The Scottish Parliament
Pàrlamaid na h-Alba

RURAL AFFAIRS, CLIMATE CHANGE AND ENVIRONMENT COMMITTEE

AGENDA

14th Meeting, 2014 (Session 4)

Wednesday 14 May 2014

The Committee will meet at 10.00 am in the Robert Burns Room (CR1).

1. **Resource use and the circular economy:** The Committee will take evidence from—

   Dustin Benton, Head of Resource Stewardship, Green Alliance;

   Ian Menzies, Senior Education Officer for Sciences and Learning for Sustainability, Education Scotland;

   Gordon McGuiness, Deputy Director of Industry and Enterprise, Skills Development Scotland;

   Ewan Mearns, Strategy Development Senior Manager, Scottish Enterprise;

   Colin Webster, Education Programme Manager, Ellen MacArthur Foundation;

   James Curran, Chief Executive, Scottish Environmental Protection Agency;

   Iain Gulland, Director, Zero Waste Scotland;

   Marilyn Wakefield, Financial Director, Dryden Aqua;

   Lucy Chamberlin, Senior Researcher, Royal Society for the encouragement of Arts, Manufactures and Commerce - The Great Recovery Project.

RACCE/S4/14/14/A

Lynn Tullis
Clerk to the Rural Affairs, Climate Change and Environment Committee
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The papers for this meeting are as follows—

Agenda item 1

Note by the Clerk	RACCE/S4/14/14/1

Resource use and the circular economy

Introduction

1. As part of its recent work programme discussion the Committee agreed to hold a roundtable session with stakeholders to inform its consideration of resource use and the circular economy in Scotland.

Background

2. On 20 June 2013[1] the Committee heard from the European Commissioner for the Environment, Janez Potočnik. During this session the Commissioner spoke of the benefits of moving towards a more circular economy. Following this, the Committee invited Professor Walter Stahel to give more detailed evidence on resource use and the circular economy at its meeting on 2 October 2013[2]. A SPICe briefing was provided for the evidence session with Professor Stahel and subsequently published on the Parliament's website[3].

3. The Committee agreed, as part of its work programme[4], to invite Scottish Government officials to provide an informal briefing on the issue to get a better understanding of the opportunities and challenges for Scotland in relation to the circular economy. This took place on 30 April 2014 and the Committee agreed to follow this with a roundtable session with stakeholders.

Evidence session on 14 May 2014

4. Written evidence received can be found in Annexe A and supplementary evidence from Scottish Government officials can be found in Annexe B to this paper.

5. The Committee is interested to—

- learn more about what a circular economy would look like;
- hear how it differs from Scotland's current approach to resource use;
- understand the scope and scale of the circular economy potential in Scotland;
- hear views on any particular opportunities that Scotland could focus on/prioritise;
- learn more about the challenges in realising the potential and how they could be overcome; and

[1] Scottish Parliament Rural Affairs, Climate Change and Environment Committee. Official Report 20 June 2014. Available at: http://www.scottish.parliament.uk/parliamentarybusiness/28862.aspx?r=8244&mode=pdf

[2] Scottish Parliament Rural Affairs, Climate Change and Environment Committee. Official Report 2 October 2013 Available at: http://www.scottish.parliament.uk/parliamentarybusiness/28862.aspx?r=8539&mode=pdf

[3] SPICe briefing. Available at: http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_13-72.pdf

[4] Scottish Parliament Rural Affairs, Climate Change and Environment. Work Programme. Available at: http://www.scottish.parliament.uk/S4_RuralAffairsClimateChangeandEnvironmentCommittee/General%20Documents/RACCE_-_web_work_prog_-_April_2014.pdf

- hear examples that can help bring the concept of a circular economy to life both in Scotland or beyond.

Next steps

6. The Committee will consider any further work on this issue when it next considers its work programme in June 2014.

Clerks
Rural Affairs, Climate Change and Environment Committee

Annexe A

Written evidence from Green Alliance

Why be circular?

