

Resource efficiency and circular economy in Europe – even more from less

An overview of policies, approaches and targets of the United
Kingdom in 2018

July 2019



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Acknowledgements

This country profile is based on information reported by the Eionet network and, in particular, the National Reference Centres on Resource Efficiency and Circular Economy. The information is current as of March 2019, when members of Eionet verified the content of this profile.



This country profile was prepared as part of the 2019 EEA review of material resource efficiency, circular economy and raw material supply policies, which aimed to collect, analyse, and disseminate information about experience with the development and implementation of these policies in EEA member and cooperating countries.

At the time of writing, a summary report is being finalised. The report reflects on trends, similarities and differences in policy responses, showcases selected policy initiatives from member countries and identifies possible considerations for the development of future policies.

These country profiles were compiled and finalised by members from the European Topic Centre on Waste and Materials in a Green Economy, namely Bart Ullstein, Bettina Bahn-Walkowiak, Jeroen Gillabel, Margareta Wahlström, Jutta-Laine Ylijoki, Dirk Nelen, Theo Geerken, Veronique Van Hoof and Evelien Dils. The responsible EEA project managers for the work were Pawel Kazmierczyk and Daniel Montalvo.

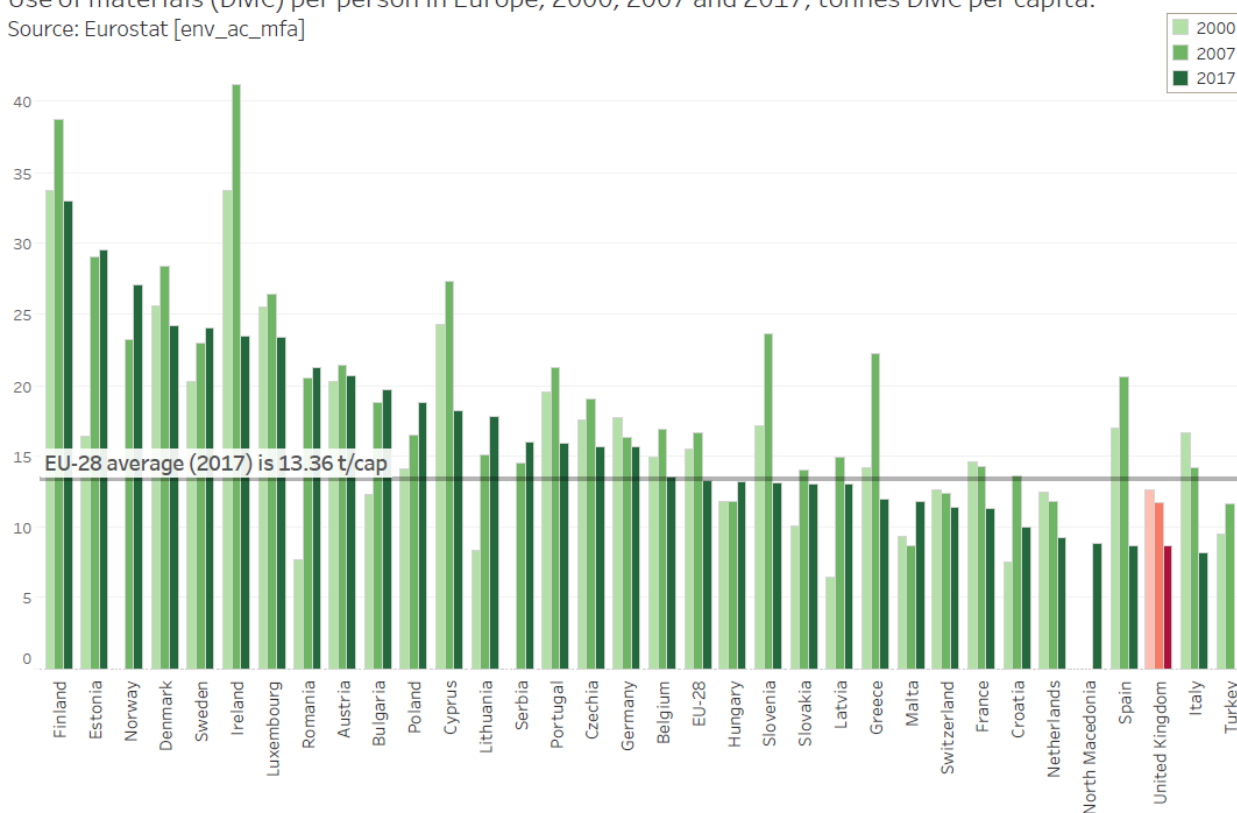
United Kingdom, facts and figures

Note: data in this section was sourced from Eurostat databases (April 2019), except where noted otherwise

	<p>GDP: EUR 2,338 billion (14.7 % of total EU28 in 2017)</p> <p>Per capita GDP: EUR 35,400 (purchasing power standard) (117.9 % of EU28 average per capita figure in 2017)</p> <p>Use of materials (domestic material consumption (DMC)) 575.7 million tonnes DMC (8.4 % of EU28 total in 2017) 8.7 tonnes DMC/capita (65.2 % of EU28 average per person in 2017)</p> <p>Structure of the economy: agriculture: 0.7 % industry: 20.1 % services: 79.2 %</p> <p>Surface area: 248.5 thousand square kilometres (km²) (5.6 % of total EU28)</p> <p>Population: 65.8 million (12.9 % of EU28 total in 2017)</p>
	

