



## PAPER 1: THE CIRCULAR ECONOMY – MAIN PLAYERS AND PROGRAMMES

**A Circular Economy for a Fairer Footprint**  
**Scoping Phase paper**  
**July 2018**

### International / European

**Sustainable Development Goal 12:** Ensure sustainable production and consumption patterns. All signatory countries to SDGs should develop indicators to enable them to monitor progress.

**World Economic Forum – [Platform for accelerating the CE](#).** The World Economic Forum has collaborated with the Ellen MacArthur Foundation for a number of years to accelerate the Circular Economy transition through [Project MainStream](#) - a CEO led initiative that helps to scale business driven circular economy innovations.

Building on this work, the Platform for Accelerating the Circular Economy - PACE- was launched in 2017 as a public-private collaboration, co-chaired by the CEO of Philips, the heads of the Global Environment Facility and UN Environment, with the Ellen MacArthur Foundation, the International Resource Panel, Circle Economy and Accenture Strategy as knowledge partners. The World Economic Forum hosts and facilitates the Platform.

PACE aims to create systems change at speed and scale by enabling partners to:

- Develop blended financing models for circular economy projects, in particular in developing and emerging economies
- Help create and adjust enabling policy frameworks to address specific barriers to advancing the circular economy
- Bring the private and public sector into public-private collaborations to scale impact around circular economy initiatives

### Ellen MacArthur Foundation

#### Programmes

##### Business -

- [Project Mainstream](#): Project MainStream is led by the chief executive officers of nine global companies: Averda, BT, Tarkett, Royal DSM, Ecolab, Indorama Ventures, Philips, SUEZ and Veolia. It focuses on systemic stalemates in global material flows that are too big or too complex for an individual business, city or government to overcome alone, and on enablers of the circular economy such as digital technologies. To date focused on following areas: New plastics economy, Intelligent assets, Urban biocycles, Paper

- [CE100](#): It brings together [corporates, governments and cities](#), academic institutions, emerging innovators and affiliates in a unique multi-stakeholder platform. Specially developed programme elements help members learn, build capacity, network, and collaborate with key organisations around the circular economy

#### **Government -**

- [Circular cities](#): conducting in-depth research with two main aims: to learn more about the circular economy opportunities for cities; and to explore how cities can capture these opportunities in complex urban environments
- [Toolkit for policy makers](#): The report [Delivering the circular economy: a toolkit for policymakers](#), describes a step-by-step methodology and demonstrates its application through a case study in Denmark. In 2018, the Foundation is developing a new research initiative that further explores the six policy intervention types that were identified in the Toolkit for Policymakers. The goal is to evaluate and analyse the current policy landscape, promote useful resources and contribute to a wider critical discussion on these circular economy levers.
- [CE100 government and cities](#)

#### **Insight and analysis -**

- [ResCom](#): Moving towards [restorative models](#) of production and consumption presents industry with opportunities to capture more value from products and materials, mitigate the risks of price volatility and material supply, establish more economic resilience, and decouple growth from the increasing demand on finite resources. The ResCoM (Resource Conservative Manufacturing) project has been set up to help manufacturers capture those opportunities by collecting, remanufacturing and reusing products. The project is co-funded by the European Commission and carried out by a consortium of twelve organisations across research, industry and technology.
- [Circularity indicators](#): The Circularity Indicators Project provides companies with a methodology and tools to assess how well a product or company performs in the context of a circular economy, allowing companies to estimate how advanced they are on their journey from linear to circular. The developed indicators consist of the Material Circularity Indicator, measuring how restorative the material flows of a product or company are, and complementary indicators that allow additional impacts and risks to be taken into account. The indicators may be used by product designers, as well as for internal reporting, procurement decisions, and the evaluation or rating of companies.

#### **Learning -**

- [Universities](#): The Foundation works with higher education institutions worldwide to develop, share and scale circular economy learning. We also enable research collaborations to inform the effective application of the circular economy framework across sectors and industries
- [Schmidt MacArthur fellowship](#): Now in its fifth year, the Schmidt MacArthur Fellowship is the only circular economy fellowship programme in the world and is aimed at postgraduate students studying design, engineering and business.
- [Schools and colleges](#): teaching and learning resources, curriculum development, professional development
- [Disruptive innovation festival](#): Through the Disruptive Innovation Festival (DIF), the Ellen MacArthur Foundation showcases the ideas and innovations disrupting the future of the global economy. The DIF facilitates a digital conversation among designers, startups, academics, economists and innovators to explore the most disruptive trends, underpinned by the principles of the circular economy. Hosted almost exclusively online, the DIF is a three-week long online festival of ideas, which is free to watch for a global audience.
- [Courses](#)

### **Systemic initiatives -**

- [Circular fibres initiative](#): The Circular Fibres Initiative brings together industry leaders and other key stakeholders to collaborate and innovate towards a new textiles economy, based on the [principles of a circular economy](#)
- [New plastics economy](#): The New Plastics Economy is an ambitious, three-year initiative to build momentum towards a plastics system that works. Applying the principles of the circular economy, it brings together key stakeholders to rethink and redesign the future of plastics, starting with packaging.

### **European Union**

[Closing the loop – An EU action plan for the CE](#) (2015).

Implementation of CE Action Plan:

[2018 Circular Economy Package](#).

A Europe-wide [EU Strategy for Plastics in the Circular Economy](#) and annex to transform the way plastics and plastics products are designed, produced, used and recycled. By 2030, all plastics packaging should be recyclable. The Strategy also highlights the need for specific measures, possibly a legislative instrument, to reduce the impact of single-use plastics, particularly in our seas and oceans. To reduce the leakage of plastics into the environment, the Commission has adopted a new proposal on [Port Reception Facilities](#), to tackle sea-based marine litter and published a report on the impact of the use of oxo-degradable plastic, including oxo-degradable plastic carrier bags, on the environment.

A Communication on [options to address the interface between chemical, product and waste legislation](#) that assesses how the rules on waste, products and chemicals relate to each other.

A [Monitoring Framework on progress towards a circular economy](#) at EU and national level. It is composed of a set of ten key indicators which cover each phase – i.e. production, consumption, waste management and secondary raw materials – as well as economic aspects – investments and jobs - and innovation.

A [Report on Critical Raw Materials and the circular economy](#) that highlights the potential to make the use of the 27 critical materials in our economy more circular.

### **Extended Producer Responsibility**

In context of Europe 2020 Strategy and Resource efficient Europe.

EPR introduced in three directives: ELV 2000/53/EC (end of life vehicles), WEE 2012/19/EU (electrical and electronic), and Batteries 2006/66/EC. Also widely used in the implementation of the Packaging and Packaging Waste Directive 94/62/EC. Article 8 of the Waste Directive 2008/98 sets some principles regarding the implementation of EPR. Individual countries have EPR schemes covering other product groups.

Report evaluating schemes [http://ec.europa.eu/environment/waste/pdf/target\\_review/Guidance%20on%20EPR%20-%20Final%20Report.pdf](http://ec.europa.eu/environment/waste/pdf/target_review/Guidance%20on%20EPR%20-%20Final%20Report.pdf)

[European CE Stakeholder Platform](#), joint initiative by EC and European Economic and Social Committee to engage stakeholders and network.

## UK

### Government

Theresa May [announced](#), in January 2018, that the government would show global leadership in tackling plastic waste.

#### [25 year plan](#) (Jan 2018)

Chapter 4: Increasing resource efficiency and reducing pollution and waste

1. Maximising resource efficiency and minimising environmental impacts at end of life.

i. Achieving zero avoidable plastic waste by the end of 2042

ii. Reducing food supply chain emissions and waste

iii. Reducing litter and littering

iv. Improving management of residual waste

v. Cracking down on fly-tippers and waste criminals

vi. Reducing the impact of wastewater

March 2018 [call for evidence](#) on taxing single use plastics

Promise from Environment Secretary Michael Gove that England would definitely institute a [deposit return scheme](#) to capture more plastic bottles for recycling. Earlier this month, to coincide with a meeting of the Commonwealth nations, he added that England would seek to ban disposable single use plastics like straw stirrers and cotton buds.

April 2018 launch of the [UK Plastic Pact](#), a voluntary business led initiative aiming to create “a world where plastic is valued and never pollutes the environment”. Participating companies are promising, by 2025, to: “eliminate problematic or unnecessary single use packaging”; make 100 per cent of plastic packaging reusable, recyclable or compostable; ensure 70 per cent is effectively recycled or composted; and include 30 per cent recycled content across all plastic packaging.

### NGOs

#### WRAP

WRAP's vision is a world in which resources are used sustainably.

WRAP works with governments, businesses and communities to deliver practical solutions to improve resource efficiency.

Our mission is to accelerate the move to a sustainable, resource-efficient economy by:

- re-inventing how we design, produce and sell products,
- re-thinking how we use and consume products, and
- re-defining what is possible through re-use and recycling

WRAP is a catalyst for positive economic and environmental action. We work uniquely, and by design, in the space between governments, businesses, communities, thinkers and individuals – forging powerful partnerships and delivering ground-breaking initiatives to support more sustainable economies and society. We are world leaders in establishing the facts, getting the right people working together, then converting ideas into action and delivery on the ground.

