainable board with a natural starch lining – making the box fully compostable.

If restaurants across Scotland routinely offered doggy bags to customers, it could save the equivalent of 800,000 full meals going in the bin every year. Eateries across the country are now being urged to sign up for Good to Go.

Eleanor Cunningham from the Edinburgh Larder Bistro, which took part in the pilot, said, "As well as helping us to reduce the amount of food being thrown away, we've also had a great response from our customers to the 'Good to Go' trial, who were keen to take home what they couldn't eat for later. It's therefore great to see the scheme being offered across Scotland, and I would encourage other restaurants to sign up."



2. Design

2.1 Our ambition

We want Scotland to be at the forefront of design for a more circular economy, combining ambitious research and thinking with practical application. We want to see more Scottish products designed with their full life-cycle in mind: for long lifetimes, ready to be disassembled and repaired, and eventually recycled. And we want an increasing number of companies to redesign their business approaches to find profitable ways to keep hold of valuable products and components: increasing revenue through leasing, servicing, repair and re-sale.

2.2 Context

Action on a more circular economy and to prevent waste starts with design: the design of products, the design of business models, the design of services, and the design of processes.

The design of products is key in determining how far their value can be retained in a more circular approach. Design for disassembly, using standard components, recyclable materials and so on are fundamental to enabling greater repair, reuse, remanufacturing and recycling.

The design of systems and business models shapes the scope for business to retain the value in the products and materials that flow through their operations. Circular economy business models involve hiring and leasing, performance/service systems, incentivised return, asset management, collaborative consumption and long life as set out in the diagram below.

Circular economy business models



Scotland has a strong history of innovation, and a number of sectors and individual companies have already embraced circular economy principles in product design and system design. We now need to raise wider business awareness of circular economy opportunities, particularly innovation in design and we have concluded that the best way to do that is to integrate circular economy thinking, particularly on design, into a more mainstream approach.

2.3 Our priorities

To improve awareness and capabilities around design innovation for the circular economy, we will enhance design innovation support provided through Scottish Enterprise, Highlands and Islands Enterprise and Zero Waste Scotland. This will include a new EU-funded **circular economy investment fund and circular economy service** through Zero Waste Scotland, and working with Business Gateway. This will be delivered as a coordinated package to companies comprising:

- competitive **calls for circular design projects** and services including collaborative work between business and academia to catalyse next generation products;
- support for companies in devising and implementing more **circular economy business models** within their processes and supply chains;
- awareness raising events and case studies showcasing business benefits of product, process and service innovation relating to circular design;
- better connections between innovative companies and Scotland's design community.

To help more businesses take practical steps to adopt more circular practices, the Enterprise Agencies will **integrate circular economy thinking within mainstream support** for business growth and innovation, working closely with Zero Waste Scotland.

We will work to influence **EU decisions** on a life-cycle approach to design of products and packaging, with products designed for long lifetimes, ready to be disassembled and repaired, and eventually recycled, for example by restricting the use of toxic materials.

We recognise the potential for **public procurement** to support the development of a more circular economy in Scotland building on the statutory guidance on the sustainable procurement duty under the Procurement Reform (Scotland) Act 2014¹¹ and the extensive training on circular economy principles of the procurement professional community through the Scottish approach to Sustainable Public Procurement.

We will work with public organisations to identify the products and services where innovation and best practice in public procurement can have the greatest benefit in promoting circular approaches such as leasing, repair and remanufacture, while delivering value for money; and how best to expand that best practice, such as through collaborative procurement, guidance or regulation.

¹¹ <http://www.gov.scot/Topics/Government/Procurement/policy/ProcurementReform/ProcReformAct>

Kalopsia: Fashion and textiles professionals share space for sustainability

A new, innovative communal working space and sharing facility in Edinburgh's Ocean Terminal is helping fashion and textiles professionals work sustainably. Zero Waste Scotland supported the launch of The Facility, a place where students, graduates and start-up companies can work on design and production projects in a shared space.

The space, run by creative textiles agency Kalopsia, makes available equipment such as knitting and sewing machines, mannequins and CAD embroiderers. People who use the space also have access to trained technicians, and Kalopsia's micro-manufacturing and prototyping services.

Zero Waste Scotland helped develop and implement this circular economy business model. It moves away from the traditional make-use-dispose approach to goods towards methods of keeping them in high value use for as long as possible.

"With The Facility we hope to build a community of textiles related businesses and individuals who can come together to strengthen our industry and promote the benefits of the circular economy," says Adam Robertson, managing director, Kalopsia. "We hope that the circular economy business models developed here will become the new standard for the textiles industry across Scotland and the UK."



3. Reuse

3.1 Our ambition

We want the sale and use of second hand goods to be seen as an attractive, mainstream, good value option for an increasing range of products. We want reuse businesses and community organisations to thrive, on the back of a growing reputation for quality and value for money. We want our major industrial sectors in Scotland to learn from best practice to optimise the value of used equipment and infrastructure.

3.2 Context

Reuse is a key element of a more circular economy, and is as important for the public as it is for business and industry. The reuse economy in Scotland has a yearly turnover of at least £244 million, supports over 6,000 jobs, reuses 89,000 tonnes of material annually, and provides opportunities for individuals to obtain high quality products at considerably lower cost than new.

Together with the Community Recycling Network Scotland¹², Zero Waste Scotland has developed the *Revolve* reuse quality standard, designed specifically to overcome issues of consumer confidence, and to establish a robust and recognisable reuse sector in Scotland. Reuse presents a particular opportunity for social enterprises in Scotland, who are in a unique position to deliver the environmental, economic and social benefits of a more circular economy in communities.