The UK is increasingly at risk from resource scarcity and price volatility. The last decade has seen a dramatic shift from 20th century expectations that relatively ready access to cheap raw materials was the norm, and that the occasional resource crunch would be overcome by new technology and new sources of supply. This has been visible in restrictions on raw materials like rare earth metals and very substantially greater price volatility across a whole host of commodities: over the past decade world food prices have doubled, metals prices have trebled and energy prices have quadrupled.

We can't meet growing resource demand the way we did in the 20th century, by simply expanding extraction. Across a range of materials, the rising environmental costs of production are a major reason for volatile prices and restrictions on access to materials. Absolute scarcity is rarely a hard limit, but, across a range of materials, the rising environmental costs of production are a major reason for volatile prices and restrictions on access to materials. In the case of copper, ore grades have declined from 8% to 0.7% over the last 150 years, and the need to mine in increasingly extreme environments – new Chilean mines now pump seawater nearly 2.5km up and several hundred kilometres into the desert before desalinating the water to use in mining – have helped double the cost of new mines.

Unsustainable extraction also contributes to resource risks in more subtle ways, creating significant price and availability problems for businesses. For example, bauxite, or aluminium ore, is abundant, but the ability to expand extraction is at risk from costly delays or project failure due to conflict with land users, causing substantial economic impacts. Delays in Vedanta's bauxite mine caused a $1 billion refinery to be closed; $1 billion in expansion investment to be frozen; and production in its $4.3 billion smelter to stall, potentially shutting it down. Similar risks can be seen in the coal, aluminium, tin, and palm oil industries.

Defining a circular economy

Keeping resources in circulation for longer through more circular economic models could shield the UK from resource risks. At its best, a circular economy restores old products, parts and materials back to their original use in a way that uses the least resources to deliver the same function.

Ideally, this means direct reuse of products, which preserves both the highly engineered character of a product and its useful function. Where a product needs repair or reconditioning before it can be used again, remanufacturing preserves the most value. These are the tightest closed loops within a circular economy.

The next best thing is recycling, which can be closed or open loop. Closed loop recycling turns products into materials that can be used to create the products they were recovered from: examples include glass bottle to glass bottle or specialty alloy to specialty alloy recycling. In contrast, open loop recycling, or downcycling, creates

material suitable only for lower value applications. For example, glass bottles can be used for construction aggregate and specialty alloys can be downcycled into bulk metals. This avoids the use of new, lower value materials.

Green Alliance's approach focuses on maximising the value, both environmental and economic, in the circular economy: the illustration below shows the difference between the value of raw materials, components, and finished products for three common items: a car, a mobile phone and a tonne of textiles. The value of the finished product is inevitably many times greater than the raw materials or components in it.

At the point at which their first owner decides to discard them, these products show a similar pattern: their worth is much greater as products than as materials. The most striking example is perhaps an iPhone. A reused iPhone retains around 48 per cent of its original value, whereas its value as recyclate is just 0.24 per cent of its original value.