We drive change in areas where we can make the biggest difference. Our priority sectors are:

- [Food and drink](#)
- [Clothing and textiles](#)
- [Electricals and electronics](#)

**UK Plastics Pact.** The UK Plastics Pact, launched by sustainability experts WRAP, is a unique collaboration which brings together businesses from across the entire plastics value chain with UK governments and NGOs to tackle the scourge of plastic waste.

Today 42 businesses, including major food, drink and non-food brands, manufacturers and retailers right through to plastic reprocessors and packaging suppliers have made their commitment to the Pact.

These Pact members are responsible for over 80% of the plastic packaging on products sold through UK supermarkets. In addition, 15 other organisations have also shown their commitment to the Pact.

This powerful collective has committed to hit a series of ambitious targets by 2025:

**Eliminate** problematic or unnecessary single-use plastic packaging through redesign, innovation or alternative (re-use) delivery models.

**100%** of plastic packaging to be reusable, recyclable or compostable

**70%** of plastic packaging effectively recycled or composted

30% average recycled content across all plastic packaging

The UK Plastics Pact is the first of its kind in the world. It will be replicated in other countries to form a powerful global movement for change as part of the Ellen MacArthur Foundation's New Plastics Economy initiative. It is being led by WRAP, the sustainability experts

## Scotland

**CE Strategy** [Making Things Last](#) focuses on:

- Food and drink and broader bio-economy;
- Remanufacture
- Construction and the built environment
- Energy infrastructure

And has a number of targets for 2020 and 2025 on waste reduction and recycling.

Commitment to a CE Bill for this parliamentary term in SNP manifesto, although not mentioned in current Programme for Government.

Commitment to introducing a deposit return scheme and to ban certain single use items such as micro-beads, plastic stemmed cotton buds and plastic straws. Consulted on proposals to ban the manufacture and sale of plastic-stemmed cotton buds and consultation open on Deposit Return System.

The Expert Panel on Environmental Charging and Other Measures is an advisory group being established to provide advice to Scottish Government Ministers on measures – such as disposable cups and plastic straws – that may be taken in Scotland with the goal of encouraging long-term and sustainable changes in consumer and producer behaviour in order to move towards a circular economy.

Current Electoral Commissioner Dame Sue Bruce has been appointed as Chair. Joining her will be behavioural expert Professor Dame Theresa Marteau, economist Professor Liam Delaney, Mike Barry, the Director of Sustainable Business at Marks & Spencer, Roger Kilburn from the biotech and chemical industry, Professor Margaret Bates from the waste industry and Professor Aileen McHarg, who will bring legal expertise. Scottish Environment Protection Agency (SEPA) Chief Executive Terry A'Hearn, Zero Waste Scotland Chief Executive Iain Gulland and Disability Adviser Professor Kate Sang will also sit on the group. A 2050 Climate Group representative will help provide a young person's perspective

[Zero Waste Scotland](#) is the main agency involved in CE and carry out most of the SG work in relation to CE. Largely funded by SG which limits any advocacy activity.

**Private Sector**

It is noted that there are examples of businesses who have been proactive and adopted circular practices such as [Desso](#)



## PAPER 2: STATUTORY INSTRUMENTS AND POWERS

### A Circular Economy for a Fairer Footprint Scoping Phase paper July 2018

This short paper reviews the statutory instruments of relevance to the circular economy in Scotland.

#### 1 EU considerations

EU Treaties prohibit Member States from introducing measures that restrict the free movement of goods. This makes it difficult for a Member State to unilaterally ban a particular product or put extra charges on it. However, Article 191 of the Treaty of the Functioning of the European Union does allow Member States to introduce measures that interfere with trade 'for non-economic environmental reasons' and on this basis a Member State would need to show that a particular action was justified and satisfy a number of conditions.

#### 2. UK considerations

[Schedule 5](#) of the Scotland Act 1998 lists those areas where responsibility remains reserved to Westminster. In the context of products these include:

- Taxes (setting of VAT rates)
- Product standards, safety and liability (for example the technical and legal requirements for safety, design, packaging and insurance, to ensure products are safe and fit for purpose)

In relation to taxes it is worth noting that the [EU Commission](#) have recently referred to a tax on plastic and the UK Government [A Green Future: Our 25 Year Plan to Improve the Environment](#) commits to explore this, and has recently concluded a public consultation on how the tax system or charges could reduce the amount of single use plastics waste.

It is also worth noting that the Scottish Parliament can, in principle, introduce new taxes through the Scotland Act 2012 subject to the approval of the UK and Scottish Parliaments ([HM Government - Strengthening Scotland's Future](#)).

#### 3 Scotland

Under the [Scotland Act](#) the Scottish Parliament has responsibility for most environmental matters and can develop environmental regulation accordingly. There are a number of different approaches that have, or are in the process of being, used in Scotland to ban, control or charge for single use plastic using powers available to the Scottish Parliament.

##### **Ban on sale and manufacture of a particular product**

The legality of imposing a ban on certain products in Scotland is complex given that the UK government has responsibility for product standards and EU Treaties prevent Member States introducing measures that restrict the free movement of goods (although exemptions are possible on environmental grounds). However, the [Environmental Protection Act \(1990\)](#) does provide powers for the UK or devolved administrations to "prohibit or restrict" the use or supply of "injurious substances or articles." It is on this basis that the Westminster and Scottish Government plan to use [secondary legislation](#) to impose a ban on plastic microbeads. The Scottish Government plan to use the same approach to introduce their recently announced ban on plastic cotton buds.

##### **Charging (levies)**

The Scottish Government has used devolved powers to introduce charging measures on environmental grounds. The [Climate Change \(Scotland\) Act 2009](#) made provision for a levy to be

applied to single use carrier bags through secondary legislation. In 2014 [The Single Use Carrier Bag Charge \(Scotland\) Regulations 2014](#) were subsequently adopted.

If Scotland were to introduce a charging scheme for other single use items (e.g. plastic straws) primary legislation would be required.

#### **Other opportunities under the Climate Change Scotland Act (2009)**

Chapter 5: Waste reduction and recycling<sup>1</sup> has a number of provisions relevant to increasing circularity. Of particular interest at this juncture are:

S 82: Procurement of recyclate

82A: Procurement of recycled and recyclable products

S 83: Targets for reduction of packaging etc

#### **Other relevant legislation**

The Waste (Scotland) Regulations require all businesses and organisations to separate key materials – plastic, glass, metals, paper and card – for recycling. Most food businesses are also required to separate food waste for collection. The Waste (Scotland) Regulations 2012 also amended Pollution Prevention and Control (Scotland) Regulations 2000 to require that for any new incinerators dense plastics are removed from the residual municipal waste stream before going to incineration.

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<sup>1</sup> [Chapter 5: Waste reduction and recycling](#)

S 78: Waste prevention and management plans. Scottish Ministers may require persons to prepare and comply with plans

S 79: Information on waste. Scottish Ministers may require persons to provide SEPA with information on waste produced.

S 80: Recyclable waste: facilities for deposit.

S 81: Recyclable waste: facilities for deposit at events etc.

S 82: Procurement of recyclate

82A: Procurement of recycled and recyclable products

S 83: Targets for reduction of packaging etc

S 84: Deposit and return scheme

S 85: Deposit and return schemes: designation of scheme administrator

S 86: Power to establish scheme administrator

S 87: Finance of scheme administrator

S 88: Charges for supply of carrier bags



## PAPER 3: TARGETS AND METRICS

### A Circular Economy for a Fairer Footprint Scoping Phase paper July 2018

#### 1 Introduction

This short paper outlines targets that are relevant to the CE and reporting, both at the Scottish and European levels.

#### 2 Existing targets in Scotland

Progress towards circularity is currently assessed through the targets in the strategy *Making Things Last*, 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 (note: I think this has been superseded by 70% target for all waste below)	2020	Scottish Government
No more than 1.26 million tonnes of biodegradable municipal waste to be sent to landfill (note: plus a SG ban from 2021 below)	2020	EU
70% recycling and reuse of construction and 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 a 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. Addition target added: Food waste reduced by 33% from 2013 by 2025	2025	Scottish Government

#### Some notes on these targets:

##### Waste reduction targets:

- 15% reduction in waste arising against 2011 baseline. This target is very sensitive to construction and demolition due to the weight of associated waste.
- 33% reduction in food waste. Material specific target thought to be more useful. Interplay between this and above target in that if 33% food waste reduction met, allows rest of waste to be reduced by approximately 10% (rather than 15%). Challenging target – difficult and slow to change household behaviour so majority of reduction will need to come from non-household sector. In baseline year, 44% of food waste from households.

##### Waste management targets:

- Ban on biodegradable municipal waste to landfill by 2021. Very challenging as biodegradable waste not fully separated out, so effectively banning all municipal waste from landfill. Main option will be incineration.