Beyond the re-use of products produced by individual companies, there are some significant sector-wide opportunities for re-use that have the potential to expand Scotland's reuse economy. There are particular opportunities in the energy, medical technologies and construction sectors.

3.3 Our priorities

For consumers, we are trialling **large scale reuse and repair hubs** to encourage increased capture rates, to deliver economies of scale for the sector and to create recognised reuse superstores for consumers.

We propose to further **expand the availability of the Revolve standard** to include a wider range of reuse organisations, and to develop the standard to provide further confidence for consumers in the products they are purchasing.

We will **support local authorities and local reuse organisations** to improve reuse collection, storage, retail and communications, including at Household Waste Recycling Centres and through bulky waste services; and through the National Reuse Phoneline, making it easier to donate items.

¹² <http://crns.org.uk/>

As the Scottish Household Recycling Charter takes effect, we will consider the potential for a **framework for complementary reuse activities** between the third sector, local authorities, private sector and the public.

For business and industry, we will introduce large scale, collaborative approaches to re-use in relation to energy infrastructure. This includes:

- Identifying priority components for re-use in the oil and gas industry, developing protocols and standards for component reuse and supporting the development of re-use markets in oil and gas and other sectors;
- Addressing opportunities for reusing onshore wind turbines and bases, working with onshore wind operators and developers to explore these opportunities; and
- Identifying re-use opportunities relating to Scotland's grid and transmission infrastructure.

We will work with partners to identify how **regulation** can support a greater level of reuse, repair and remanufacturing while continuing to protect the environment. This will include influencing EU-level decisions; and in Scotland, identifying how improvements can be made through the Better Environment Regulation programme¹³ and SEPA guidance to clarify the activities subject to waste regulation.

As mentioned in our priorities for design, we recognise the potential for **public procurement** to support the development of a circular economy, and will explore opportunities within procurement to encourage greater reuse.

SEPA – Better Environment Regulation Programme

¹³ <http://www.sepa.org.uk/regulations/how-we-regulate/better-environmental-regulation/>

Blythswood Care Re-Use Hub, Dingwall

Scotland's first second-hand superstore, which opened in the Highlands last June, is going from strength-to-strength.

It's the first in a national programme of re-use 'hubs' – unique shopping experiences intended to transform the scale and economic clout of re-use retail in Scotland. Blythswood Care's Dingwall Superstore secured funding and support from Zero Waste Scotland after a nationwide call for collaborative bids from private, third and public sector groups to team up on major joint retail initiatives.

Blythswood has teamed up with Revolve-accredited re-use businesses from around Scotland - Glasgow-based Spruce Carpets and Second Opportunities as well as Inverness-based Everything Baby - to offer customers a huge choice of goods.

Encouraging re-use has a key role to play for Scotland's economy and environment, helping us move away from the model of buying items and casting them aside after little use. There is also potential for local job creation. Many items, which could be used by someone else, currently go to landfill. Thousands of re-usable items end up there every year, including 304,000 individual 3-seater sofas and 151,000 washing machines.

Through their re-use businesses selling books, clothing, furniture and electrical items across the Highlands, Blythswood and other third sector organisations already contribute to carbon savings of over 7,500 tonnes annually.



4. Repair

4.1 Our ambition

When a product develops a fault, we want repair to be the first choice, on the basis of convenience and value. We want businesses to design products which are easier and cost-effective to repair, to expand the range of repair services they offer and to encourage reparability in procurement decisions. We want to empower the growth of the repair sector – commercial, third sector and individuals – and increase the number of people with the necessary repair skills.

4.2 Context

Repair is an area that brings together the innovation of a more circular economy with the established repair and maintenance services that have been commonplace in many industrial sectors and communities across Scotland.

The provision of repair services can add value to a business' customer offer, whilst allowing them to reduce material and other input costs, gaining greater value from and control over their own materials and products.

In recent years a combination of pace of technological change, cheaper products, and a lack of information and confidence in how to repair complex products has led to a decrease in repair.

We have a suite of measures already in place to support behaviour change in communities, including Zero Waste Scotland's Volunteer and Community Advocate Programme which encourages reuse and repair; grants for repair training in reuse; and development of certified repair training.

4.3 Our priorities

For consumers, we will explore the potential for a comprehensive **repair-finding service** or network to make it easy to find where items can be repaired.

We will continue to provide opportunities to increase the **repair skills** of the third sector and householders through training and self-repair workshops and infrastructure.

We will support businesses and the third sector to identify the circular practices that offer most value including repair opportunities to help them reduce material and other costs.

As mentioned in our priorities for design, we recognise the potential for **public procurement** to support the development of a circular economy, and will explore opportunities within procurement to encourage greater **levels of repair and reparability**.

We will also work to influence **EU decisions** on a design of products including for repair.

Edinburgh Tool Library

How often do you use the drill, power-saw or sander that sits in your shed or DIY cupboard? Or how often do you need a tool that you don't have, but don't want to splash out and buy one? If tool-sharing libraries were commonplace, you wouldn't have to.

It is estimated that the average drill is only used for about 13 minutes in its lifetime. With all the valuable resources that go into it, it's a waste that it is idle for so long.

Sharing tools helps reduce the environmental impact of making them and it also helps people save on the costs of buying them.

The Edinburgh Tool Library is the UK's first tool library, promoting sharing as a way of reducing our environmental impact and saving people money.