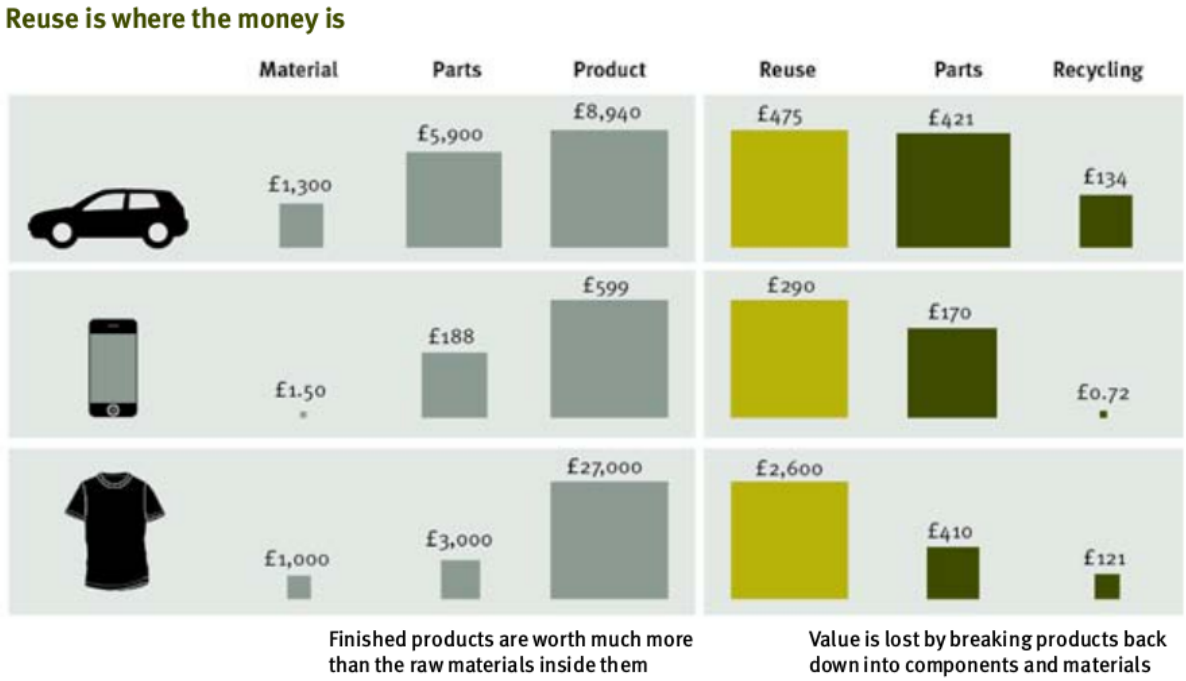


Chart drawn from *Resource Resilient UK*[5]

What can Scotland do to become circular faster?

Achieving a more circular economy will mean acting and governing differently. More collaboration, both within and across sectors, needs to be underpinned by a more entrepreneurial suite of institutions – whether led by the state or industry.

[5] p19, *Resource resilient UK*, July 2013, http://www.green-alliance.org.uk/uploadedFiles/Publications/reports/Resource%20resilient%20UK_a%20report%20from%20the%20circular%20economy%20task%20force%20.pdf

Green Alliance undertook an analysis of three key sectors in Scotland to identify which circular economy opportunities might be possible, given a range of different technical, political, and social drivers. This analysis was intended to identify sectoral opportunities, but was focused more on identifying the thematic, governance-focused challenges that Scotland faces in promoting the circular economy across all sectors. A brief outline of these sectoral opportunities is attached as a slidepack annex to this note, which draws on lessons from the bioeconomy sector only.

Scotland's characteristics

Scotland has three key characteristics which affect its circular economy opportunities:

Policy and politics

Coordination and targeted policy will be needed to secure supply chain collaboration and investment in a circular economy. Scottish politics has featured a consistent narrative in favour of renewables and on the value of industrial strategy. This has helped derisk investment in on- and off-shore wind, and significantly improved the prospects of commercialising marine energy resources. Similarly, Scotland's Zero Waste regulations have been more comprehensive and targeted than other parts of the UK.

Institutions

Scotland has a panoply of institutions which help develop and commercialise new technologies. Notably, its new innovation centres could build on international innovation policy experience to bring forward technologies and business models for the circular economy; Scotland's regional development agencies have the opportunity to play a coordination and funding role in bringing new technologies and startups out of the lab and into the market; and Scotland's trade bodies and cross sectoral convenors, such as SCDI, can help diffuse innovative ideas and promote collaboration. The key challenge for these institutions will be to enable them to act in concert as a system which moves circular economy innovations into common use.

Scale

Scotland has an economies of scale challenge. Low population density outside the central belt already limits large scale recycling infrastructure – opportunities for Scotland are likely to lie in high value reuse and remanufacturing loops, and greater separation of higher value materials. For example, Scotland could adopt the approach pioneered by Biffa Polymers, a plastics recycler, which switched from a mixed plastics input stream to a polypropylene-only input to enable its small scale (c 20,000 tonnes per year) to be economic.

Scotland's small size has an upside, however: greater social connectedness. The concentration of economic activity in a few, highly networked sectors lowers the cost of collaboration and increases the viability of cross sector projects and resource use opportunities.