- Maximum of 5% of waste to landfill by 2025, by weight. About 25 – 30% of all waste is soil, rubble etc which is unproblematic. Would be better if this target excluded construction and demolition waste?
- Minimum of 70% recycling target by 2025. Stretching, but will also leave remaining 30% of which only 5% can go to landfill ..... incineration until recycling gets to 95%?

### 3 Reporting

SEPA report on these targets. Below table from ‘Waste from all sources – Summary data 2016’  
[https://www.sepa.org.uk/media/356705/wfas\\_2016\\_official\\_statistics.pdf](https://www.sepa.org.uk/media/356705/wfas_2016_official_statistics.pdf)

**Table 2. Key figures to support targets specified in Scottish waste policies\***

Indicator	Year	Performance	Target / Target year
1. Reduce biodegradable municipal waste sent to landfill	2005	2.16 million tonnes	< 2.7 million tonnes / 2010 < 1.8 million tonnes / 2013 < 1.26 million tonnes / 2020 0 million tonnes / 2021
	2006	2.03 million tonnes	
	2007	1.97 million tonnes	
	2008	1.78 million tonnes	
	2009	1.57 million tonnes	
	2010	1.48 million tonnes	
	2011	1.35 million tonnes	
	2012	1.29 million tonnes	
	2013	1.18 million tonnes	
	2014	1.12 million tonnes	
	2015	1.10 million tonnes	
2016	1.15 million tonnes		
2. Recycling and preparing for reuse of construction and demolition waste <sup>‡</sup>	2011	94.8%	70% / 2020
	2012	92.7%	
	2013	94.6%	
	2014	97.1%	
	2015	98.4%	
	2016	99.1%	
3. Recycling/composting and preparing for re-use of waste from all sources <sup>§</sup>	2011 (old method)	52.9%	70% / 2025
	2012 (old method)	50.5%	
	2013 (old method)	57.8%	
	2014 (old method)	54.1%	
	2014	53.5%	
	2015	56.4%	
	2016	61.0%	
4. Percentage of all waste sent to landfill <sup>§</sup>	2011	43.1%	< 5% / 2025
	2012	45.0%	
	2013	38.1%	
	2014	39.6%	
	2015	37.1%	
	2016	32.5%	
5. Reduce waste generated in Scotland	2012	84.0%	<93% of 2011 baseline / 2017 <85% of 2011 baseline / 2025
	2013	92.4%	
	2014	83.2%	
	2015	94.0%	
	2016	89.6%	

\* Making Things Last - A Circular Economy Strategy for Scotland (2016).

Figures for the carbon metric impacts of waste, targets and performance are published by Zero Waste Scotland at [www.zerowastescotland.org.uk/content/scotland%E2%80%99s-carbon-metric-impact](http://www.zerowastescotland.org.uk/content/scotland%E2%80%99s-carbon-metric-impact)

<sup>‡</sup> C&D recycling rates are from data provided to Europe for reporting under the Waste Framework Directive. C&D recycling excludes hazardous waste and soil and stone recycled.

<sup>§</sup> The methodology used to calculate recycling tonnages changed in 2014. The figures for 2014 and 2015 have been revised under the new method to take into account waste composted or anaerobically digested at non-PAS certified facilities.

#### **4 Looking forward – new data and indicators**

From *A Strategy for improving Waste data in Scotland* (2017)

[https://www.sepa.org.uk/media/335133/waste\\_data\\_strategy\\_for\\_scotland.pdf](https://www.sepa.org.uk/media/335133/waste_data_strategy_for_scotland.pdf)

Action 4: We will review and progress the tools and levers required to support and monitor Scotland's transition to a more circular economy

- Identifying, developing and adopting new methods will help us understand how resources move through our economy and find new ways to capture data on the flow of materials. This will help us measure and track Scotland's progress towards a more circular economy.
- Enhancing existing policy and legislation will support the development of innovative new systems for tracking waste and the sustainable use of resources.
- Using non weight-based targets and indicators provides additional insight into the environmental, social and economic impacts of waste management.

Zero Waste Scotland are working on a material flow metric. We have been told that they will have a basic metric for Scotland by the end of this financial year. This will improve year on year as more data becomes available. A material flow metric will enable us to measure the material footprint.

#### **5 Europe**

The European Commission have produced a comprehensive monitoring framework, although it doesn't include targets.

The following table is from the *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a monitoring framework for the circular economy* (2018) <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0029&from=EN>

No	Name	Relevance	EU levers (examples)
<b>Production and consumption</b>			
1	EU self-sufficiency for raw materials	The circular economy should help to address the supply risks for raw materials, in particular critical raw materials.	Raw Materials Initiative; Resource Efficiency Roadmap
2	Green public procurement*	Public procurement accounts for a large share of consumption and can drive the circular economy.	Public Procurement Strategy; EU support schemes and voluntary criteria for green public procurement
3a-c	Waste generation	In a circular economy waste generation is minimised.	Waste Framework Directive; directives on specific waste streams; Strategy for Plastics
4	Food waste*	Discarding food has negative environmental, climate and economic impacts.	General Food Law Regulation; Waste Framework Directive; various initiatives (e.g. Platform on Food Losses and Food Waste)
<b>Waste management</b>			
5a-b	Overall recycling rates	Increasing recycling is part of the transition to a circular economy.	Waste Framework Directive
6a-f	Recycling rates for specific waste streams	This reflects the progress in recycling key waste streams.	Waste Framework Directive; Landfill Directive; directives on specific waste streams
<b>Secondary raw materials</b>			
7a-b	Contribution of recycled materials to raw materials demand	In a circular economy, secondary raw materials are commonly used to make new products.	Waste Framework Directive; Eco-design Directive; EU Ecolabel; REACH; initiative on the interface between chemicals, products and waste policies; Strategy for Plastics; quality standards for secondary raw materials
8	Trade in recyclable raw materials	Trade in recyclables reflects the importance of the internal market and global participation in the circular economy.	Internal Market policy; Waste Shipment Regulation; Trade policy
<b>Competitiveness and innovation</b>			
9a-c	Private investments, jobs and gross value added	This reflects the contribution of the circular economy to the creation of jobs and growth.	Investment Plan for Europe; Structural and Investment Funds; InnovFin; Circular Economy Finance Support Platform; Sustainable Finance Strategy; Green Employment Initiative; New Skills Agenda for Europe; Internal Market policy
10	Patents	Innovative technologies related to the circular economy boost the EU's global competitiveness.	Horizon 2020

\* Indicators under development

**Table 1: Indicators on the circular economy included in the monitoring framework**

Eurostat is measuring these indicators for EU as a whole and for individual member states. Data can be viewed here <http://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework>

## **ASIDE**

### **Notes on incineration**

- The Scottish targets have implications for incineration, tending to push more waste to incinerators to meet the targets.
- In 2011 there were no incinerators in Scotland.
- By 2015, 9% of residual waste was going to incineration.
- 750,000 tonnes of additional capacity planned between now and 2021
- Emissions from landfill are allocated to 'waste' whereas emissions from incineration are allocated to 'energy'
- Huge emission reduction from waste sector, but some transferred to energy sector
- Land-fill tax can be seen as a subsidy to incineration. Incineration needs a tax as well.
- It would be good to know the carbon intensity of energy from incineration – average GHG per Kwhr (there is a target on carbon intensity).
- Forecasts show that there will be 1million tonnes of waste 'without a home' resulting from landfill targets (2021 and 2025) – if this goes to incineration it will more than double current levels of incineration.



## PAPER 4: CIRCULAR ECONOMY AND LINK

### A Circular Economy for a Fairer Footprint

#### Scoping Phase paper

July 2018

#### 1 Introduction

This is one of five internal background papers to inform the scoping phase of the Circular Economy for a Fairer Footprint (CEFF) project.

As well as working on the Bill process (if forthcoming) and broad high level advocacy, the CEFF project will focus on one or two specific areas. The purpose of this paper is to provide some rationale for choosing that focus. LINK members and LINK Group leaders were asked which aspects of their work are relevant to increasing circularity. Each of these areas is then considered in a little depth to help inform a strategic choice of focus for further work.

#### 2 Background

The concept of a circular economy is characterised, more than defined, as an economy that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. It is conceived as a continuous positive development cycle that preserves and enhances natural capital, optimises resource yields, and minimises system risks by managing finite stocks and renewable flows.

In the technical cycle, circular economy technologies and business models aim to maximise the value extracted from finite stocks of technical assets and materials, and thereby address much of the structural waste in industrial sectors. In the biological cycle, a circular economy encourages flows of biological nutrients to be managed so as not to exceed the carrying capacity of natural systems, and aims to enhance the stock of natural capital by creating the conditions for regeneration of, for example, soil.