Members can borrow tools for DIY, gardening, decorating and machine repair. Chris Hellawell of The Edinburgh Tool Library, explains, "Combine the cost to your pocket to the environmental cost of tool manufacture and you wonder why most of us have tools at all.

"But what if, instead of owning tools, we could just borrow them from an organisation as and when we needed them, getting all the benefits without the headaches, a bit like a library but with tools. By sharing resources like this we reduce our environmental impact and allow the tools to fulfil their potential by doing what they do for more of the time."



5. Remanufacture

5.1 Our ambition

We want Scotland's strategically important remanufacturing sector to fulfil its potential for growth: to raise the profile of remanufacturing, develop new markets and strengthen Scotland's international reputation for quality remanufactured products.

5.2 Context

Remanufacturing can be defined as returning a used product to at least its original performance with a warranty that is equivalent or better than that of the new product. It involves taking a product completely apart, cleaning, repairing, rebuilding and testing its functionality against its original specification.

Reduced requirements for material, water and energy mean remanufactured products can cost less than the equivalent new products, and hence significantly boost productivity, competitiveness and profitability. Remanufacture provides an excellent circular economy business model, especially where products are leased to the customer or have an incentivised return mechanism.

Our remanufacturing study¹⁴ estimated that 17,000 people are employed in remanufacturing in Scotland, contributing £1.1 billion to annual economic activity. Across 16 manufacturing sub-sectors, it has the potential to create an additional £620 million turnover and 5,700 new jobs by 2020. The study suggests that energy, automotive, electronics and medical equipment have the highest potential for remanufacturing growth in Scotland, followed by aerospace, rail, white goods, tyres and furniture.

5.3 Our priorities

Encouraging manufacturing firms to adopt circular practices, including remanufacture, is a strong focus for our Manufacturing Action Plan. The plan includes measures to stimulate awareness of opportunities; to address sector-specific opportunities for manufacturing products and services; and to support resulting skills requirements. Zero Waste Scotland and the **Scottish Manufacturing Advisory Service (SMAS)** will lead these activities.

We established the **Scottish Institute for Remanufacture** as a centre of expertise, only the fourth of its kind in the world. We want the Institute to continue to operate at the cutting edge of developments, helping the remanufacturing industry to grow and innovate by co-funding collaborative projects between industry and higher education institutions; and developing a remanufacturing community involving businesses and academics.

Drawing on the Institute's expertise, we will influence the EU, standards and certification organisations and others to ensure that **remanufactured products are properly recognised** as comparable or equivalent to new products.

We are exploring the barriers and opportunities for greater **reuse and remanufacture of medical devices** in the NHS.

¹⁴ Circular Economy Evidence Building Programme – Remanufacturing Study, March 2015: <http://www.zerowastescotland.org.uk/RemanufacturingReport>

Mackie Automatic & Manual Transmissions

Glasgow-based Mackie Automatic & Manual Transmissions has been the UK's leading remanufacturer of automotive, industrial and marine transmissions since 1977. The family-owned company, which employs over 25 people, has an annual turnover of £2.5million.

The highly specialized nature of the facility allows the firm to repair, rebuild and recondition automatic and manual gear boxes with precision and speed. The business is committed to delivering only the very best in quality standards. The transmissions are not just rebuilt, they are remanufactured to meet or exceed the item's original condition.

Automatic gearboxes are among the most complex components in modern cars, with high embedded material value. Shipping out about 100 gearboxes per month, Mackie's return, refurbish and re use business model results in significant resource savings.

Mackie is the sole UK supplier of remanufactured units to Subaru, Isuzu, Hyundai, Nissan and Chevrolet, and is the major transmission distributor in the UK. The main focus for the business is car and commercial vehicle transmissions, with the potential to diversify into a range of other industries where transmissions are used, for example, wind energy, oil and gas extraction.



6. Recycling

6.2 Our ambition

We want businesses, local authorities, the third sector and householders to work together so that recycling becomes routine in every business, household and community - with more consistent local services and more packaging designed for recyclability - and we want every household in Scotland to have access to a food waste service. We also want to improve the quality of recyclate to enable more materials to be returned to the same use, and greater benefit to be retained in Scotland.

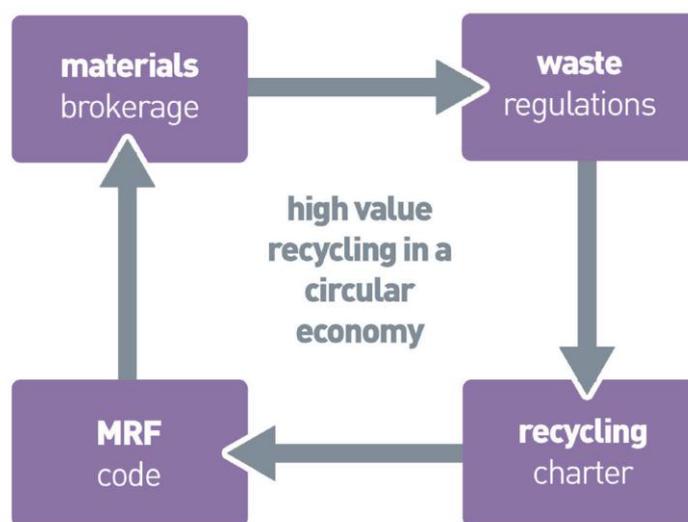
6.3 Context

Our action on recycling is driven by long-term Scottish targets to recycle 70% of all waste, and to send no more than 5% of all waste to landfill, both by 2025. The challenge is to increase the quantity and quality of materials recycled to support a more circular economy; while tackling contamination and working to remove poor quality and illegal activity from the sector.