Bioeconomy sector: the importance of cross sector opportunitiesMany of the opportunities of a circular economy will require both technological innovation and integration of material flows across multiple sectors. The example below contrasts the valuable but limited circular economy opportunities available to the whisky sector on its own, with the greater value that can be achieved by extracting high value materials from whisky byproducts, and cascading them to different industries:

Incremental and transformational opportunities

The circular economy presents two sorts of opportunities, as highlighted in the bioeconomy example above. These will require different approaches to foster:

a) Resource efficiency opportunities, characterised by the **diffusion** of near commercial or established technologies, and increased collaboration within broadly established business models. In the sector analyses above, examples of these include:
   - metal alloy or plastic type separation to improve recycling, and
   - more anaerobic digestion, including by better characterising commercial supplies of biowaste (see the 'single sector opportunity' above).

b) Circular economy opportunities, characterised by innovation to establish and commercialise novel technologies, and some degree of business model integration with supply chains and between sectors. Examples of these include:
   - business model integration: steel reuse in construction, extending supermarket distribution systems to food redistributors
   - novel technology: CCS and biorefining to create chemicals or extract proteins and other valuable products (see the 'working together' graphic above).

Lessons from energy policy

Policy is driving the energy sector toward both incremental and transformational change, driven by the need to decarbonise. There are four strategies that different

actors have used to foster this change, which provide useful lessons for the range of thematic policy options that Scotland could take to promote the circular economy:

a) 'Labs and laissez faire' – this involves funding R&D and taxing externalities (eg a carbon tax or trading), but otherwise leaving the market to develop and deliver new technologies.
b) 'Ditch losers' – this involves funding R&D, regulating away bad choices (such as blocking new coal without CCS, landfill bans; and gCO2/km limits for cars), and letting the market do the rest.
c) 'Create competition' – this involves funding R&D, and then subsidising many technologies to prove commercial viability, before leaving the market to choose now mature technologies. For example, the UK's EMR subsidises the early deployment of renewables, nuclear, and CCS, but then will auction these to determine price in the 2020s, before moving to a fully commercial system.
d) 'Pick winners' – in addition to funding R&D, this involves analysing the viability and suitability of options early, and choosing a subset of the best for a particular context. The German Energiewende has adopted this approach, by choosing technology families and targeting R&D on these families.

Scotland's existing strategy

These strategies are ideal types – all countries have chosen parts of each strategy, and Scotland can't be divorced from overall UK strategy. However, Scotland has focused on ditching 'losers', including by banning new nuclear and non CCS coal power stations, and 'picking winners', by consistently promoting wind and marine power – technologies that suit Scotland's geography –at a political level, backed by effective use of RDAs, planning policy, and subsidy.

In doing so, Scotland has been consistently much more successful at decarbonising than the rest of the UK, though it has been helped by drawing on 28 per cent of the total UK renewables subsidy spending in 2012-13, despite having only a tenth of the households in the UK.

Adapting Scotland's low carbon strategy to the circular economy

Adapting a 'ditching losers' strategy could involve fostering agreement or regulating to achieve well known resource efficiency type opportunities (eg mandating alloy separation for offshore assets) and some more radical 'circular economy' opportunities (eg brokering an agreement to extend supermarket IT stock management systems to food redistributors, so less food is wasted).

Overall, greater resource efficiency type opportunities can be achieved by improving the collaboration activities that Zero Waste Scotland and other Team Scotland entities, like Scottish Enterprise, already conduct. Scotland is already ahead of other parts of the UK in policy terms – the main challenges to increasing resource efficiency opportunities for Scotland relate to its relatively small scale and consequent challenge in attracting investment in projects which require large amounts of feedstock, and enforcing regulation that is not shared with other parts of the UK or EU.

Circular economy innovation through an entrepreneurial state?

Achieving more radical, circular economy type opportunities in Scotland could build on the 'picking winners' strategy. This would mean changing from a business-led innovation strategy, exemplified by the innovation centres' 'led by industry for industry' model, to a more directed, challenge-focused innovation system. This is because a business-led innovation system is likely to produce valuable but incremental innovation, focused mainly on companies' near-term needs.