#### 3 Areas of work relevant to a more circular economy

The following work areas were put forward by LINK members and Group leaders:

- Work promoting the Sustainable Development Goals, with goal 12 aligning very closely: *Ensure sustainable production and consumption patterns.*
- Synergies with landscape scale conservation and rewilding which have been shown to generate local, small nature-based economic activities.
- More circular agriculture and food production.
  - Nitrogen budget
  - Minimising farm waste
  - Promoting integrated pest management.
  - Banning of horticultural peat extraction and promotion of sustainable peat alternatives.
- Promoting natural solutions to, for example, flooding or erosion, to reduce the use of finite materials.
- Utilisation of waste / by-products from habitat management.
- Natural Capital thinking and promoting the idea of natural capital being a fundamental asset that needs to be preserved and enhanced.
- The Have You Got the Bottle campaign for a deposit return system on drinks containers. Likely next focus to be Extended Producer Responsibility (EPR).

- Marine litter campaigns leading to proposed banning of (some) single use plastics and microbeads.
- Windfarm repowering.
- Decommissioning of North Sea oil infrastructure.
- Climate change – increased circularity would reduce the emission of climate change gases into the atmosphere.
- Campaigning for more sustainable aquaculture.

#### **4 What we need to consider**

In order to help decide which of these areas are best suited to become a focus for the CEFF project, each example will be considered against the following criteria:

- Scale of issue and how a more circular approach would result in environmental enhancement.
- Interest in government / likely traction; including targets, legislative opportunities or other policy gains.
- Of interest to LINK members and Groups.
- Suited to a CEFF focus in terms of fairer footprint and value added. Is it in tune with the project emphasis on circular economy and fairer footprint? Is there background work on which to build, are others working on it and would LINK's voice make a difference?

The following sections of the report discuss the various areas of work listed in section 3 in terms of the criteria above.

#### **5 Cross cutting**

Several of the suggested areas are considered cross-cutting.

##### **5.1 Work promoting the Sustainable Development Goals, with goal 12 aligning very closely: *Ensure sustainable production and consumption patterns.***

###### **Scale of the issue and environmental gain of a more circular approach**

This is a broad cross cutting theme. Increased circularity would contribute to SDG 12 and sustainable production and consumption would reduce pressure on the natural environment.

###### **Interest in Government and relevant legislation, policy or targets**

Scottish and UK Governments signatory to SDGs. There is an obligation for countries to have criteria in place against which to assess progress towards Goals. At present the National Performance Framework is weak on criteria for SDG 12.

###### **Interest to LINK members**

Of broad interest

###### **Suitability as, and added value of, CEFF focus**

LINK voice could add weight to emphasise this Goal and Scotland's commitment. Should be embodied in work of CEFF project, although probably not seen as a discrete focus.

##### **5.2 Natural Capital approach**

###### **Scale of issue and environmental gain of a more circular approach**

Circular economy and natural capital approaches are complimentary. A more circular economy, if reducing overall resource consumption, would enhance stocks of natural capital. Taking a natural

capital approach highlights the value of our stocks of natural capital and encourages their enhancement and careful use.

#### **Interest in Government and relevant legislation, policy or targets**

There is interest in Government in Natural Capital. It is mentioned in the Economic Strategy, the Biodiversity strategy and is an indicator in the National Performance Framework.

#### **Of interest to LINK members and groups**

Of particular interest to SWT

#### **Suitability as, and added value of, CEFF focus**

LINK should be aware of cross cutting synergies and use accordingly. Probably not suited to a specific project focus.

### **5.3 Climate Change**

#### **Scale of issue and environmental gain of a more circular approach**

Climate change is one of the biggest and most pressing issues facing today's society. A more circular economy generally reduces climate change emissions as the energy embodied in products is saved.

#### **Interest in Government and relevant legislation, policy or targets**

Climate change high on Governments' agendas and existing legislation and targets are driving policy.

#### **Of interest to LINK members and groups**

Of broad interest to LINK members

#### **Suitability as, and added value of, CEFF focus**

Most climate change advocacy is taken forward by SCCS. LINK is already collaborating on specific areas. Although GHG savings should be highlighted across CEFF work – useful drivers for increasing circularity due to targets in legislation, it is not considered an appropriate focus due to the extent of other's work on climate change and the intention of CEFF to look beyond carbon footprints to material footprints.

### **6. Biological cycles**

In biological cycles, biologically-based materials feed back into the system through processes like composting and anaerobic digestion. These cycles regenerate living systems, such as soil, which provide renewable resources for the economy. Non-renewable inputs are minimised as are waste and leakages.

Currently our food production system is generally conceptualised as a linear system, with extractive inputs, production, processing, distribution, and sale of goods. This results in demands for resources, some of which are scarce and finite; waste and leakages, some of which are potentially useful and some of which are polluting and harmful. There is, of course, some widespread circular practice, for example spreading of manure and slurry; and some examples of recent circular innovations, such as using waste from whisky distilleries for animal and fish food.

Intensification and on farm specialisation has tended to take us away from more circular systems. Whereas mixed farms find a natural symbiosis between animal and plant production, when these systems become geographically removed from one another, the physical barrier makes this symbiosis harder to achieve, requiring additional communication, coordination and transportation.



In Scotland there is a distinctive east – west split, with the majority of livestock being reared in the West of the country and the majority of arable being grown in the East.

In a more circular food production system, chemical and natural fertilisers and manures would be applied in a careful and efficient manner, so that uptake by target plants is maximised and runoff and pollution is minimised. Agro-chemical use in general would be minimised as these generally rely on extraction of finite resources which aren't replenished. The use of peat for composts for the horticulture sector would also be minimised for the same reasons, being replaced with a sustainable alternative.

## **6.1 Closing the loops: Nitrogen<sup>2</sup>**

### **Scale of the issue and environmental gain of a more circular approach**

Farmers apply nitrogen to their fields through artificial fertilisers and manure. Some crops fix nitrogen and some is contained in the food we consume. A large proportion of crops grown become feed for livestock and a large proportion of N ends up in manure which is then applied to fields. At every stage of the food production process N is lost and leaks out to the wider environment through emissions to the atmosphere and leaching into watercourses.

Approximately half of the N applied to the land in Scotland is lost to the wider environment. The livestock sector is particularly inefficient, leaking N in the field where fodder is being grown, in the animal mass that is not consumed and in the poor management of manure.

Leakages of N disrupts the balance of nutrients - eutrophication in water causes algae and plants to grow excessively which can result in depletion of oxygen in the water and 'dead zones'. Terrestrial eutrophication, where N compounds are deposited from the air onto plants, benefit particular plant species which tend to crowd out other species. Various forms of airborne nitrogen pollution effect human health. Ammonia (NH<sub>3</sub>) emitted from agricultural activity (such as slurry storage and spreading) plays a leading role in the formation of fine particulate matter. Nitrous oxide (N<sub>2</sub>O) emitted during fertilizer application, is the main cause of stratospheric ozone depletion, increasing the risk of skin cancer, as well as being a GHG gas (contributing around 7% of Scotland's total GHG emissions in 2004).

Costs of eutrophication were estimated to be \$105 – 160 million per year for England and Wales in 2004<sup>3</sup>.

### **Interest in Government and relevant legislation, policy or targets**

SG Climate Plan (2018): Policy outcome 2: Emissions from nitrogen fertiliser will have fallen through a combination of improved understanding, efficient application and improved soil condition.

### **Interest to LINK members**

Of interest to a number of LINK members, particularly Nourish, RSPB, SWT

### **Suitability as, and added value of, CEFF focus**

Adequate background material available on which to build. It is being taken forward by Nourish and SCCS as a policy ask so would need to discuss regarding added value or role of LINK CEFF project. In terms of 'fairer footprint' relevance, reduced and better use of N would result in reduced carbon and ecological footprints.

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<sup>2</sup> More information can be found here <http://www.nourishscotland.org/climate-change-bill-blog-2-nitrogen-budget/>

<sup>3</sup> <https://pubs.acs.org/doi/abs/10.1021/es020793k>

## 6.2 Minimisation / utilisation of farm waste

### Scale of the issue and environmental gain of a more circular approach

There are many aspects of farm waste that could be reduced and or better utilised, including:

- Unsaleable produce which is often ploughed back into fields when there are sometimes other higher value uses. Purchasing agreements held between farmers and supermarkets tend to result in excess produce.
- Whey, a by-product from the dairy industry, which makes a very valuable pig feedstock, but much of it is discarded (don't have figures).
- Plastic, for example silage wrapping. There is a company in Dumfriesshire that recycles the plastic wrapping from silage; what are the opportunities for this to be a widespread practice?
- The use of anaerobic digesters which are promoted as a way of utilising farm waste (to produce electricity). There are now examples of farmers growing crops to feed digesters (don't know scale). This is not an efficient way to produce electricity. The sludge produced by digesters has value as a fertilizer but it is unclear how effectively this is used.

### Interest in Government and relevant legislation, policy or targets

Climate change targets and policies in the Climate Plan. Waste reduction targets / recycling targets. Reduction in biological waste and wasted on-farm produce priority in Making Things Last.

### Interest to LINK members

Of general interest to Food and Farming Group.