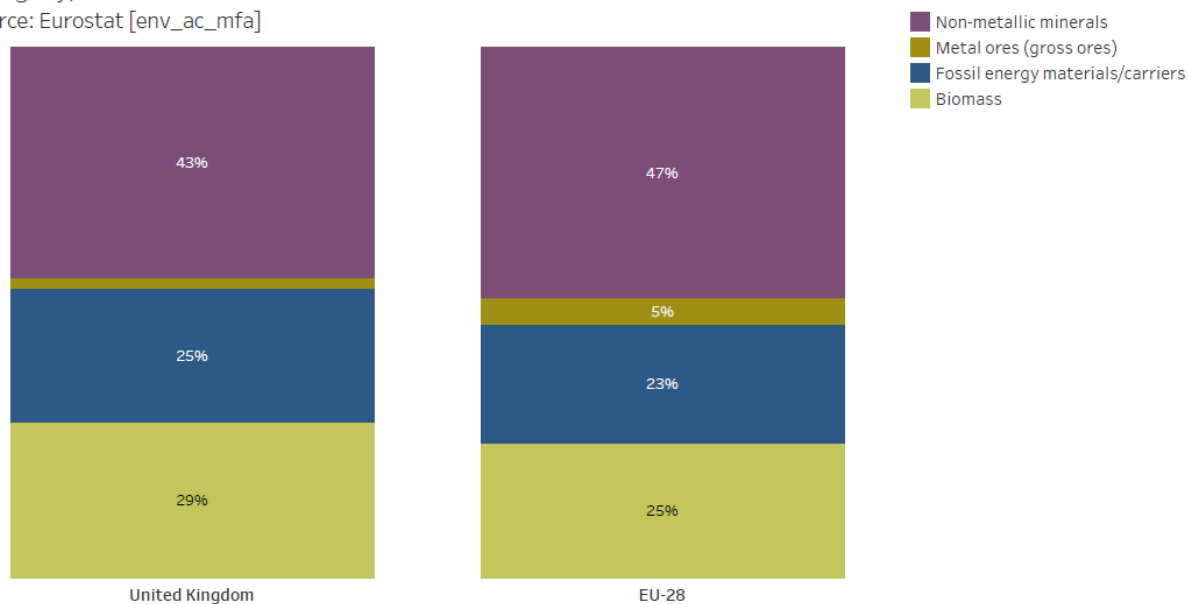
Use of materials (DMC) per person in Europe, 2000, 2007 and 2017, tonnes DMC per capita.

Source: Eurostat [env_ac_mfa]



United Kingdom & EU-28. Domestic Material Consumption by material category, 2017.

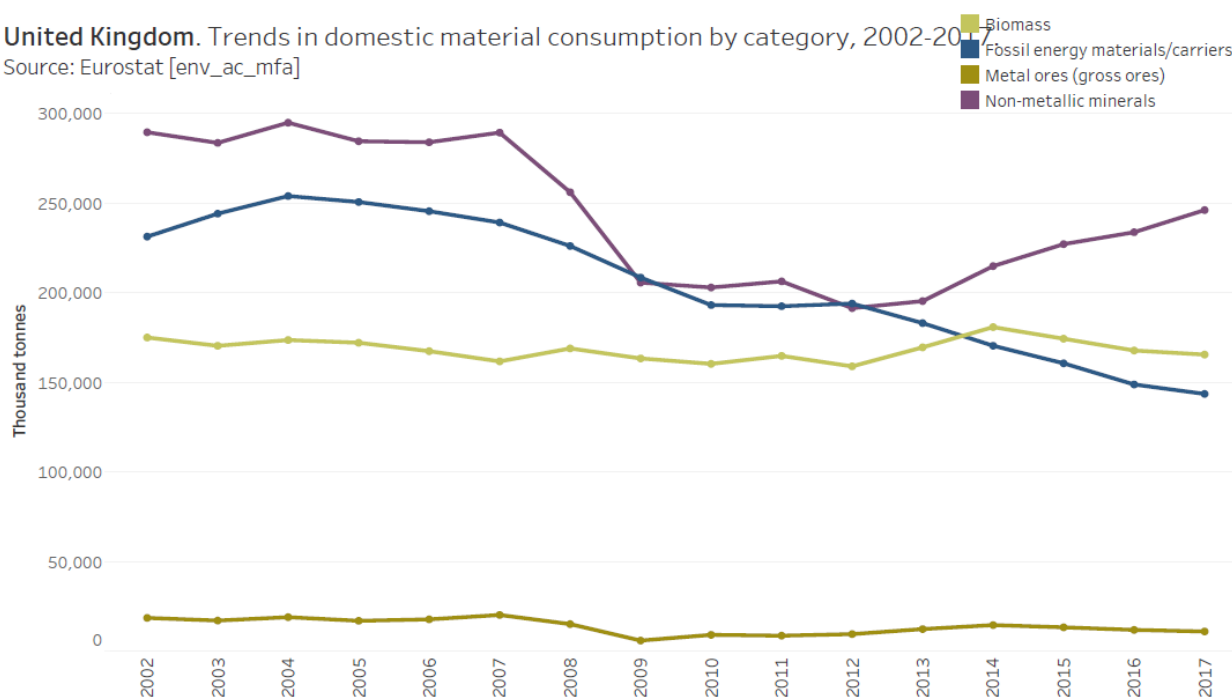
Source: Eurostat [env_ac_mfa]



Note: The domestic material consumption categories 'other products' and 'waste for final treatment and disposal' are excluded from the figure.

United Kingdom. Trends in domestic material consumption by category, 2002-2017

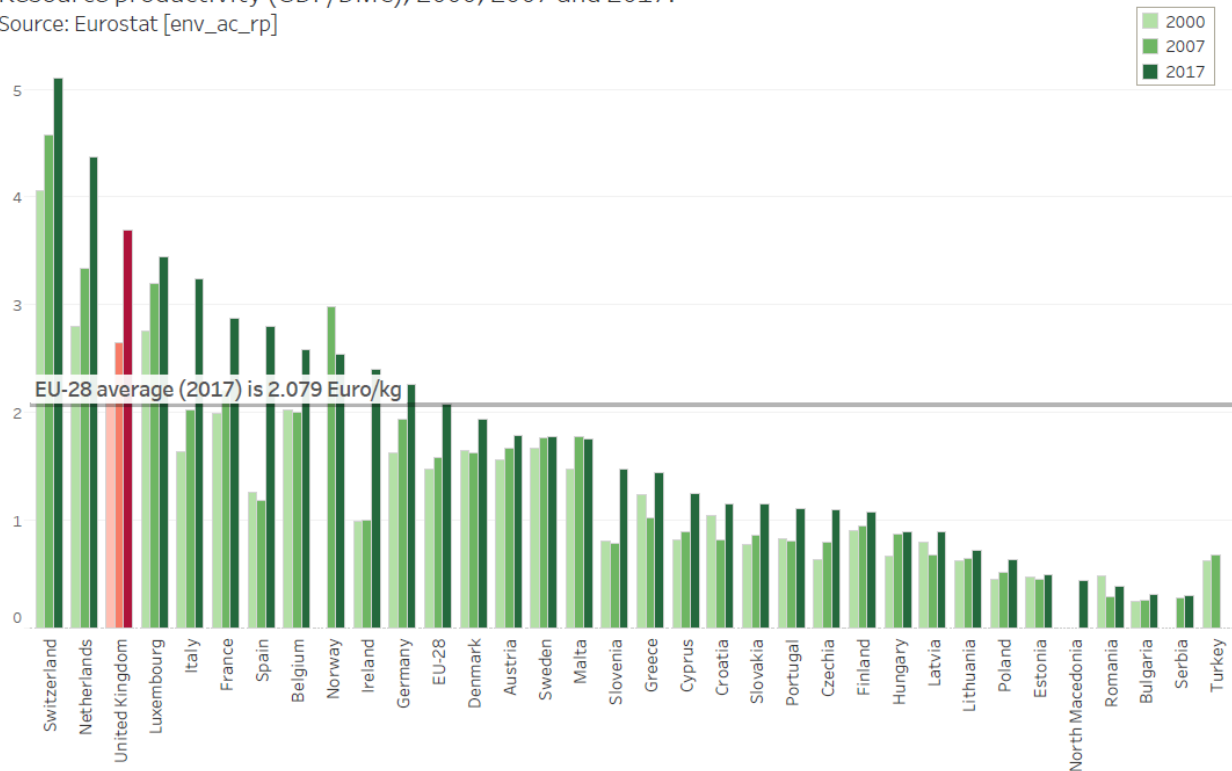
Source: Eurostat [env_ac_mfa]