Enabling circular economy opportunities seen to be advantageous for Scotland (for example, developing technology and systems integration to enable CCS and biorefining, or creating business models for steel reuse in construction) demands an institutional structure and policy framework that functions as an innovation system, building in interaction between companies and publicly funded research, education, public infrastructure, venture capital and regional development agencies to an agreed goal.

Scotland should adopt a challenge-led model, building on examples such as those detailed below from both the public and private sector:

ARPA-E, the US government's advanced energy innovation centre, sets its objectives via a deep dive into a particularly challenging energy problem, identifying the potential technical merit of technology solutions and the potential market pull and cost effectiveness of these solutions. The assessment incorporates detailed workshops with academics, civil servants with specialist sector knowledge, and business experts. This problem-led approach, along with a mandate to avoid incremental improvements, ensures a focus on advanced technology.

In the private sector, an excellent example of a similar challenge-led model comes from the Confederation of European Paper Industries' 'two team' project – an open innovation process. It started with a challenge: to cut the industry's CO2 emissions by 80% while creating 50% more added value. CEPI then set up two teams of scientists and businesspeople and asked them to start building a common knowledge base, drawing on their expertise and on ideas from other sectors with carbon reduction targets, including the steel and chemicals industries. The teams then were tasked with competing to develop four technology ideas each, with a view to being judged on their carbon reduction, value add, innovativeness and feasibility potential. Both teams came up with a number of feasible solutions. The IP for the ideas was retained by CEPI, who will license it to members for further development.

In both cases, the challenge was set externally and is explicitly about radical innovation, and the process was characterised by numerous actors and significant knowledge sharing. These should form the basis for more radical circular economy innovation institutions.

This is necessarily risky: innovation happens amidst a sea of good but failed projects. The key political challenge to make this possible is to invent a legitimising rationale to justify investment in technologies and business models which will include failures.

No strategy can avoid the risk of failure, but Scotland can improve the odds of success by building an integrated system composed of the following elements:

- A clear political direction, backed by challenge oriented innovation bodies mandated to concentrate on areas where Scotland is likely to have comparative advantages in the future. The Scottish Government's proposed roadmap to a circular economy in 2050 could outline these areas.
- Institutions with a mandate to foster technology and business model diffusion by building on Scotland's social connectedness. These could include Zero Waste Scotland, Scottish and Highlands and Islands Enterprise, and Scotland's innovation centres.
- A mechanism to close the gap in funding between lab results and early stage products. Lessons from the successful US Small Business Innovation Research programme suggest that a system which funds proof of concept development, along with a commitment to procure early stage products provides the best combination of grant and commercial discipline to help early stage companies succeed.

Written evidence from Zero Waste Scotland

A more Circular Economy

A circular economy keeps materials and products in use for as long as possible; allowing the economy and business to extract maximum value from them.

Zero Waste Scotland believes it is an economy that:

- **Rewards** new approaches to product design so that materials and components can be easily recovered;
- **Embraces** the emergence of new, regenerative industries such as remanufacturing, reverse logistics, disassembly and refurbishment;
- **Incentivises** retailers to adopt service-based sales models wherein product ownership is retained by manufacturers to enable easier recovery of materials or components;
- **Empowers** consumers to demand better performance from products not ownership;
- **Invests** in skills and learning to inspire a new generation of designers, engineers and entrepreneurs;

The Scottish Government has placed the circular economy at the heart of its **Safeguarding Scotland's Resources** strategy.

A more productive economy

When coupled with advanced forms of manufacturing[6], the circular economy can underpin a **resurgence in locally-rooted industries,** reversing trends driven by off-shoring manufacturing and supply chains.

[6] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255922/13-809-future-manufacturing-project-report.pdf

We predict that delivering **zero waste plan** targets has the potential to create **5,200 new jobs** from the collection, sorting and reprocessing of materials.

Far greater levels of job creation are possible when materials are managed **higher up the value chain** (e.g. through repair, refurbishment, re-use and remanufacturing).