Contamination is a barrier to high quality recycling. Even low levels of contamination can render materials unsuitable for reprocessing, losing value. The complex nature of materials and the way in which they move through our economy can also get in the way of the recycling of packaging and other consumer goods with a high turnover.

We have put in place a framework to deliver our aim of supporting a more circular economy through our recycling systems. There are four key elements to this framework.

Figure - Framework for improving recycling



First, the Waste (Scotland) Regulations 2012¹⁵ set out requirements for the separate collection of key materials, including food waste, and prohibit any separately collected material going to incineration or landfill.

Second, the Scottish Household Recycling Charter¹⁶, a joint initiative between national and local government, sets out a more consistent approach to household recycling collection systems, supported by a Code of Practice, to:

- increase householder participation in recycling;
- improve the quality of recyclate; and
- provide greater economic benefits and opportunities for savings in local authorities.

Third, the Scottish Materials Brokerage Service will deliver collaborative contracts for waste and recyclable materials from local authorities and other public bodies of sufficient scale to help local authorities and public bodies achieve a better deal, and reduce risk from price volatility. This will support the business conditions for investment in domestic reprocessing in Scotland by providing certainty in the volume and duration of supply of valuable materials.

Finally, the statutory Code of Practice for Materials Recovery Facilities¹⁷ introduces a sampling procedure to improve transparency of waste moving through our economy, and importantly to improve the quality of materials arriving for sorting.

SEPA will continue to engage and support waste producers and service providers to ensure compliance with the Waste (Scotland) Regulations 2012 and use appropriate enforcement procedures, including fixed penalty powers on waste producers that persistently fail to take all reasonable steps to segregate material for recycling.

By signing the Scottish Household Recycling Charter and subsequently implementing the systems described in the Code of Practice, local authorities will be in a stronger position to stimulate inward investment and subsequent job creation in recycling and reprocessing industries, and retain and enhance existing jobs in waste collection.

6.4 Our priorities

To support local authorities in securing the benefits of a more circular approach, we will explore with councils their view on the way that **their duties are currently defined** - as waste disposal and collection authorities, rather than resource management or similar authorities – influences their activities.

The Waste (Scotland) Regulations 2012 (Amended January 2014)

¹⁵ <http://www.legislation.gov.uk/sdsi/2012/9780111016657>

The Scottish Household Recycling Charter (28th August 2015)

¹⁶

<http://www.zerowastescotland.org.uk/sites/default/files/Charter%20for%20Household%20Recycling.PDF>

Code of Practice for Materials Recovery Facilities. (March 2015)

¹⁷ <http://www.gov.scot/Resource/0047/00472355.pdf>

We will take a **'whole supply chain' approach to recycling**, recognising that all players need to work together to supply and demand high quantity and high quality recycling, identifying and working with key partners to deliver improvements. We will target interventions across the supply chain to continue to address quality.

Because of the impact on quality of recyclate from contamination, **we intend to review the specific circumstances in which contamination arises in household and commercial collection systems**; in particular mixed collections with glass; food waste collections; and contamination of dry recyclables by food. This will help local authorities get the most from their recyclate in a challenging commodities market and improve the quality of recycling available for reprocessing.

Preventing food waste is our priority, but to ensure that as many households and businesses as possible are able to divert unavoidable food waste away from landfill, we intend to **review the rural exemption for food waste** in the Waste (Scotland) Regulations 2012. Where food waste is already collected, our priority is supporting small food businesses that now come into the scope of the waste regulations. More broadly, we intend to support small businesses in meeting their obligations under the waste regulations.

We intend to build on the collaborative approach to the Scottish Household Recycling Charter and **work closely with the waste, grocery and packaging industry**, moving beyond collection systems into markets, communication and packaging design, while continuing to learn from experiences abroad.

We will build on the evidence provided to Zero Waste Scotland and give further consideration to the role that a **deposit return system** could play in Scotland.

Falkirk Council Leads the Way

In 2014, Falkirk Council was the first local authority in the UK to move to three-weekly residual waste collections, which it launched as part of a new recycling service for residents. Several local authorities around the UK have subsequently followed Falkirk's lead, with its new service cutting costs and seeing recycling rates increase.

The local authority continues to lead the way, recently being announced as the first council in Scotland to sign up to the Scottish Government and COSLA's Household Recycling Charter. The Charter aims to create consistent household recycling collections across the country. It includes a new three-stream recycling system, which will include one container for glass, one for paper and card, and one for metals and plastics, together with existing food waste and residual collections. Over time, the intention is to move to a common colour system.

Falkirk's decision to get on board was based on the Charter's potential to save costs and increase public understanding of recycling – two good reasons for doing so.



7. Producer Responsibility for reuse and recycling

7.1 Our ambition

We believe that producer responsibility offers an opportunity to drive innovation and greater circularity for certain products – to influence product design as well as increasing reuse and recycling.

7.2 Context

At its simplest, Producer Responsibility is about ensuring that those who produce products and put them onto the market are responsible for the end of life management of their products, especially for take-back, recycling and final disposal.

There are UK-wide Producer Responsibility regimes for four materials (End of Life Vehicles, Batteries, Packaging, and Waste Electronic and Electrical Equipment). Producer responsibility is devolved to the Scottish Parliament but generally delivered by the UK Government with the agreement of the Scottish Government and the administrations of the other devolved nations.