Note: The domestic material consumption categories 'other products' and 'waste for final treatment and disposal' are excluded from the figure.

Resource productivity (GDP/DMC), 2000, 2007 and 2017.

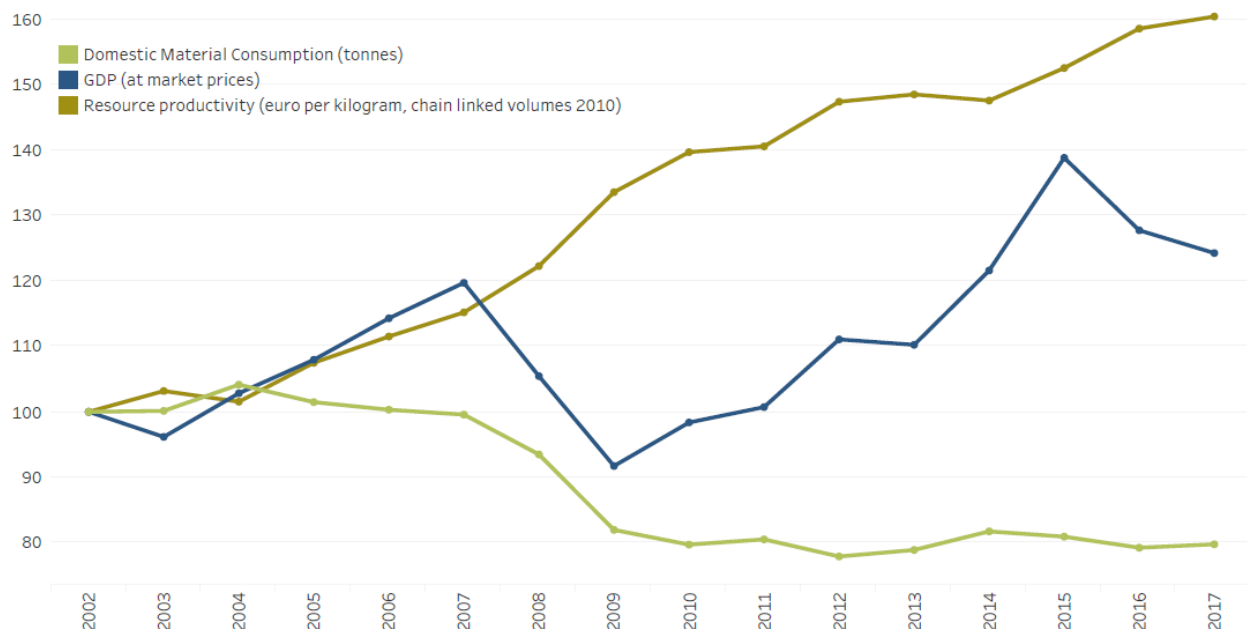
Source: Eurostat [env_ac_rp]



Note: GDP expressed in chain linked volumes 2010.

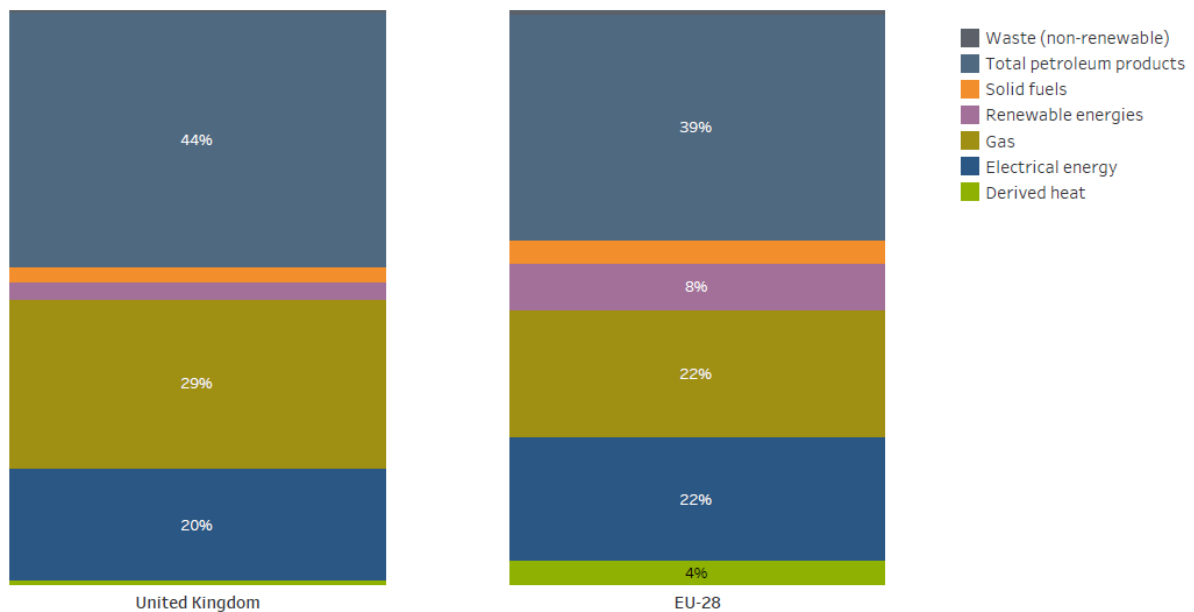
United Kingdom. GDP, DMC and resource productivity trends, 2002-2017, index 2002=100.