These approaches are already a present-day reality in Scotland, in products and services we use e.g. City Car Club, Fairphone and successful businesses e.g. Mackies Transmissions, which specialises in remanufacture of gearboxes and other automotive parts.

Looking internationally, the Flanders region has a target to create 3,000 FTE jobs from its regional network of re-use centres for household goods[7], and the Netherland estimate a circular economy would create 46,000 new jobs for their economy[8].

A more resilient economy

In the face of intense demands on natural resources, driven by the scale and speed of demand growth from emerging economies, the circular economy is being **embraced by business and the international policy community**[9].

Keeping materials in circulation creates resilience to supply disruptions, price volatility, and political protectionism over access to critical materials.

9% proportion of current global Lithium production required to meet electric car battery demands in Scotland by 2030

UK INDEMAND research (2014)

100% increase in global water demand since 1960.

UNEP (2012) Key Environmental Indicators

147% increase in real commodity prices since the turn of the century

McKinsey (2011) Resource revolution

A greener economy

A circular economy has the potential to drive down Scotland's global carbon emissions footprint through increased design for reduction, re-use, repair and remanufacturing.

The circular economy blueprint can also help companies work across their supply chains to drive down their environmental footprint. Examples of ground breaking initiatives include Marks and Spencer's Plan A and Kingfisher's net positive initiative.

[7] European Topic Centre on Sustainable Consumption and Production (2014), Knowledge sharing on reuse – Implementation of reuse initiatives in EEA countries http://scp.eionet.europa.eu/themes/waste_prevention/wpwebinar/index_html

[8] http://blogs.ec.europa.eu/orep/opportunities-for-a-circular-economy-in-the-netherlands/

[9] http://www.ellenmacarthurfoundation.org/business/ce100

Zero Waste Scotland's priorities

Investing in skills and education

We are working with Education Scotland and the Ellen MacArthur Foundation to embed circular economy concepts into the **Curriculum for Excellence**.

Transforming markets and investor confidence

We run a market develop programme providing access to expertise, knowledge and funds to support growth of Scottish reprocessing and recycling industries;

With Scottish Enterprise, we are managing a **£3.8 million loan fund** to invest in circular economy businesses;

With Scottish Procurement and local Government, we are developing a new brokerage service to transform markets for the materials produced and handled by the public sector.

We are delivering a national engagement programme to raise business awareness of the circular economy and its relevance to key Scottish growth sectors.

Supporting innovation

We work with key sectors, including the **oil and gas** industry, to promote new business models and reuse and remanufacturing opportunities (e.g. via decommissioning of offshore oil and gas infrastructure);

We are piloting **service-based business models** to extend product life, conserve resources and prevent materials become waste, as part of a European partnership project;

The national **Revolve** standards programme, run by Zero Waste Scotland, aims to increase supply and demand for re-used products;

We provide direct advice and support to businesses and other organisations through the **Resource Efficient Scotland** service.

We are also working with the enterprise agencies and other partners to better understand the economic opportunities of a circular economy and how we can create the conditions needed to harness the opportunities for our economy and Scottish businesses.

About Zero Waste Scotland

Zero Waste Scotland is an independent, non-for-profit company, recognised in Scotland and internationally for our expertise in resource efficiency and the circular economy.

Our mission is to help Scotland become more efficient in its use of resources. As a facilitator and enabler of change, we help to reduce waste, increase energy

efficiency and promote responsible water use – all part of a journey towards a low-carbon, sustainable economy.

Annexe B

Supplementary evidence from Scottish Government

At our informal briefing to the Committee last week, we agreed to provide further information on a few points:

- action underway by colleges, universities and business on re-skilling; and
- action underway in Europe and beyond.

We have also enclosed a 2-page summary document on the circular economy which the Committee might find useful to have to hand for further deliberations.

Action on re-skilling for a circular economy

There are a range of different skills required to make the transition to a more circular economy. For example, new business models may lead to greater levels of product leasing, reuse and remanufacture in the economy, requiring new skills in assessment and inspection, cleaning and repair. The development of new skills in this area is primarily seen as a challenge for SMEs as larger companies are more likely to be able to afford any necessary training from their own internal resources.