The current regimes are overly complex and are generally opaque to consumers. Consumers have a substantial influence on how much value can be retained from a product, and so there is an opportunity to more accurately reflect the costs of disposing of an item in the price. Each regime for each product type also operates independently, resulting in duplication for business.

The 2015 EU Circular Economy package highlights the much greater role that producer responsibility could play in driving a shift to a more circular economy.

7.3 Priorities

We believe there is potential to **reform producer responsibility** to keep these products in higher value use, and incentivise the use of products with increased durability, with recycled content or avoiding toxic materials which limit recycling. This could include influencing the demand for secondary materials such as recycled content or material quality.

We intend to explore the concept of a **single framework** for producer responsibility, bringing together common elements into one flexible and transparent system, making it simpler for businesses who are involved in more than one product type and making it easier to add new products and materials to the producer responsibility regime in the future.

We intend to explore how we can improve the producer responsibility system to **promote products that support a more circular economy**, for example through increased durability and or with recycled content. We also intend exploring how we could direct **more products into higher value use** beyond recycling and into reuse and remanufacture.

We want to explore how we can make the costs of recycling and disposing of products **more transparent to consumers** to help influence their purchase choices. We intend making **tyres, furniture and mattresses** subject to producer responsibility, over and above the existing products.

We intend to **convene an international group of experts** on producer responsibility to develop and model such a framework for debate and discussion.

We will work with the Northern Ireland Executive, Welsh Government and UK Government in exploring this approach across the UK.

Broader action in tackling issues caused by waste tyres

Waste tyres have been banned from being landfilled in Europe since then, the issue of what to do with 'waste tyres' has been a difficult one to find a solution for. The storage and treatment of waste tyres under waste management licensing exemptions had often been associated with illegal activities by businesses such as ignoring the quantity limits in the exemptions, businesses which fail because of a lack of end markets, and fire risk and simply dumping tyres.

Therefore, on 25 January 2016, Scottish Ministers introduced legislation to remove exemptions to the licensing of the storage and treatment of waste tyres. By moving more waste tyre storage sites into waste management licensing, SEPA will be able to monitor breaches of the law, including:

- how businesses are running waste tyre storage and treatment sites;
- making sure previously convicted waste tyre site operators stay out of the market;
- better regulating storage of tyres;
- reducing fire risk;
- and ensuring that provisions are in place to cover the costs of waste tyre removal if an operator goes out of business.

Better regulation of operators, and the removal of unlicensed operators from the market, will make it easier for the Scottish Government to encourage recycling of tyres through initiatives such as producer responsibility schemes, as part of its overall policy objective of developing a more circular economy in Scotland.



8. Recovering value from biological resources

8.1 Our ambition

We want Scotland to be recognised as an international leader in the efficient use of biological resources. While our primary focus is on reducing waste, we want an increasing proportion of biological wastes to be used for production of high value materials and chemicals, maximising environmental and economic benefits and replacing non-renewable chemical feedstocks. When high value uses have been exhausted, we want to see increased production of renewable fuels, heat, and fertilizer products.

8.2 Context

Industrial biotechnology is already viewed at a global and EU level as a key technology with real growth potential. By 2025, estimates of the value of the global market range from £150 billion to £360 billion¹⁸.

Scotland's vibrant food & drink sector is a major user of biological resources and also produces significant quantities of biological waste and by-products which could potentially generate significant value. To support a more circular economy we need to retain the highest value in these resources.

Separate collection of organic waste enables extraction and recirculation of nutrients, through anaerobic digestion, composting or biorefining. It also avoids harmful greenhouse gas emissions and can generate energy. Household and commercial food waste collections have been driven by the Waste (Scotland) Regulations 2012. To realise the full value from biological resources, we also need to develop new technologies; explore new markets and stimulate demand; and collaborate through supply chains and across sectors.

The Scottish Industrial Biotechnology Development Group leads the delivery of Scotland's National Plan for Industrial Biotechnology. The Plan aims to increase turnover from £190 million to £900 million by 2025 through industry growth and development; use of the Industrial Biotechnology Innovation Centre (IBioIC); and development of key skills.

It also works through the Biorefinery Roadmap for Scotland¹⁹, which aims to develop cost-effective technologies to convert sustainable feedstocks into high value chemicals, biofuels and other renewable products. It recognises that biorefining should not compete with food & feed supply chains, so coproducts, residues and wastes are priority feedstocks.

The Renewable Heat Incentive supports the creation of biogas and its use in the gas grid. Where biogas is used for purposes other than as a transport fuel, our

¹⁸ IB 2025, Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy, A report to government by the Industrial Biotechnology Innovation and Growth Team, May 2009 <http://webarchive.nationalarchives.gov.uk/20090609003228/http://www.berr.gov.uk/files/file51144.pdf>

¹⁹ Biorefinery Roadmap for Scotland, Chemical Sciences Scotland: <http://www.scottish-enterprise.com/knowledge-hub/articles/comment/biorefinery-roadmap>

preference is that it be used in heat-only or high quality combined heat and power schemes²⁰.

Linked to the use of fertilizers and growing media, we have committed to supporting the phasing out of peat for horticultural use. Peatlands are important for biodiversity, water quality and reducing carbon emissions – and need to be well managed and protected. The National Peatland Plan²¹ sets out Scotland’s ambitions for protecting, managing and restoring our peatlands. Given that peat used for horticulture is sourced from many countries this commitment recognises Scotland’s responsibility around what is a global challenge.

8.3 Our priorities

To improve awareness of circular economy opportunities, particularly higher value uses which also maximise environmental benefits, we will work with the IBioIC to help deliver the industry-led National Plan. This will include **mapping bio-resources**; investigating the potential for local **biorefining hubs**; and looking at how best to support investment in research, development and innovation to address technical barriers for the use of biological waste.