Source: Eurostat [env_ac_mfa], [env_ac_rp] & [nama_10_gdp]



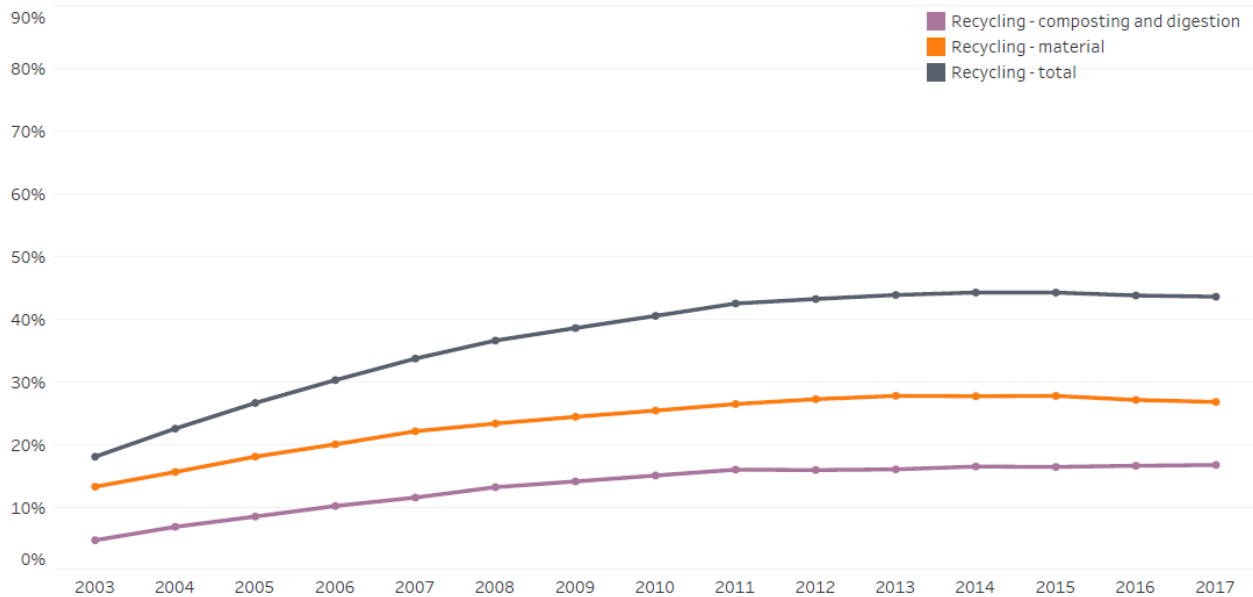
United Kingdom & EU-28. Primary energy consumption by energy product, 2016.

Source: Eurostat [nrg_100a]



United Kingdom. Recycling of municipal waste, 2003-2017, as share of total waste treatment.

Source: Eurostat [env_wasmun]



Note: The amount of municipal waste treatment is reported for the treatment operations incineration (with and without energy recovery), recycling, composting and landfilling.

Note on the governance

In the UK environmental policy, including on material resource efficiency is devolved. This means that there can be, and are, different policies for resource efficiency, waste management and a more circular economy in the different administrations. In this response we differentiate between the policies on resource efficiency by using sub-headings by UK region (England, Wales, Scotland and Northern Ireland) as appropriate. Where policies are the same or responses to the questions are the same then we use the UK heading.

Policy framework

Driving forces for material resource efficiency and circular economy

UK - England

UK

The key factors driving the development and implementation of policies related to material resource efficiency, circular economy and raw materials supply are:

1. Productivity and competitiveness;
2. Material security – securing access to raw materials;
3. Environmental concerns, including climate change.

These are the same across the UK. Further details can be found in a number of documents, including *Prevention is better than cure: The role of waste prevention in moving to a more resource efficient economy*, December 2013¹.

UK - Northern Ireland

Historically, environmental considerations have been at the forefront of governmental drivers for these developments; addressing issues increasing our ability to meeting rising recycling targets, reducing environmental impacts through reduced reliance on the extraction of raw materials, supporting initiatives to prevent serious organised waste crime, and reducing residual waste.

For example, the Northern Ireland Waste Management Strategy – Delivering Resource Efficiency² moved the emphasis of waste management in Northern Ireland from resource management to resource efficiency, with a renewed focus on waste prevention. Its aim is to use waste as a resource more efficiently and make it a key element in developing and promoting a low carbon, circular economy.

In 2017 however, economic and social drivers are receiving increasing recognition – as evidenced in the draft Industrial Strategy Consultation issued (January 2017) by Northern Ireland’s Department for Economy: ‘...a circular economy can encourage innovation, deliver job creation and improve resource efficiency and material productivity. Reducing our reliance on imported goods can help businesses to remain competitive in the global market as well as assisting efforts to tackle climate change and protect valuable ecological assets. To help develop the circular economy, the Department for the Economy will work with the Department of Agriculture, Environment and Rural Affairs (DAERA) to develop a circular economy strategy for Northern Ireland.’

¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/265022/pb14091-waste-prevention-20131211.pdf (English)

² <https://www.daera-ni.gov.uk/articles/waste-management-strategy> (English)

UK - Scotland

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

The drivers for a more resource efficient and circular economy are three fold.

Firstly, from an environmental perspective, the circular economy will reduce reliance on scarce resources, reduce waste and cut carbon emissions. The opportunities of a more circular economy are fundamental to the Scottish Government's approach to tackling emissions arising from the consumption of goods. Zero Waste Scotland³ estimates that, by 2050, a more circular economy could reduce carbon emissions by 11 million tonnes per year.

From a business perspective, a move to a more circular economy offers cost savings, improvements in productivity, market development opportunities and improved business resilience. These Circular Economy business benefits are recognised across government and are reflected within Scotland's Economic Strategy and its four priorities of: Innovation, Inclusive Growth, Internationalisation and Investment, as well as forming a key workstream within the Manufacturing Action Plan.

The third driver is the benefit to communities across Scotland, providing lower cost options for the products and services consumed in Scotland, as well as opportunities for social enterprise.

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

UK - Wales

Sustainable development has always driven Welsh Government policy, including policies for resource efficiency and waste; the Welsh Government was given a statutory duty to promote sustainable development when devolution occurred in 1999.