There are a range of activities currently being undertaken to support skills development, including:

the Scottish Manufacturing Advisory Service (SMAS) is undertaking a baseline assessment of companies that could potentially adopt remanufacturing and is planning to offer support and run events on this topic;

- Strathclyde University has undertaken a range of research projects on remanufacturing and developed a proposal for setting up a “Knowledge Hub for Remanufacturing” which is currently being discussed with a range of stakeholders. A facility of this nature could assist SMEs access the skills development they need to move into remanufacturing.
- Skills Development Scotland and Zero Waste Scotland are working together on a study to examine the potential for a Skills Academy for zero waste and circular economy skills.

Action in Europe and beyond

The European Commission is due to make an announcement on the Circular Economy shortly. We anticipate that this will further strengthen and develop previous work on the Roadmap to Resource Efficiency, and previous statements supporting a move to a Circular Economy. In the next few weeks Zero Waste Scotland will be showcasing our Resource Efficient Scotland service at Scotland House in Brussels, during EU Green Week.

Nations such as the Netherlands and Japan are often seen as leaders in this area due to early government action. Engagement with the Ellen MacArthur Foundation (EMF) has shown that best practice can be shared between governments across Europe; and Scotland recently hosted a delegation from Denmark to share good practice.

As a member of the EMF Circular Economy 100 (EMF CE100) - a global platform bringing together leading companies, emerging innovators and regions to accelerate the transition to a circular economy - Scotland is working closely with leading global companies, nations and regions to collaborate on changing global supply chains to facilitate an accelerated circular economy.

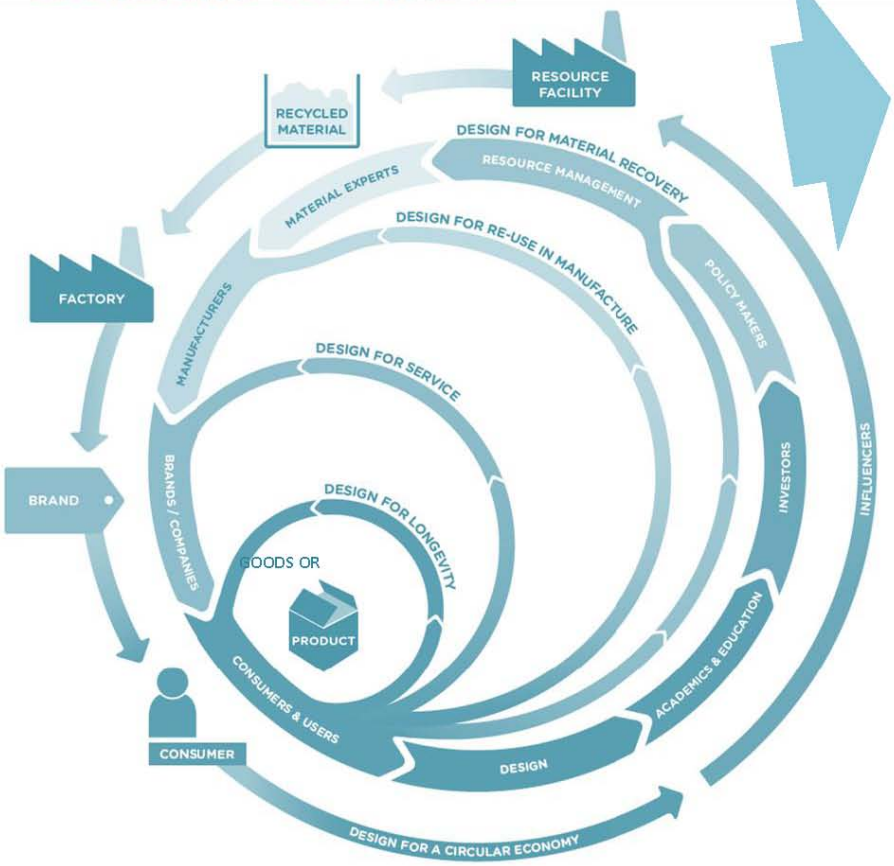
A key project within this remit is Project Mainstream; a joint initiative between EMF and the World Economic Forum to influence the design and recyclability of products and materials to create a critical trigger point for modified supply chains. This has the support of major global businesses.