### Suitability as, and added value of, a CEFF focus

There is a lack of information about the quantities and locations of biological waste. Considerable background work would be needed first and the focus narrowed. Not currently being addressed by other organisations so space exists for a campaign. The use of 'waste' could displace other raw materials, in line with 'fairer footprint' CEFF aim.

## 6.3 Integrated Pest Management: reducing our reliance on harmful pesticides

### Scale of the issue and environmental gain of a more circular approach

Almost all active pesticide ingredients are hydrocarbons derived from petroleum. (note: need to find out about the resource intensity of pesticides) and their use has contributed to the drastic decline in pollinators. Better developed integrated Pest Management (IPM) and implementing pollinator focused initiatives could achieve real change for pollinators

### Interest in Government and relevant legislation, policy or targets

In February 2013, the UK Government published the *UK National Action Plan for Pesticide Use* to fulfil a requirement under the EU directive on the Sustainable use of Pesticides. The plan lacks ambition and fails to set out a clear direction for achieving sustainable use of pesticides and preventing damage to pollinator populations. The Scottish Government confirmed a commitment to IPM in the [Scottish Pollinator Strategy](#), "Support the use and development of pollinator-friendly pest control measures in agricultural and urban areas, including Integrated Pest Management (IPM). The IPM Strategy will build on the principles set out in the EU Directive on the Sustainable Use of Pesticides." (see also <http://www.gov.scot/Topics/farmingrural/Agriculture/Environment/Pesticides/IntegratedPestManagement>). Currently there is great disparity in the interpretation of IPM amongst stakeholders, as well as their understanding of its capacity to deliver reductions in pesticide use and wider benefits through habitat creation to encourage natural pest control and to benefit pollinator populations. Apart from the SG department, SRUC have done/are doing some work on this.

## **Interest to LINK members and groups**

Main cross-over is with the Food & Farming and Wildlife Subgroups within LINK.

## **Suitability as, and added value of, a CEFF focus**

There has been some work done in this area and as such there is material available on which to build. There are no specific campaigns on IPM in Scotland at the moment, making it something that LINK could add value to. IPM replaces unsustainable and harmful inputs with sustainable alternatives which perform the same function, preventing harmful leakages into the environment. Its production is energy intensive and, as such, reduced use would result in a reduced carbon footprint.

## **6.4 Using by-products as an alternative to Peat in composts**

### **Scale of the issue and environmental gain of a more circular approach**

Coir, wood fibre, bark and other materials are used in compost as a substitute for peat. Peat extraction damages the environment and 95% of extracted peat goes to the horticultural sector as a component of composts. Extraction in Scotland is from Lowland bogs which are valuable and threatened habitats and carbon sinks. Over the past 100 years, the area of relatively undisturbed lowland raised bog in the UK is estimated to have diminished by around 94%, from 95,000 hectares to approximately 6,000 hectares today<sup>4</sup>. Degraded peat releases 6MtCO<sub>2</sub>e/yr in Scotland and £8.6 million has so far been spent to fund restoration of 10,000 ha. There are targets to restore 50,000 ha by 2020 and 250,000 ha by 2030<sup>5</sup>.

Peat continues to be extracted from lowland bogs in Scotland despite a robust presumption against new consents. Existing licenses, which can run for a number of years, mean that there is the potential for future extraction. Half a million tonnes of peat were extracted from 14 sites in 2014 in Scotland. There are 80 sites where planning documents exist regarding extraction and 40 where the consented area is documented<sup>6</sup>. There are therefore many sites where companies have extraction rights but no extraction activity meaning these areas are left in limbo with the security and future integrity of the huge stores of carbon in doubt.

### **Interest in Government and relevant legislation, policy or targets**

Scottish Government targets<sup>7</sup>: a voluntary target for amateur gardeners to phase out the use of peat by 2020 and a final voluntary phase-out target of 2030 for professional growers of fruit, vegetables and plants. These targets are looming with little progress. Roseanna Cunningham recently tasked the National Peatland Group to look into this so they should be looking for input (Jim Densham and Clifton Bain, both RSPB, are on this group).

Options exist to set percentage requirements for recycle under the Climate Change Scotland Act 2009, which could be used to phase out demand for peat for compost. Also, if introduced, a 'sunset clause' would mean that all companies with consents lying dormant would need to re-activate them through the planning process (through the existing statutory ROMP review process) or abandon the consents permanently.

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<sup>4</sup> <http://www.gov.scot/Topics/farmingrural/SRDP/RuralPriorities/Options/LowlandRaisedBogs>

<sup>5</sup> <http://www.gov.scot/Resource/0053/00532096.pdf>

<sup>6</sup> [http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/Summary%20of%20ROMP%20review%20findings\\_EG.pdf](http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/Summary%20of%20ROMP%20review%20findings_EG.pdf)

<sup>7</sup> as per UK targets introduced in 2011 and repeated in UK 25yr plan  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/693158/25-year-environment-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf)

### **Interest to LINK members**

Of general interest to a range of members especially RSPB, SWT, Plantlife

### **Suitability as, and added value of, a CEFF focus**

Background work done on this by members, and LINK campaign could add weight and help take forward. We would need to establish that the peat substitutes are sustainable and, ideally, making better use of by-products to chime with CE thinking and our 'fairer footprint' aim.

## **6.5 Utilisation of waste from habitat generation and restoration work**

### **Scale of the issue and environmental gains of a more circular approach**

Many habitats managed for the purpose of nature conservation are dynamic systems and maintaining them as such places a huge demand on resources and typically produces high yields of harvested material that is currently surplus. Conservation land management commonly involves removing unwanted vegetation by cutting. In many situations, there is no commercial market for this cut vegetation (for example, rushes *Juncus* spp, and reeds *Phragmites australis* which are unsuitable for thatching), meaning that the inability to dispose of this material can limit the amount of vegetation cut, and therefore limit the ability to achieve conservation targets. However, this cut material has the potential to generate an income through the production and sale of bioenergy products. Conversion of otherwise unwanted biomass to bioenergy products also has the benefit of reducing fossil fuel use.

The Department of Energy and Climate Change (DECC) funded the Wetland Biomass to Bioenergy Project. Through this project a number of end-to-end processes were developed, from harvesting of the unwanted material to its final, marketable bioenergy product<sup>8</sup>.

RSPB has trialed this on a few reserves, producing sustainable briquettes (for renewable heat generation) from the biomass. Briquettes are being sold in the Loch Leven shop<sup>9</sup>.

### **Interest in Government and relevant legislation, policy or targets**

In line with *Making Things Last* and climate change ambitions

### **Of interest to LINK members and groups**

Of interest to members with reserves

### **Suitability as, and added value of, CEFF focus**

Need to find out if any post DECC project plans to take this forward. Also would need to know the potential scale and the costs / returns of the trials.

## **6.6 Aquaculture**

LINK aquaculture sub-group are going to discuss at their next meeting. They are not currently engaged in any aspect that particularly relates to circularity.

## **7. Technical cycle**

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<sup>8</sup> [https://ecosystemsknowledge.net/sites/default/files/wp-content/uploads/DECC%20Biomass%20to%20Bioenergy%20End%20User%20Report\\_0.pdf](https://ecosystemsknowledge.net/sites/default/files/wp-content/uploads/DECC%20Biomass%20to%20Bioenergy%20End%20User%20Report_0.pdf)

<sup>9</sup> <http://ww2.rspb.org.uk/our-work/rspb-news/news/385125-fuelling-a-recycling-revolution>

In the technical cycle, circular economy technologies and business models aim to maximise the value extracted from finite stocks of technical assets and materials, and thereby address much of the structural waste in industrial sectors.

### **7.1 Deposit return / Extended Producer Responsibility (EPR)**

#### **Scale of issue and environmental gains of a more circular approach**

The quantity of plastic which is currently not re-cycled is a huge issue – currently X% of plastic is recycled in the UK. The goal is for all producers to be held 100% responsible for the return and recycling of all packaging and single use items. Campaigning to reform EPR replaces campaigns on individual items such as coffee cups, cutlery or straws, important though these are.

Producer Responsibility is fairly complex with different models, such as Deposit Return or Packaging Recycling Obligations (PRO). In the UK, PROs apply to all companies with sufficiently high turnover who handle a certain amount of packaging each year, and requires companies to demonstrate that they have recycled a proportion of that packaging. Companies comply by buying packaging recovery notes (PRN) from reprocessing companies in the UK, or from companies exporting waste for recycling abroad.

#### **Interest in Government and relevant legislation, policy or targets**

Scottish Government have an expert panel to look into environmental charging measures; the Climate Change Act (2009) is being updated; there is a manifesto commitment to a Circular Economy Bill; as well as deposit return being likely to be implemented by 2019.

At Westminster there is a Treasury Consultation into taxation of single use plastics, as well as a National Audit Office review of existing (flawed) PRN systems. At the suggestion of the UK Parliament's Environmental Audit Committee, the National Audit Office is currently carrying out a review to assess the effectiveness of the PRN scheme, including whether Government has had good oversight of the scheme's performance against its objectives, and whether government has taken a robust approach to preventing fraud and non-compliance - the suspicion being that neither of these are in fact the case.