One Wales: One Planet, the 2009 Sustainable Development Scheme of the Welsh Government set visions for:

- 1) sustainable resource use: 'within the lifetime of a generation we want to see Wales using only its fair share of the earth's resources'; and
- 2) a sustainable economy of 'a resilient and sustainable economy for Wales that is able to develop whilst establishing, then reducing, its use of natural resources and reducing its contribution to climate change'.

In order to achieve these visions, One Wales:One Planet identified the following material efficiency actions as needing to be addressed alongside actions to reduce carbon emissions:

- have a radically different approach to waste management, moving towards becoming a zero-waste nation. By this, we mean a society where we focus on eliminating waste, and waste that cannot be eliminated must be recycled in closed loop systems that achieve the best reduction in ecological and carbon footprints. This will build on our stated goal of achieving 70 per cent recycling across all sectors and diverting waste from landfill by 2025;

³ <https://www.zerowastescotland.org.uk/CarbonImpactsOfTheCircularEconomy> and [Zero Waste Scotland](#) (English)

- have a resilient and sustainable economy that is able to develop whilst stabilising, then reducing its use of natural resources, reusing sites and buildings and reducing its contribution to climate change.

Wales now has the Well-being of Future Generations (Wales) Act 2015⁴ and its seven well-being goals as a key driver to improve the social, economic, environmental and cultural well-being of Wales. The Act compels public bodies listed in the Act (including the Welsh Government) to do their activities in a sustainable way, to maximize their contributions to the well-being goals and to take a more joined up approach by working better with people and communities and each other. Specific well-being goals relating to resource efficiency are the A Prosperous Wales goal which explicitly mentions using resource efficiently, and the Globally Responsible Wales goal which requires consideration of Wales' impact on global well-being, and implicitly its use of the world's natural resources.

Environmental drivers for a more resource efficient, circular, economy in Wales include the following laid out in the Environment (Wales) Act 2016.

- Part 1: Sustainable management of natural resources – enables Wales' resources to be managed in a more proactive, sustainable and joined-up way. It also helps to tackle the challenges we face and is focused on the opportunities our resources provide. The Natural Resources Policy (NRP) required under the Act identifies the need to reduce the over-exploitation of Wales natural resources and identifies resource efficiency and a more circular economy as a way to achieve this. The NRP published in 2017 identifies that *'increasing raw material costs, price instability and a lack of security of supply of key materials are a threat to the resilience of manufacturing in Wales. In addition, many of our industries are focused on providing raw materials that are immediately exported or undergo only minimal processing within Wales'*.
- Part 2: Climate change – provides the Welsh Ministers with powers to put in place statutory emission reduction targets, including at least an 80% reduction in emissions by 2050 and carbon budgeting, including for consumption, to support their delivery. This is vital within the context of existing UK and EU obligations and sets a clear pathway for decarbonisation. Resource efficiency and a circular economy make a contribution towards reducing both direct territorial carbon emission, and consumption-based carbon emissions.

Other economic motivators for Wales to work towards a more circular economy include two important studies on the benefits to Wales of a circular economy approach. The 2013 WRAP/Ellen MacArthur Foundation report *Wales and the Circular Economy: Favourable system conditions and economic opportunities* identifies potential savings to the Welsh economy of over GBP 2 billion by it adopting a circular economy for two specific business sectors. .

The 2015 WRAP/Green Alliance report *Employment and the circular economy: Job creation in a more resource efficient Britain* identifies the potential for up to 30,000 jobs to be created in Wales through moving towards a circular economy.

A 2013 report identified that critical raw material (CRM) issues in Wales are potentially significant for Wales' Advanced Materials and Manufacturing Sector, and may also be significant for the Energy and Environment Sector and the Welsh Government's ambition to create a sustainable low-carbon economy, particularly if price rises occur in imported finished products such as wind turbines, solar photo-voltaic (PV) cells, electric vehicles and energy efficient lighting (Light Emitting Diodes (LED)), due to the use of rare earths in their production. The report *Mapping Critical Resources for Wales 2013 – Wales Eco-Design Centre*, is available online⁵.

⁴ <https://gov.wales/topics/people-and-communities/people/future-generations-act/?lang=en> (English)

⁵ <http://pdronline.co.uk/Portfolio/mapping-critical-resources-for-wales-mcrw> (English)

UK - England

England

To date the UK has not had a dedicated resource efficiency strategy.

The government is developing a renewed strategy on resources and waste. This will set out the detail of how we will meet the ambitions for resources and waste that are set out in the Clean Growth Strategy, Industrial Strategy and the 25YEP.

The aim of the strategy will be to make us a world leader in resource efficiency and resource productivity and increase competitiveness. It will set out how we will work towards our ambitions of doubling resource productivity and zero avoidable waste by 2050, maximising the value we extract from our resources and minimising waste and the negative environmental impacts associated. The strategy will be published in 2018.

The **Waste Prevention Programme for England** which was published in December 2013 and which responds to a requirement of the EU Waste Stream Work Directive 2008/98 EC. These programmes are run separately in each of the Devolved Administrations.

The Waste Prevention Programme for England articulates the actions for government, the wider public sector, business, civil society and consumers which, together, will move us towards a more resource efficient economy.

The aim of the Programme is to improve the environment and protect human health by supporting a resource efficient economy, reducing the quantity and impact of waste produced whilst promoting sustainable economic growth. We want to encourage businesses to contribute to a more sustainable economy by building waste reduction into design, offering alternative business models and delivering new and improved products and services.

The Waste Prevention Programme for England and other related documents can be viewed online⁶.

A newsletter providing a summary of progress on some of the main actions highlighted for government in the Programme was published in December 2014⁷.

England does not currently have a national circular economy strategy. In England, more so than other UK regions, there has been a trend towards cities developing local actions to promote the circular economy. For example, in London and Peterborough. In June 2017 the London Waste and Recycling Board (LWARB) produced a Circular Economy Route Map to help direct activity, introduced programmes to help support circular businesses and the Mayor of London has incorporated circular economy into land use planning policy, whilst Peterborough has developed a app to promote sharing amongst local businesses.

London is growing fast. With the capital's population predicted to reach more than 11 million people by 2050, a more flexible and sustainable approach to products, housing, office space and critical infrastructure is crucial to London's ability to adapt and grow.

By 2036, the circular economy could provide London with net benefits of at least GBP 7 billion every year in the sectors of built environment, food, textiles, electricals and plastics, as well as 12,000 net new jobs in the areas of re-use, remanufacturing and materials innovation.