Leading global businesses are already taking action in different ways to change their business models. For example:

- Renault is focusing on remanufacturing more car parts and Jaguar Landover has also indicated a move in this direction;
- Kingfisher has a *Net Positive* initiative to make its supply chains for DIY products more circular and is looking at new lease and rent models for DIY products;
- Phillips is investigating “pay by lux” models for lighting and providing lower cost remanufactured medical scanners for hospitals;
- Ricoh and Zerox use remanufactured printers/photocopiers extensively within their ranges;
- Cummins remanufactures large diesel engines for heavy plant at its facility in Cumbernauld;
- HP refurbishes servers and laptops at its facility in Erskine employing c160 staff with the prospect of further expansion.

INFO-GRAPHIC 1

CIRCULAR ECONOMY: DESIGNING OUT WASTE



WHAT
Change in economic and industrial systems to allow materials to be cycled continuously and efficiently in the economy

DRIVERS
Cost and volatility of markets;
Emergence of new technologies
Environmental limits- carbon and planetary

HOW
Clear policy vision and market conditions to create investor confidence and innovation
TEAM SCOTLAND

REGENERATIVE INDUSTRIES
Closely connected set of industries that feed, and feed off, the new system

JOBS AND SKILLS
Skilled and low skill labour opportunities
Netherlands estimate up 46.000 new jobs
Scottish opportunities being investigated

Retail
Repair/reuse sector
New lend/lease schemes
New financing tools

Logistics
Take back schemes
National/international reverse logistics
Recycling

Disassembly
Oil and gas
Electronics
Automotive
Aerospace

Remanufacture
Parts
Automotive
Medical
Construction

Technology/research
Life sciences
Material sciences
Engineering
Design

Materials
Sorting
Reprocessing
Fabrication
Food and drink

OPPORTUNITIES
International momentum (£1 trillion opportunity)
Commercial activity – business leading the change
EC drive and European single market
Low carbon economy
Zero waste momentum

Our work

Our circular economy work, as set out in **Safeguarding Scotland Resources,** is being advanced by Zero Waste Scotland, the enterprise agencies, CoSLA, Education Scotland and SEPA, and through close engagement with industry and business.

Investing in skills and education

- Education Scotland, with support from Zero Waste Scotland, is working to embed circular economy skill sets into the Curriculum for Excellence- science, design, business studies and economics.

Creating conditions for innovation

- Scottish Funding Council and ZWS are working with a number of Scottish universities to create the UK's first **remanufacturing innovation hub** to bring together researchers and industry.
- Zero Waste Scotland is working with key sectors, including the **oil and gas industry**, to promote new business models and reuse and remanufacturing opportunities.
- As part of the next phase of **EU Structural Funds**, we are working with ZWS and stakeholders to establish a circular economy accelerator programme.
- Scotland is the first member nation of an **international Circular Economy acceleration network** (EMF CE-100), that is creating new knowledge exchange hubs and new levels of international collaboration.
- The Procurement Reform Bill includes new powers to create market demand for remanufactured and refurbished goods, and stimulate new leasing-based business models.

Transforming markets and investor confidence

- With the support of local government, Scottish Procurement and Commercial Directorate is developing a new **brokerage service** to maximise the value of materials produced and handled by the public sector.
- Zero Waste Scotland, with support from the enterprise agencies, runs a market development programme to help **catalyse investment** in Scotland, focusing on recycling and reprocessing.
- A multi-agency team scrutinising the economic opportunities for Scotland and the policy interventions that would encourage growth of new industries and business models.

Leadership and engagement

- An engagement programme focusing on key business and industry leaders has been established to raise the profile of this work and gain insights on opportunities and barriers from key sectors.

Establishment of a Zero Waste Taskforce to provide political leadership to maximise the economic and business impact of local authority recycling services.