The National Audit Office report is due out this summer. If, as suspected, it recommends tightening up the PRN system, there will be a need for campaigners to back this against powerful vested interests.

#### **Of interest to LINK members and groups**

APRS are in discussion with the Campaign to Protect Rural England, Greenpeace, Keep Britain Tidy and Surfers Against Sewage about how to further work together on how to tackle litter and move towards a more circular economy in terms of packaging and other single use items.

#### **Suitability as and added value of CEFF focus**

If APRS decide to focus their next campaign on EPR reform, there may not be great added value in LINK also focusing on this in too much detail.

### **7.2 Marine litter / single use plastics (WAITING TO HEAR FROM MCS ON THIS)**

#### **Scale of issue and environmental gains of a more circular approach**

#### **Interest in Government and relevant legislation, policy or targets**

## Of interest to LINK members and groups

### Suitability as and added value of CEFF focus

#### 7.3 Windfarm repowering

##### Scale of issue and how a more circular approach would help

Windfarms are typically thought to have a 25yr life span, after which their planning permission lapses. At this time, many of the windfarms will be 'repowered', which is likely to involve an upgrade to bigger and more efficient turbines. SEPA briefing<sup>10</sup> on this highlights CE principles, how, if possible the same bases should be used and any removed components should be kept in as high a value use as possible. The quantity of materials will be very large (figures?) and if CE principles followed, impact could be large. However, The blades are difficult to recycle: *'A short time ago, Finland's very first wind power turbines were dismantled after nearly 30 years in service. Much of the material is easy to recycle – it's mostly steel. But the blades, the largest up to 90 meters long and close to 10 tonnes in weight, are made with thermoset FRPs that have so far been considered unrecyclable.'*

*Together with the 28 Ecobulk partners, the possibilities of re-using and recycling bulky composite products are being explored in the construction, automotive and furniture industries. Markku Vilkki, CEO of Conenor and demonstration manager for the H2020 project, [Ecobulk](#), wants to demonstrate that it is not only possible, but also profitable<sup>11</sup>.*

### Interest in Government and relevant legislation, policy or targets

## Of interest to LINK members and groups

Of general interest, but not central to any members or groups.

### Suitability as and added value of CEFF focus

Project would need either a technical solution to promote or to advocate for research to make sure a technical solution is found to the issue of recovering value from the blades.

#### 7.4 Decommissioning

##### Scale of issue and environmental gains of a more circular approach

North Sea oil and gas (O&G) decommissioning represents a unique challenge and economic opportunity for Scotland. From 2016-2040, close to 7,800 oil and gas wells are expected to be plugged and retired, and 398 platform structures removed (289 from the UK continental shelf). The cost of decommissioning is estimated at >£50 billion, at least half of which is slated to come from public funds, and could involve the on-shoring of some 5.4 million tonnes of material. However, there remains much uncertainty about the future of North Sea decommissioning (NSD), from the environmental and economic opportunities for Scotland, through the quantity, quality and utility of materials, to the ultimate cost to the public purse. At present, NSD activity achieves average recycling rates above 95%, thanks largely to the high steel composition of retired assets, with the remaining material reused (3%) or sent to incineration or landfill (2%). However, this recycling entails cutting-up the steel platforms into small segments, and shipping abroad (to Turkey, India

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<sup>10</sup> <https://www.sepa.org.uk/media/219689/sepa-guidance-regarding-life-extension-and-decommissioning-of-onshore-windfarms.pdf>

<sup>11</sup> <https://waste-management-world.com/a/european-circular-economy-project-researches-wind-turbine-blade-recycling>

etc.) to be melted down as scrap metal, with these mostly high-grade materials being lost from the Scottish economy.

The O&G sector's heavy reliance on downcycling into scrap metal wastes significant carbon, energy and economic value embodied in decommissioned materials and equipment.

There have been very few examples of decommissioning projects going beyond basic scrappage towards greater reuse/repurposing, despite interest from many 3rd-party companies in Scotland. Veolia is one of the few examples where a profit-sharing agreement has been used to incentivise higher-value reuse and refurbishment routes for materials and components.

Many O&G operators are reluctant to explore circular economy solutions due to the perceived 'liability' of reuse and repurposing, and the lack of clear reputational incentive to go beyond the 95% recycling rate. Moreover, in the absence of established best-practices, the potential financial benefits of higher-value decommissioning are considered 'not-worth-the-risk' when disposal via scrappage is fast and adds relatively little to the lifetime costs of O&G operations. Under these conditions, much of the embedded value of decommissioned O&G infrastructure in the North Sea will continue to be wasted.

#### **Interest in Government and relevant legislation, policy or targets**

There should be interest in Government in keeping the materials in high value uses as it is in line with CE Strategy, where energy infrastructure is one of the priority areas. Interest from industry would be based on reputation and best practice.

#### **Of interest to LINK members and groups**

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#### **Suitability as and added value of CEFF focus**

Significant work has been done on this by Zero Waste Scotland and they are keen for it to be taken forward. As such, LINK could add value. It aligns closely with 'fairer footprint', as if redeployed in Scotland, the decommissioned infrastructure would displace raw materials and also represent saving in energy.

## **8 Other**

### **8.1 Synergies with landscape scale conservation and rewilding which have been shown to generate local, small nature-based economic activities**

Scale of the issue and environmental gains of a more circular approach

Many estates base their businesses on an old model of traditional deer estates and/or massive investment from the landowners. A different model could see more sustainable livelihoods built around using the resources of the land better and economic activity centred on nature based tourism. This model is compatible with landscape scale conservation and re-wilding.

*Socio-economic benefits of rewilding the Highlands<sup>12</sup>*, outlines the type of enterprise and scope of economic activity compatible with re-wilding, noting that potential is considerable. There is no analysis of the circularity of these enterprises, although there is an assumption that they are

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<sup>12</sup> Birnie, N. and Barnard, F. (2016) Rewilding Britain: Socio-Economic benefits of Rewilding in the Highlands of Scotland.



'sustainable' as they generally rely on wildlife and/or high quality natural environment in their surroundings.

#### **Interest in Government and relevant legislation, policy or targets**

There is no evidence of significant SG interest in this specifically, but it would support both the land reform agenda and the concept of re-peopling the Highlands and other remote rural areas.

#### **Interest to LINK members**

Relates to LINK work on land use and deer management

#### **Suitability as and added value of CEFF focus**

There is very little background information on which to build, which the project would need to undertake/commission and as a project focus it is currently rather vague.

### **8.2 Promoting natural solutions to reduce the use of finite materials.**

#### **Scale of the issue and environmental gains of a more circular approach**

Natural solutions have a range of applications and the scale of opportunity is huge. There are many different strands, for example:

- Mitigation of urban heat island effect
- Slowing surface run-off from impermeable urban areas e.g. by de-paving
- Reducing pollutants – e.g. Suds ponds collecting industrial waste or pollution from roads, trees reducing pollutants in the air, reed beds filtering pollutants.
- Reducing peak flood events by slowing water flow over a landscape (urban or rural)

In many examples, the 'natural solution' replaces the use of concrete. Flood control infrastructure uses vast quantities of concrete (EXAMPLES, HOW MUCH?). Structural concrete typically contains 14% cement. The cement industry is one of the primary producers of CO<sub>2</sub>, creating up to 5% of worldwide manmade emissions with a carbon intensity of 410kg/m<sup>3</sup>.

#### **Interest in Government and relevant legislation, policy or targets**

Relevant to Climate Change targets and to adaptation. In referring to the new Climate Adaptation Programme, due 2019: *The new Programme should promote co-benefits across wider policy objectives (economic growth, social justice, health and wellbeing etc.) and integrate adaptation into wider policy objective-setting and delivery*<sup>13</sup>.

#### **Interest to LINK members**

Indirectly worked on by LINK Planning, Wildlife, and Food and Farming groups.

#### **Suitability as and added value of a CEFF focus**

Background work needed. Value in LINK highlighting the benefit in terms of not requiring as much hard grey infrastructure (and resultant reduction in resource consumption)

## **9 Discussion**

### **In summary**

CEFF should be mindful of and use connections, where appropriate, to the relevance / importance of CE measures to:

- Sustainable Development Goal 12

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<sup>13</sup> <http://www.gov.scot/Resource/0053/00535998.pdf>



- Climate change ambitions
- Enhancing natural capital

Areas potentially suited to a project focus:

- Nitrogen budget – background work done, expertise within LINK.
- Utilisation of farm waste – would need to choose one form of waste or a case study farm, and do background work as first stage.
- Integrated Pest Management - expertise in LINK, might be seen as tangential to what many consider CE.
- Peat – background work done, expertise within LINK
- Utilisation of by-products from habitat management – (have reports to read. Will comment verbally in meeting).
- Extended Producer Responsibility – sense is that this already has considerable weight behind it.
- Windfarm repowering – understanding that current barrier is technical, so not suitable for project focus.
- Decommissioning – background work done and expertise available. Would LINK members be happy to promote reuse for carbon capture and storage?
- Rewilding and nature based SMEs – lack of relevant targets or levers and too general for focus(?)
- Natural infrastructure solutions – would need to focus on one area and do background work as first stage.