In parallel with our drive to reduce food waste, we want Scotland to become a leader in **anaerobic digestion**. We will work with the whole supply chain to investigate, pilot and implement improvements to improve the economics and environmental impact of the industry, including through enhancing the quality of digestate and compost; and utilising more of the heat produced by the facilities.

As part of our work on public procurement see Section 2 - Design, we will explore the scope to **phase out the purchasing of non-renewable biological materials, such as peat**, by the public sector. This will help stimulate demand for renewable fertilizer and soil conditioner products from anaerobic digestion and in vessel composting.

Horizon Proteins

There are important circular economy opportunities in the beer, whisky and fish sectors, and a report from Zero Waste Scotland valued the potential of these opportunities at £500 million to £803 million each year, through better utilisation of waste and by-products.

Horizon Proteins is based at Heriot-Watt University and includes members from the School of Engineering and Physical Sciences and School of Life Sciences. Its vision is to transform under-used resources from food and drink industries, into higher value, sustainable, high-quality protein products. And it is not only about protein extraction. Horizon Proteins aims to address the issues associated with by-product inefficiencies within the food and drink industries by offering integrated solutions that add value, increase energy efficiency and reduce carbon emissions associated with by-product processing.

The team works closely with industry to translate academic research into a commercial reality and states that its unique Scottish solution is applicable worldwide.

²⁰ Chapter 5 of ‘Heat Policy Statement: Towards Decarbonising Heat: Maximising the Opportunities for Scotland’ - Scottish Government, 2015: <http://www.gov.scot/Publications/2015/06/6679>

²¹ National Peatland Plan <http://www.snh.gov.uk/climate-change/taking-action/carbon-management/peatland-action/national-peatland-plan/>.

9. Energy Recovery

9.1 Our ambition

Our ambition is to have an energy from waste infrastructure that effectively manages the “leakage” from a more circular approach to the economy in Scotland without creating demand for materials that could otherwise be kept in higher value use. We want to ensure that energy recovered from waste supports, directly, high quality heat and power schemes.

9.2 Context

Energy can be recovered from waste products in two key ways: through anaerobic digestion of organic materials which retains nutrients as part of a circular economy; and through the creation of heat and energy through thermal treatment of non-recyclable waste. These approaches can provide valuable heat and energy to communities, business and industry.

In a circular economy it is important that thermal treatment (including incineration) of non-recyclable waste is recognised as having a role limited to recovering energy only where materials cannot be retained in higher value use. However, materials used in this way have to be replaced. So while thermal treatment plays an important role in diverting non-recyclable materials from landfill, it is important to ensure that, in line with the waste hierarchy²², we exhaust all options for retaining the value of those materials before concluding thermal treatment is the best option.

Thermal treatment has a continuing role in addressing demand for energy during transition to a more circular economy. In the longer term, there will be a more limited role, albeit with an appropriate level of capacity to reflect the success of a more circular economy.

We want to avoid the situation arising in some nations where overprovision of energy from waste infrastructure presents a barrier to a more circular economy by creating a demand for material as a feedstock that could otherwise be reused, remanufactured or recycled.

Where thermal treatment plants are required, we wish to see only high quality combined heat and power schemes developed. As with other thermal electricity generation plants these should be located where there is a demand for heat to make the most of our resources, while minimising environmental impacts including meeting Scotland’s high standards on air quality. This is supported by a regulatory framework through planning, Pollution Prevention and Control regulations on the use of waste heat and by programmes such as district heating support for local authorities.

SEPA produces annual figures of waste infrastructure capacity needs for a variety of technologies including thermal treatment infrastructure. This provides a guide to the

²² Guidance on applying the Waste Hierarchy - Scottish Government, 2013: <http://www.gov.scot/Publications/2013/04/7548>

waste management industry, investors and local planning authorities as to the likely level of required infrastructure.

9.3 Our priorities

Given the limited role of thermal treatment in a more circular economy, our priority is to ensure that long term decisions on waste infrastructure are as well informed as possible. We are keen to have a coherent, over-arching discussion on the **requirements for infrastructure and services** with industry, local authorities and other partners.

We will work, with SEPA and Zero Waste Scotland, to continue to improve the way that we provide and present **information on the anticipated capacity requirements for future waste infrastructure**, for use by planning authorities and industry - helping ensure the capacity of waste infrastructure developed, such as thermal treatment facilities, is appropriate.

10. Landfill

10.1 Our ambition

The Scottish Government is the first administration within the UK to introduce a statutory ban on biodegradable municipal waste going to landfill as part of our transition to a more circular economy. As landfilling decreases, we now want to manage the legacy of landfill sites around Scotland, minimising emissions from operational and closed sites.

10.2 Context

In a circular economy, landfill disposal is an option to be avoided. We already have a strong policy, regulatory and fiscal framework which has delivered significant reductions in the amount of material sent to landfill and will continue this trend. Biodegradable municipal waste will be banned from landfill from 2021, and we have a target to send no more than 5% of all waste to landfill by 2025. Our waste regulations require businesses and local authorities to collect both key recyclable materials and food waste separately, which cannot then be sent to landfill.

As waste for landfilling continues to decrease, we would like to see a managed retreat from landfill with the number of active sites reducing and sites closing in accordance with permit requirements, ensuring necessary aftercare so that environmental protection remains a priority, including minimising climate change impacts.