⁶ <https://www.gov.uk/government/publications/waste-prevention-programme-for-england> (English)

⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/385049/wppe-1yearon-newsletter201412.pdf (English)

The Route Map recommends actions for a wide range of stakeholders, including London's higher education, digital and community sectors as well as London's businesses, social enterprises and its thriving finance sector. Some stakeholders are already signed up to deliver actions, but LWARB is looking for others to get involved and help make London a city where circular economy businesses can flourish.

The route map⁸ is an action-orientated document, developed in partnership with London stakeholders. An economic analysis of the route map estimated that the actions within it can contribute GBP 2.8 billion towards the GBP 7 billion opportunity identified. The route map is available here at:

The Great Recovery Project: Redesigning the future

The Great Recovery Project was created in 2012 and completed in early 2017. It was funded by **Innovate UK** and the **Royal Society for the encouragement of Arts, Manufactures and Commerce**.

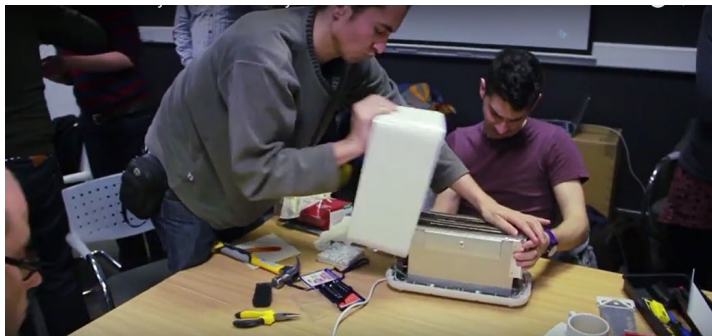


Considering the limitation of linear models, raw material prices volatility and resource depletion, the project aimed at **fostering a circular economy through product design solutions** (designing products for a longer lifespan, leasing, reusing in manufacture or for

material recover) and encouraged designers, material experts, manufacturers, brands, retailers, consumers, policy makers, investors and academics to work together.

The services that were offered included **design workshops** where participants from all industries were guided through the deconstruction process, mapping out material sources and supply chains and were encouraged to consider options for redesign and prototyping new products and services that fitted into a circular system. The Great Recovery also provided **theoretical insights** to better understanding the concept and trends of the circular economy and organised **networking and panel debate events**.

In September 2014, the Great Recovery Project opened an innovation hub at **Fab Lab London** where people from different backgrounds could learn new skills and new solutions for accelerating the transition towards a circular economy.



Extract from the video The Great Recovery Project 2015 – Our Story So Far

Key words: circular economy, product design, reuse, recovery, fab lab

Sources (including the picture):

<http://www.greatrecovery.org.uk/> ; <https://www.fablabs.io/fablablondon>

Contact: info@greatrecovery.org.uk

UK - Northern Ireland

While Northern Ireland does not currently have a dedicated resource efficiency strategy or action plan the Northern Ireland Waste Management Strategy 2013, Delivering Resource Efficiency⁹ in conjunction with The Northern Ireland Waste Prevention Programme *The Road to Zero Waste*, published in September 2014, set out to decouple economic growth from the environmental impacts associated with waste

⁸ https://circulareconomy.europa.eu/platform/sites/default/files/strategy_-_londons-ce-route-map.pdf (English)

⁹ <https://www.daera-ni.gov.uk/articles/waste-management-strategy> (English)

generation; encourage people to use resources efficiently and generate less waste; and establishes improved resource efficiency and waste prevention as an integral part of business management and project planning.

Northern Ireland intends to produce a Circular Economy strategy (see section 'Driving forces for material resource efficiency and circular economy').

UK - Scotland

Scotland's first Zero Waste Plan¹⁰ was issued in June 2010 and set out the Scottish Government's vision for a Zero Waste Society: considering waste as a resource, taking steps to minimise its production, identifying targets for recycling and avoiding landfill where possible. The Plan also committed to the development of a Waste Prevention Programme for all wastes, ensuring that prevention and reuse of waste is central to future actions and policies.

This Waste Prevention Programme was subsequently issued as Safeguarding Scotland's Resources¹¹ in 2013. The programme's aim was to make today's model of production and consumption more resource efficient, while also laying the foundations for a more circular model of resource use.

The key priorities and actions defined were:

1. helping businesses to use resources more efficiently, through:
 - a. support from Resource Efficient Scotland in material, energy and water savings;
 - b. enabling collective action in priority sectors through voluntary agreements;
 - c. establishing Resource Efficiency Pledges for businesses;
 - d. preventing construction wastes;
 - e. developing tools and information for business to help them make resource efficiency savings.
2. stimulating innovation and business opportunities in reuse, refurbishment and remanufacturing, through:
 - a. establishing an early adopter network of companies to help share good practice;
 - b. extending a loan fund to support reprocessing and remanufacturing;
 - c. harnessing public procurement to stimulate innovation;
 - d. gathering evidence on the opportunities for Scotland from a deep shift towards a more circular economy;
 - e. increasing the supply and demand for quality reusable items;
 - f. supporting the growth of refurbishment and remanufacturing businesses and investigating the viability of alternative business models/services.
3. promoting sustainable product design;
4. improving producer responsibility & reducing the impacts of packaging, through:
 - a. looking at future options for producer responsibility systems for end-of life products;
 - b. trialling innovative collection of small waste electronic a& electrical equipment to capture valuable materials and expand reuse;
 - c. evaluate the Recycle and Reward pilots of deposit return and reverse;
 - d. vending systems and examine the feasibility of a national deposit-return scheme to reduce litter and improve recycling.
5. improving information on materials, by understanding how materials move through the economy;
6. stimulating a culture of resource efficiency by influencing behaviour, through:
 - a. targeting public engagement to support the programme, and supporting teachers to equip school leavers with the relevant skills;

¹⁰ <https://www.gov.scot/policies/managing-waste/> (English)

¹¹ <https://www.gov.scot/publications/safeguarding-scotlands-resources-blueprint-more-resource-efficient-circular-economy/> (English)

- b. Continuing to promote community action to prevent waste;
- c. Requiring retailers to charge for carrier bags from October 2014 to reduce the number of bags used in Scotland – promoting reuse and reducing litter; with a voluntary agreement that net proceeds will be donated to charitable good causes, including for waste and litter prevention.