Other things to consider:

Project funders are interested in Just Transition and Grants Officer mentioned that trustees would be interested in decommissioning. Some of the biological cycle examples (Integrated Pest Management, rewilding and nature based tourism, ..... ) might be seen as a bit tangential to what many perceive as CE.

There should be synergy between the area chosen and the other strands of CEFF work. One strand will be advocacy around using the material footprint as a key indicator. Another strand could potentially be around increasing demand.

## Paper 5: RESEARCH AND DEVELOPMENT FUNDING FOR THE CE

### A Circular Economy for a Fairer Footprint Scoping Phase paper August 2018

This short paper attempts to cast some light on the investment situation regarding the circular economy. Both the scale of investment it is receiving and some of the underlying causes that might be contributing to low levels of investment are discussed.

#### Research and development funding

- The European economic strategy ([Europe 2020 Strategy](#)) includes a target for 3% of the EU's GDP to be spent on R&D. The [UK Industrial Strategy](#) calls for 2.4% of GDP to be invested in R & D by 2027.
- The current level of investment in the UK is 1.7% of GDP, compared to 2.8% in the USA and 2.9% in Germany.
- In Scotland, the [Scottish Economic Strategy](#) talks about increasing research & innovation and the National Performance Framework includes an [indicator](#) on increasing research and development funding. In 2016, Scotland spent 1.54% of GDP on R & D, compared to an EU average of 1.94%<sup>14</sup>.

Gross Expenditure on Research and Development (GERD), is made up of spend by the business sector (BERD), by higher education (HERD), by Government (GovERD) and by the private non-profit sector (PNP). Scotland's overall expenditure on R & D increased in real terms from 2015 – 2016 and, for the first time, spend from the business sector – BERD was higher than that from higher education. Despite this, compared to other parts of the UK and OECD countries, Scotland has a low business R % D spend, which results in its low ranking in overall R & D funding (GERD).

#### How much is spent on the CE

Spending across the UK Research Councils on CE related R & D amounted to £200m in 2015<sup>15</sup>, representing an estimated annual spend of approximately £70m, or approximately 2.3% of their overall budget.

Zero Waste Scotland is investing £18M in SMEs, supported by the European Structural & Investment Funds in Scotland<sup>16</sup>.

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<sup>14</sup> <https://www.gov.scot/Resource/0053/00533549.pdf>

<sup>15</sup> <https://epsrc.ukri.org/files/funding/calls/2015/circulareconomypositionstatement/>

<sup>16</sup> <https://www.zerowastescotland.org.uk/circular-economy/investment-fund>

The European Commission allocated €1Bn to circular economy innovations out of its €30Bn Research and Innovation funding programme Horizon 2020 during 2018 – 2020, representing 3% of the budget<sup>17</sup>.

The European Investment Bank invested €14.5 billion over two years (2014 – 2016) in the circular economy, representing less than 10% of overall investment<sup>18</sup>.

The European Fund for Strategic Investments (EFSI) is an initiative to help overcome the current investment gap in the EU. Jointly launched by the EIB Group and the European Commission, it aims to mobilise private investment in projects which are strategically important for the EU. EFSI earmarked a potential euro 315 billion, 2016 – 2019, for circular economy projects<sup>19</sup>.

Based on the above, the UK public research spend appears to be allocating about 2.3% of an already low budget to anything on the circular economy, and Europe allocates about 3%.

### **Some reasons why investment in the circular economy is low**

Ellen Macarthur Foundation have produced a useful report [\*Achieving Growth within: A €320 billion circular economy investment opportunity available to Europe up to 2025\*](#) which notes a significant shortfall in investment, explores why that might be, and recommends investment in 10 key areas of the economy. It focuses on Europe. The following sections are taken directly from this report.

The report states that one of the main barriers to fulfilling the potential opportunities offered by shifting to a circular economy is the lack of investment. The circular economy has not yet become a mainstream investment area for the private sector, leaving the transition lacking in funds and therefore risking the realisation of its full benefits. Industrial investment in Europe as a share of GDP is still below levels seen before the financial crisis and returns on capital are also comparatively low. There is however cash available, with approximately 40% more cash held on corporate balance sheets across the 75 largest EU corporates in 2016 than in 2010.

The low investment levels significantly hamper the EU's industrial innovation and renewal and circular economy investments offer multiple benefits:

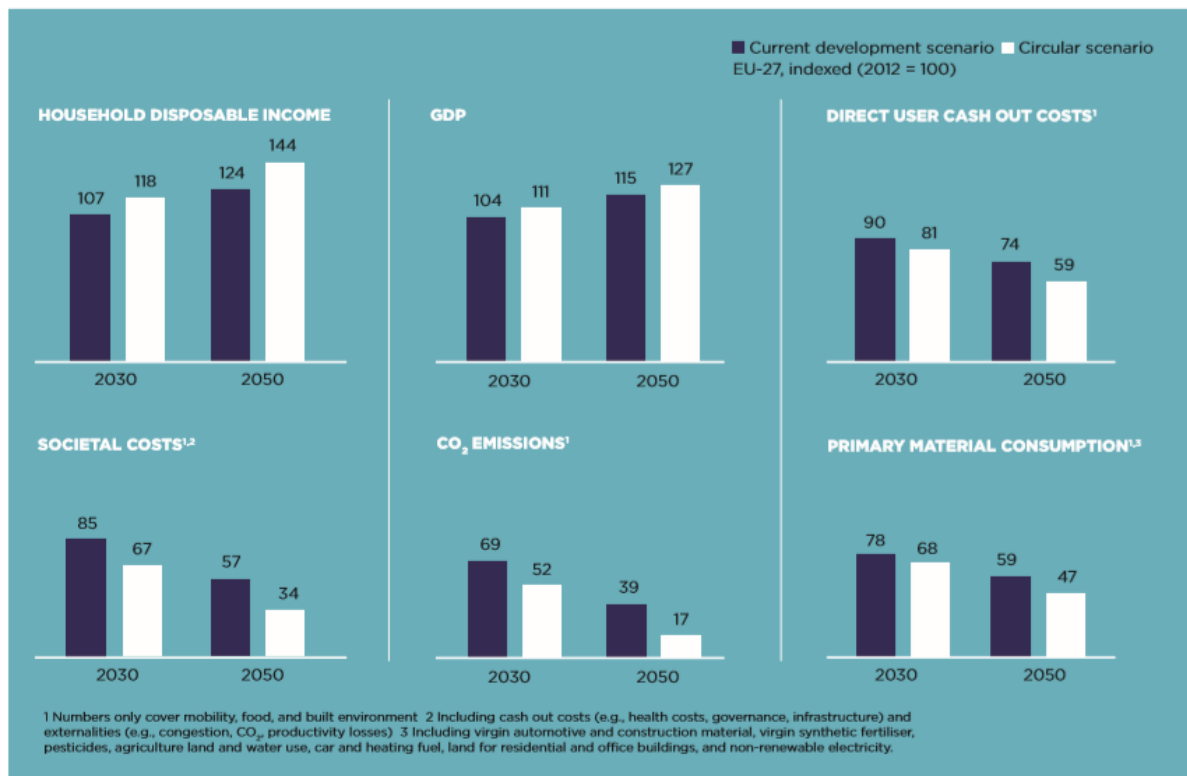
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<sup>17</sup> <https://ciwm-journal.co.uk/commission-earmarks-e1-billion-for-circular-economy-research/>

<sup>18</sup> <https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Achieving-Growth-Within-20-01-17.pdf>

<sup>19</sup> <https://aer.eu/closing-loop-funding-opportunities-circular-economy-projects/>

FIGURE 3 **BENEFITS OF MOVING TOWARD A CIRCULAR ECONOMY ACCORDING TO 'GROWTH WITHIN'**



There are however niches related to the circular economy that enjoy rapid growth in investments, such as R&D for electric vehicles and autonomous cars or space sharing start-ups. However, the majority of circular opportunities, including car remanufacturing, car sharing, anaerobic digestion (AD), organic farming, and building materials reuse, still only constitute <10% of their respective markets, with conventional linear investment making up the remaining 90% to 100%. Waste management, the most 'traditional' circular investment area for which public statistics are available, has seen flat investment levels between 2009 and 2013. Some of the smaller circular opportunities (e.g. sharing of cars and houses) are growing rapidly, and there are also numerous policy successes that could well lead to additional investments (for example, the creation of an organic fertiliser market), but these are exceptions to a general pattern of underinvestment.