The Scottish Landfill Tax provides a strong financial incentive to keep materials out of landfill and in higher value uses. It also provides a new deterrent to illegal dumping by bringing this activity under the scope of the tax.

Scottish Landfill Tax rates are in line with UK Landfill Tax rates for 2016-17. We have also committed that Scottish Landfill Tax will be no lower than prevailing UK rates, meaning the standard rate will not fall below £80 a tonne before 2020, to avoid any incentive to move waste between Scotland and England.

The Scottish Landfill Communities Fund provides funding for community or environmental projects in the vicinity of landfill sites, and the Scottish Government has increased the tax credit available to landfill operators to 5.6%, which is ~10% higher than the UK Landfill Communities Fund equivalent.

10.3 Our priorities

SEPA already requires landfill operators to demonstrate that funds are available to cover environmental obligations including for restoration and care after sites close. SEPA is considering options in this area to better ensure that **funds are adequate, secure and available when needed.**

Former landfill sites are still a significant source of greenhouse gas emissions. **Innovative flaring technology** to remove emissions already applied to two sites in the Scottish Borders is now being implemented in two further sites in Glasgow and

East Lothian. SEPA is identifying further sites across Scotland where **the same technological approach could be applied.**

11. Communications and engagement

11.1 Our ambition

We want the behaviours and practices that will support a circular economy to be increasingly mainstream within Scottish society and our economy – ending our ‘throwaway culture’ and allowing people and businesses to see the inherent value in the products and materials they use. We want people to be motivated to make changes in their lives and for Scotland to be recognised as a global leader.

11.2 Context

The circular economy can appear complex or abstract and there is a need to bring the concept to life so we can appreciate its potential for reducing the drain on our planet’s resources, and its benefits for business and communities. Throughout this document, we have highlighted public-facing initiatives that can play an important role in communicating this message.

Making the transition to a circular economy will require some significant changes to how people and organisations operate. The more that high profile brands embrace a more circular approach and bring new products and services to market that are as desirable or aspirational as previous versions, the greater the opportunity for consumers to change their habits.

The role of young people is particularly important if circular economy models of production and consumption are to become the norm over time, and we have been working with Young Scot to gather the views and priorities of young people from across Scotland to explore the idea of a circular economy.

To achieve the level of influence needed across society our approach must be to build a wide coalition of interests, including businesses, the public sector, communities, and NGOs.

11.3 Our priorities

To build on the opportunities provided by the Scottish Household Recycling Charter, we will work with local authorities and others in the recycling supply chain to deliver **high profile, national communications** to drive increased levels of high quality recycling and re-use.

We will build on the success of the **#MakeThingsLast** initiative and develop new ways to engage people in the benefits of a circular economy, and in particular continue our work with Young Scot to empower young people to help drive this agenda.

The **power of attaching a value to goods previously seen as disposable** will continue to be our focus for engaging the public and helping them to understand their responsibilities as citizens, building on the success of Scotland’s carrier bag charge in sparking high levels of public engagement.

We will further support **community-based initiatives** which facilitate the circular economy, including through sharing and the exchange of goods and services, and help to make alternative modes of consumption common-place, such as leasing or performance-based models.

Reflecting the priority given to addressing circular economy opportunities in Scotland's Economic Strategy we will work with the Enterprise Agencies, Business Gateway, local authorities, Innovation Centres and others to embed it within their **mainstream economic development functions**.

Our Scottish Circular Economy Business Network will develop **business-led initiatives** to promote the opportunities of a more circular approach.

Greener Scotland - Climate Change Campaign

The environment is seen as a complex issue and many Scots believe they are doing all that can be expected of them to help, and many believe that recycling household packaging is doing their bit. However, a survey carried out on behalf of the Scottish Government has found that around half of Scots acknowledge that climate change is an urgent problem, 8 in 10 Scots say they could do more to care for the environment.

Unfortunately being aware of the climate change problem doesn't always lead to action and for many Scots adopting greener lifestyle choices is perceived as being much harder than the reality.

To encourage people to take up greener habits, The Scottish Government launched a climate change campaign. Our aim is to shift the attitudes and behaviours of more Scots to make better lifestyle choices for tackling climate change. The campaign focusses on four accessible behavioural actions: Washing clothes at 30°; Leaving the car behind and walking shorter journeys; Avoiding and recycling food waste; Turning down the thermostat dial by 1°.



12. Skills in a circular economy

12.1 Our ambition

We want to embed the development of new circular economy skills and thinking in the next generation of business leaders, designers and innovators. We want to make sure Scotland's workforce has the right skills to take advantage of opportunities from a more circular economy, to ensure our businesses can innovate and prosper, now and in the future.

12.2 Context

As we move towards a more circular economy, it is important to identify the skills that are needed to help realise business development opportunities. New, specific skills may be needed for different approaches to design, inspection and cleaning in remanufacturing and repair. Reskilling may also be important to allow people to move from one industry to another as opportunities develop.

There is also considerable scope to broaden skills and improve opportunities in the existing resource management sector, where Health and Safety related skills are a particular priority given the nature of the work.

Skills Investment Plans outline the key skills issues for each industry sector in Scotland. These plans will identify new skills needs, building on activity such as:

- the Scottish Institute for Remanufacture, which links industry, academia and a network of similar hubs across the UK;
- the development of Modern Apprenticeships in Sustainable Resource Management;
- the energy efficiency skills programmes of the Sector Skills Council;
- the Innovation Centres e.g. the Industrial Biotechnology Innovation Centre and their support for PhD studentships;
- Community Resources Network Scotland and its support for repair and refurbishment skills;
- RSA (Royal Society for the encouragement of Arts, Manufactures and Commerce) engaging the design community in new thinking; and
- Decom North Sea - examining skills needed to repurpose offshore equipment.