The Making Things Last, Scotland Circular Economy Strategy¹², issued in February 2016, builds on the progress that has been made under the zero waste and resource efficiency strategies outlined above, and integrates the key elements into the one strategy. Essentially, the Circular Economy strategy supersedes both documents. It identifies the priority areas for Scotland, articulating the aspirations and proposing a number of actions to progress towards those goals. It focuses on actions which make tangible progress over the short to medium term and creates the conditions for longer-term change. Section 1 outlines the ambition relating to waste prevention and resource efficiency, the key priorities being:

1. working towards defined waste reduction targets;
2. introducing a new Scottish food waste reduction target (33% by 2025), putting Scotland on a path to deliver the UN Sustainable Development Goal 12 target related to food waste;
3. influencing UK wide voluntary agreements with key business sectors, such as the Courtauld Commitment, to ensure that they deliver for Scotland, in particular in relation to food waste;
4. working with a variety of stakeholders to identify a package of actions to deliver food waste reductions;
5. supporting small and medium-sized enterprises (SMEs) through Resource Efficient Scotland to prevent food waste and adapt to the new 5 kilogram (kg) threshold for separate food waste collections which came into force in January 2016;
6. investigating the potential to develop supporting indicators to assess progress on the food waste reduction target:
 - a. carbon savings from solid and liquid waste;
 - b. reduction in tonnes of on-farm losses of edible produce; and
 - c. financial savings.
7. working with the construction sector to ensure building designs consider waste reduction in both new build and refurbishment, while also enabling more reuse and recycling at end of life;
8. supporting SMEs to deliver building projects with the potential to deliver significant impact that can be scaled up and repeated;
9. delivering change in the construction sector in collaboration with the Construction Scotland Innovation Centre and other partners;
10. avoiding depletion of primary aggregates and timber resources through enhanced recycling of demolition materials.

Further details of other elements of the Making Things Last Strategy are given in the next paragraphs.

The Making Things Last, Scotland Circular Economy Strategy identifies the priority areas for Scotland, articulating the aspirations and proposing a number of actions to progress towards those goals. It focuses on actions which make tangible progress over the short to medium term and creates the conditions for longer-term change.

The strategy was developed in consultation with cross-government policy teams and in partnership with Zero Waste Scotland, the Enterprise Agencies and the Scottish Environment Protection Agency. The circular approach is also reflected in Scotland's Economic Strategy¹³, a key workstream within Scotland's Manufacturing Action Plan¹⁴, and a driver of the National Plan for Industrial Biotechnology.

¹² <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/> (English)

¹³ <https://www2.gov.scot/Resource/0047/00472389.pdf> (English)

¹⁴ <https://www.gov.scot/policies/manufacturing/> (English)

Work to deliver the strategy focuses on **four priority areas** due to the resources that they use and their importance to the Scottish economy, tackling environmental and economic objectives in parallel. These are woven into the various chapters of the strategy.

- **Food and drink and the broader bio-economy:** food waste is a significant source of carbon emissions, and a more circular approach to the beer, whisky and fish sectors could lead to potential savings of up to GBP 0.8 billion per year – Zero Waste Scotland report¹⁵.
- **Energy infrastructure:** opportunities from reuse of equipment from wind turbines and decommissioned oil and gas platforms. With the recent growth in renewables and GBP 30–35 billion of oil and gas decommissioning spend expected by 2040, the potential for added value is significant.
- **Construction and buildings:** construction accounts for about 50 per cent of all waste arising in Scotland, and is a major influence on efficient use of resources.
- **Remanufacturing:** already worth **GBP 1.1 billion** to annual economic activity, and potential to add an additional **GBP 620 million** by 2020 – Zero Waste Scotland report¹⁶.

The key areas of action within the Circular Economy Strategy are as follows.

1. Waste Prevention:
 - working towards defined waste prevention targets & introducing a food waste prevention target;
 - supporting SMEs to reduce waste, with a particular focus on food and construction wastes.
2. Encouraging Circular Design:
 - enhancing design innovation support provided through public sector agencies;
 - Integrating circular economy thinking into mainstream business support;
 - using public procurement to drive innovation in the design of products and services.
3. Mainstreaming Reuse
 - increasing the quantity of products reused;
 - clarifying regulations around reuse;
 - expanding the national Revolve standard for reuse to improve customer confidence.
4. Increasing Repair Services:
 - enhancing repair skills in communities;
 - supporting businesses to offer more repair services.
5. Growing Scotland's Remanufacturing Sector:
 - supporting businesses to innovate through the Scottish Institute for Remanufacture¹⁷;
 - raising awareness of remanufacturing through the work under the Manufacturing Action Plan.
6. Increasing recycling:
 - working across partners in the waste, grocery and packaging sectors to increase the quantity and quality of recyclates;
 - ensuring a common system for collection across all Local Authority areas through the Recycling Charter;
 - building evidence on a deposit return system for Scotland;
7. Exploring Producer Responsibility.
8. Recovering Value from Biological Wastes;
 - mapping biological waste arisings across Scotland¹⁸;
 - increasing biorefining – maximising value from biological resources which would otherwise end up in lower value uses or as waste.

¹⁵ <https://www.zerowastescotland.org.uk/BeerWhiskyFish> (English)

¹⁶ <https://www.zerowastescotland.org.uk/RemanufacturingReport> (English)

¹⁷ <http://www.scot-reman.ac.uk/> (English)

¹⁸ <https://www.zerowastescotland.org.uk/sites/default/files/Biorefining%20Potential%20for%20Scotland%20Final%20report.pdf> (English)

9. Communicating and engaging:
 - broadening understanding of the circular economy;
 - encouraging change and collaboration between businesses through the Scottish Circular Economy Network;
10. Enhancing skills:
 - encouraging the development of new skills and thinking in the next generation of designers, business leaders and innovators;
 - Exploring a Skills Academy for circular economy skills with Sector Skills Councils, employers, Industry Leadership Groups, and skills partnerships;
 - supporting schools to embed circular economy principles within their curriculum by identifying a cohort of teaching 'champions' for the circular economy.
11. Measuring progress:
 - improve our range of indicators to better understand how products and materials flow through our economy, both to measure progress and to identify opportunities.

UK - Wales

Towards Zero Waste (TZW) is expressly written as a document that sets out a long-term framework for materials resource efficiency and waste management between 2010 and 2050. It identifies the outcomes we wish to achieve, sets high level resource efficiency targets to becoming a zero waste, and one planet resource use nation, with associated waste prevention and recycling targets. Wales is believed to be unique in setting such resource efficiency outcome targets.