The report finds that, in many cases, the key reasons for underinvestment seem to be:

- an uncertainty about if and when transition will come – although buying in to the attractiveness of a circular end state for their value chains, and for the economy at large, many companies still feel uncertain about if and when the transition will happen. Unlike for clean energy, the race is not seen to be on. This uncertainty is amplified by the raw materials bust – World Bank's non-energy commodity index increased on average by 7% per annum 2000 – 06 and to 13% per annum during the 2009 – 11 resource boom, but has since decreased by 8% per annum to 2015; reducing the perceived urgency of the overall transition.

- a set of policy barriers – there are complex policies that increase (real or perceived) complexity and cost.
- Transition costs – typically, ramping up circular business models is different from ramping up a linear business model in that it is not simply a matter of launching a new product or using a new technology to improve efficiency, but rather nearly always necessitates redefining roles along the value chain, for suppliers as well as customers. For example, remanufacture requires securing sufficient supply of end-of-life material at predictable volumes and quality on the one hand, as well as finding customers willing to purchase the remanufactured parts or material.
- A lack of awareness about circular opportunities and their benefits among company executives who have been raised in a linear economy. Examples include 54% of UK car repair shops not having heard of remanufacturing, many farmers not knowing in detail what the benefits are of shifting to more regenerative practices, and the building constructive market generally being conservative with regard to moving to innovative business models.

The lack of underlying profitability is an issue only in some cases, and therefore does not seem to be the primary barrier.

The report makes a point that circular economic investment offer resilience and transformation of those assets that might otherwise face being stranded or becoming redundant. Powerful technology and market trends are underway with the potential to create unprecedented stranded assets across Europe – the shift from a linear to circular industrial model will entail major shifts in the demand for different types of goods, shifts in value creation and hence changes in asset value. Two factors drive the risk of assets and companies being stranded:

- Volume-based businesses risking negative growth and a disproportionate negative impact on profitability.
- businesses not carrying their environmental costs. A mapping of major environmental externalities globally estimated that unpriced environmental damages amounted to 13% of global GDP in 2009<sup>20</sup>. This is particularly the case for resource extraction and primary processing industries. With raising awareness and transparency of these damages, customers, regulators and investors will increase pressure on these companies to act, and the stranded asset risk will rise. An increasing number of executives take externalities into account when defining their strategy.

Four principles of ‘circular economy compliant’ investment have been developed and are presented in this report. Adopting these or similar principles would provide investors with a more thematic approach to investing not offered by ‘modern portfolio theory’ which is often used to identify a diversified investment portfolio, but typically overlooks risks that run across seemingly uncorrelated assets.

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<sup>20</sup> TEEB/Trucost, Natural Capital at risk – the top 100 Externalities in Business, 2013

- Avoid companies that have a low utilisation rate of valuable assets;
- Avoid companies where unpriced environmental damage is large compared to current profitability;
- Avoid companies generating large amounts of waste;
- Avoid companies without a clear roadmap to circularity.

The report identifies 10 attractive circular innovation and investment themes which could be unlocked with modest intervention to take off at scale which fall into the mobility, food and built environment sectors. The value chains in these sectors represent 60% of consumer spending and 80% of resource use. The 10 themes were selected based on:

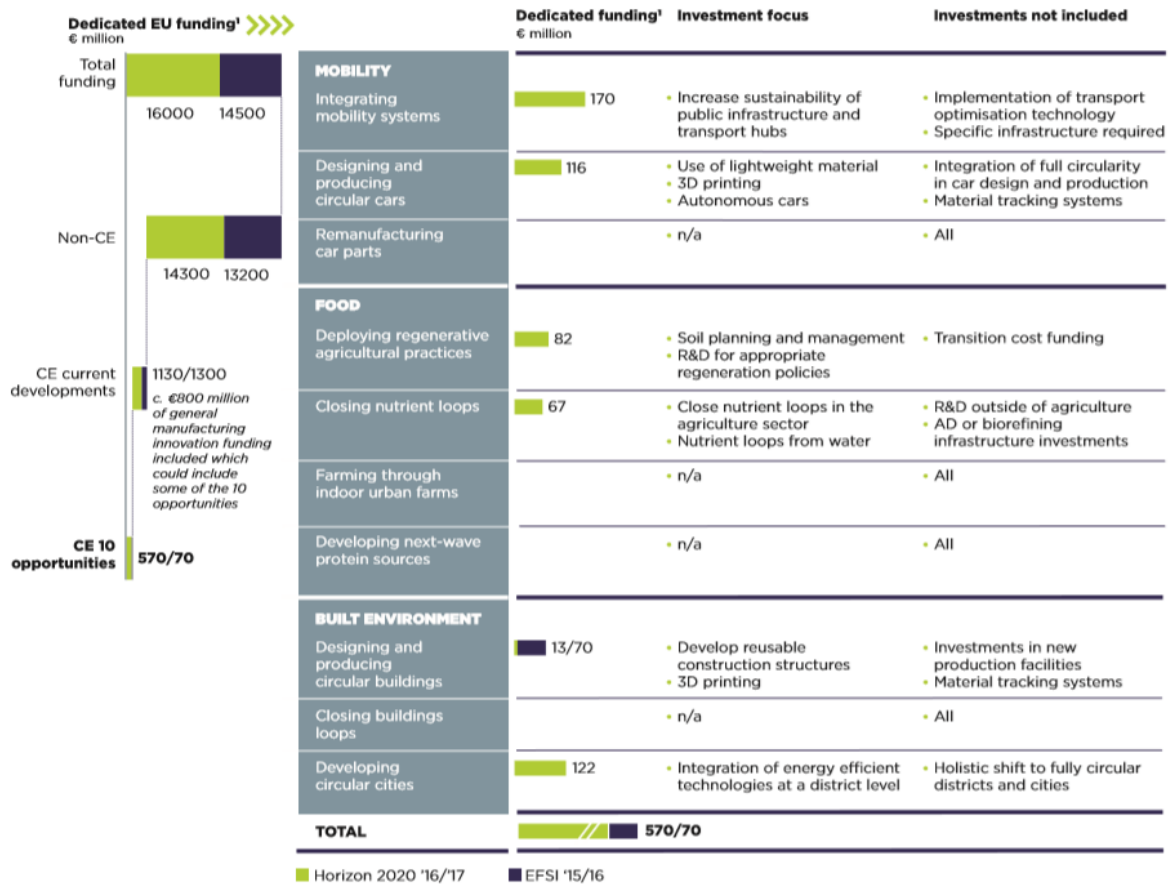
- Developing a set of well-defined innovation and investment areas within each of the three sectors;
- Determining those that could be unlocked through 'modest policy or industry interventions' (as opposed to those that will happen anyway and those that are harder to achieve)

FIGURE 6 DESCRIPTION OF NEXT-WAVE CIRCULAR ECONOMY INVESTMENT THEMES

		DESCRIPTION	CASE EXAMPLES	INVESTMENTS UP TO 2025 <sup>1</sup> € BILLION	CROSS-CUTTING OPPORTUNITIES	
MOBILITY	Integrating mobility systems	Fully integrate the public transport system with shared vehicles		100	DIGITAL INNOVATIONS (IOT, APPLICATIONS, ANALYTICS)	
	Designing and producing circular cars	Design and produce zero-emission cars made for looping with durable materials		35		
	Remanufacturing car parts	Rollout remanufacturing of car parts at scale		1		
FOOD	Deploying regenerative agricultural practices	Shifting towards an agricultural system that regenerates the soil and revitalises ecosystems		15		MATERIAL TRACKING SYSTEM THROUGH SECONDARY MATERIAL MARKET
	Closing nutrient loops	Scaling nutrient and energy recovery from various waste streams using anaerobic digestion or biorefineries		10		
	Farming through indoor urban farms	Scaling hydroponic, aquaponic, and aeroponic farms in urban areas		45		
	Developing next-wave protein sources	Develop new and efficient sources of protein from vegetables, bacteria, algae or insects		2		
BUILT ENVIRONMENT	Designing and producing circular building	Design and produce multi-use highly modular and energy positive buildings made of durable non-toxic materials		105		
	Closing building loops	Ramp up recycling and re-manufacturing of building materials		2		
	Developing circular cities	Integrate circularity into urban developments through innovative business models		10		

<sup>1</sup> Total investments by system and across systems have been rounded to nearest €5 billion throughout the report. Source: SYSTEMIQ.

FIGURE 15 EUROPEAN COMMISSION FUNDING TOWARDS 10 INVESTMENT THEMES



<sup>1</sup> Horizon 2020 budget for '16/'17 and EFSI funding spent to date for the part of the fund managed by the EIB. Sources: EIB; European Commission Horizon 2020 website; SYSTEMIQ.

The report also makes recommendations for policy makers to:

- Set direction and show commitment. A lack of clarity results in too many investors taking a 'wait and see' approach. Providing direction is a crucial policy task, be it through targets, strategies, public investments, consistent international trade agreements or industry convening.
- Removing policy barriers, such as unintended consequences of regulations, for example, those governing how proteins from sources transforming agricultural by-products or food waste may be used.
- Creating platforms for dialogue, cooperation and awareness raising.
- Focus public procurement, public circular economy investments, and existing subsidy regimes towards the ten themes.



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