Education Scotland and Zero Waste Scotland supported the Ellen McArthur Foundation between 2013 and 2015 in increasing the engagement of schools in learning relating to the circular economy. The Scottish Government's youth employment strategy, *Developing the Young Workforce*²³, considers the particular skills demands of emerging industries, with an explicit commitment to STEM (Science, Technology, Engineering and Mathematics) education, all of which will support a more circular economy. In addition, Learning for Sustainability is now integral to teaching standards in Scotland and we are supporting its development across all schools.

Developing the Young Workforce. (December 2014)

²³ <http://www.gov.scot/Resource/0046/00466386.pdf>

12.3 Our priorities

Zero Waste Scotland and Skills Development Scotland will explore the scope for a **skills academy** for the circular economy, in conjunction with Sector Skills Councils, employers, Industry Leadership Groups, and skills partnerships.

This would co-ordinate work to develop the skills required for a more circular economy across sectors. Identified needs range from semi-skilled activities in resource management; skilled roles in remanufacturing; and highly skilled design and business studies related activities - helping build a flexible and adaptable workforce to respond to an emerging circular economy.

This work will include opportunities to **review existing Skills Investment Plans (SIPs)**, to assess the specific skills needs for circular economy growth opportunities in any given sector.

We will build on existing work to encourage schools to embed circular economy principles within their curriculum and Zero Waste Scotland will work with Education Scotland to identify and support a cohort of **teaching ‘champions’ for the circular economy**. This grouping will provide opportunities for practitioners from different sectors and subject specialisms to work collaboratively to develop a range of learning resources for use in the classroom and online.

Skills make all the difference

Glasgow-based white goods re-use and repair social enterprise, Second Opportunities, recently received funding to help staff and volunteers develop their repair skills.

Research carried out by Zero Waste Scotland found a shortage of skills could be preventing re use organisations from growing their businesses. To combat this, a fund was launched for third sector groups to apply for funding to train staff in repair skills, if they could demonstrate how training staff and volunteers would increase their re-use activity.

Second Opportunities successfully applied for funding. Repair is a vital part of the business, which aims to reuse furniture which could otherwise end up in landfill. Furniture and white goods are repaired and cleaned to a high standard before being sold or made available for low income families through its referral network. This includes people who are homeless, unemployed, low income, victims of family break-up and those marginalised within society.

During the past year, Second Opportunities has re used or recycled 5,585 items and diverted 232 tonnes of useable goods from landfill.

13. Measuring progress

13.1 Our ambition

We want to improve our understanding of how products and materials flow through our economy - to track progress, understand the environmental benefits delivered, assess the scale of potential opportunities; and help identify future actions.

13.2 Context

Progress towards a circular economy means a change in the way we do things, and a change in process. While tonnage-based targets and indicators for material flows remain important, a focus on weight does not give us a full understanding of environmental impacts or economic impact, and further improvement in measures, data reliability and quality are required.

As we move towards a more circular approach, we need to better understand the flow of materials through supply chains to consumers and onwards to other uses. We want to strengthen our evidence on the value and business impacts of circular economy opportunities, building on the research undertaken so far to help business and the public sector prioritise.

Scotland has ambitious targets for waste and resource management, as set out below;

Target	Year	Set by
Reduce waste arising by 7% against the 2011 baseline of 13.2 million tonnes.	2017	Scottish Government
Recycling and preparing for re-use of 50% by weight of household waste and similar.	2020	EU
60% recycling/composting and preparing for re-use of waste from households.	2020	Scottish Government
No more than 1.26 million tonnes of biodegradable municipal waste to be sent to landfill.	2020	EU
70% recycling and reuse of construction & demolition waste.	2020	EU
Reduce waste arising by 15% against the 2011 baseline of 13.2 million tonnes.	2025	Scottish Government
No more than 5% of all waste to go to landfill. (Following ban on biodegradable municipal waste to landfill from 2021)	2025	Scottish Government
70% recycling/composting and preparing for re-use of all waste by 2025.	2025	Scottish Government
To reduce all food waste arising in Scotland and work with industry to reduce on-farm losses of edible produce	2025	Scottish Government

We are also tracking key indicators, including:

- The total amount of waste produced by sectors - household; commerce and industry; and construction and demolition.
- The amount of waste produced by sectors per unit of GVA.
- The carbon impact of waste - the whole-life impacts of waste including the benefits of prevention and recycling.

13.3 Priorities

We will continue to build our **evidence base** to help identify specific circular economy opportunities.

As part of our long term waste data strategy, we intend to refresh Scotland's suite of **targets and indicators**, incorporating **process measures** to reflect the development of a more circular economy; and informed by the requirements of the EU Circular Economy package.

We will continue to promote the **carbon metric** as an alternative to the conventional weight-based waste measurements, with a focus on making it easy to use and communicate. This will include measuring progress on our **new food waste reduction target**.

To assist us in understanding and articulating the full environmental benefits of a more circular economy, **we will work with environmental NGOs** and others to explore ways to enhance our suite of measures and indicators.

We will move towards making the use of the **electronic "edoc" system mandatory for waste in Scotland** and will consider inclusion of transfrontier shipment of waste (particularly in view of the EU Circular Economy package aspirations for electronic data exchange) and hazardous waste.



**The Scottish
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Riaghaltas na h-Alba

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