The supporting sector plans and the waste prevention programme are Wales' dedicated overall plan for materials resource efficiency¹⁹. Achieving the one planet resource use efficiency goal will be achieved through policies, targets and actions for using few resources in production and preventing waste (for example through eco-design) and increasing recycling. Increasing the supply of secondary raw materials, as a way of reducing demand for primary raw materials, are all embedded in the documents.

The key outcomes of TZW are set as:

- **A Sustainable Environment**, where the impact of waste in Wales is reduced to within our environmental limits¹⁷ by 2050. This means we will take action on reducing the ecological footprint of waste in Wales to 'one Wales: one planet' levels through waste prevention and recycling, so that we contribute to using only our fair share of the Earth's resources.
- **A Prosperous Society**, with a sustainable, resource efficient economy. More green jobs across a range of skill levels will be provided within the waste and resource management industry in Wales, and increased profit for businesses will be achieved through resource efficient practices, which are future proofed against increasing competition for resources.
- **A Fair and Just Society**, in which all citizens can achieve their full human potential and contribute to the wellbeing of Wales through actions on waste prevention, reuse and recycling.

TZW sets the following key milestones.

- **2025: Towards zero waste:** by 2025, we will have significantly reduced waste, by 27 per cent compared to 2007, through actions on sustainable consumption and production and will manage any waste that is produced in a way that makes the most of our valuable resources. This will mean that we will maximise recycling to at least 70 per cent and minimise the amount of residual waste produced, and eliminate landfill as far as possible.
- **2050: Achieving zero waste:** as a minimum, we will reduce the impact of waste in Wales to within our environmental limits, which we define as 'one Wales: one planet' levels of waste, roughly 65 per cent less waste than that produced in 2007, aiming to phase out residual waste through actions

¹⁹ http://gov.wales/topics/environmentcountryside/epg/waste_recycling/zerowaste/?lang=en (English)

on waste prevention and sustainable consumption and production so that 100 per cent of waste that is produced is reused or recycled as a resource, thus meeting the aspirations of the zero waste philosophy.

Towards Zero Waste promotes the concept of eco-design, including design to reduce the use of materials, improving the longevity and ease of repair or upgrade of products, designing for reuse, and designing for recycling.

Towards Zero Waste also promotes closed-loop recycling whereby materials are re-used for their original purpose, and high levels of clean, high-quality, source-separated recyclates to drive the market and supply to Welsh manufacturing. We have a number of actions that helps drives closed loop recycling. Interim targets for Towards Zero Waste were set for high levels of clean, high quality, source-separated recyclates to drive the market.

In terms of bio-resources, TZW promotes recycling of biowaste via anaerobic digestion, generating both a renewable fuel and a fertiliser.

The sector plans ²⁰ also pursue and implement eco-design, green procurement, resource efficient production and source separation processes – all of which would feed in to a wider move towards system optimisation and circular economy.

In terms of raw materials, we have identified Priority Waste Streams in our waste strategy.

1. Waste Prevention – reducing our waste arisings overall is very important. However, there are some materials which, if waste prevention action is focussed on them, will reduce our ecological footprint sooner. For household waste, these are Food waste, Plastic, Paper, WEEE, batteries, oil, clinical waste, hazardous items, textiles, shoes, wood, nappies, carpet, furniture also have a combined high impact on our ecological footprint.
2. Commercial and Industrial Waste – reducing our waste arisings overall is very important. However, there are some materials which, if waste prevention action is focussed on them, will reduce our ecological footprint sooner. For commercial and industrial waste these are:
 - Food – food waste generates over 30 per cent of the total ecological footprint impact of commercial and industrial waste in Wales. Working with food producers, food retailers such as supermarkets and restaurants and food industries such as hospital catering facilities to reduce food waste will result in the largest reduction in ecological footprint from this sector.
 - Paper and card – paper and card also has a large ecological footprint impact in terms of commercial and industrial waste – 15 per cent of the total.
3. Chemicals – chemical waste represents 12 per cent of the total ecological footprint impact but only 4 per cent of the total waste tonnage.
4. Construction and Demolition Waste – reducing our waste arisings overall is very important. The construction and demolition sector plan will focus on reducing our waste arisings, with specific emphasis on the priority materials which will reduce our ecological footprint the most. For construction and demolition the priority wastes are: wood, plastic, metal, insulation and gypsum, hazardous waste.

The Welsh government has developed an extensive programme of interventions in place to help deliver a circular economy in Wales. This includes the statutory recycling targets set for local authorities in the Waste (Wales) Measure 2010 and legislating the provisions in Part 4 of the Environment Act 2016 to promote more recycling by businesses and the public sector, and landfill bans.

²⁰ http://gov.wales/topics/environmentcountryside/epg/waste_recycling/publication/?lang=en (English)

We have an extensive funded programme to help deliver a circular economy in Wales, largely based around a sectorial approach. Key elements funded by the Welsh Government include:

- The Collaborative Change Programme (CCP) delivered through WRAP Cymru provides support to Local Authorities to meet the policies and recycling targets set in Towards Zero Waste as well as the EU Waste Framework Directive. The support includes modelling, business planning, materials marketing and operational support. This is intended to deliver higher quality recycling, reduced carbon impacts and reduced operational costs. Good practice is shared through the CPP.
- WRAP Cymru which is focused on preventing waste and promoting recycling and recovery, including reuse/preparation for reuse, and is working with both businesses and government to support these objectives, with the aim of reducing costs and increasing benefits to all sectors of society. The aim is to develop a successful closed loop economy in Wales, and WRAP Cymru supports the Welsh Government in implementing the target of 70 per cent recycling set in Towards Zero Waste and helps to inform the various sector plans.
- Constructing Excellence in Wales' waste programme to help shift the construction industry towards circular economy. Constructing Excellence in Wales are focussed on reducing waste in the construction, excavation and demolition industries, through reduction at source, reuse of construction materials, and recycling – through the production of recycled aggregates. It works with both business and government to support these objectives.

We have a number of new and developing policies/initiatives to support our efforts to develop a more circular economy.

- Commissioned research to fully appraise the feasibility, including costs and benefits, of the extended producer responsibility options to increase waste prevention, increase recycling and reduce litter of key types of food and drink packaging. The report of the study was published in May 2018.
- Developing legislation under the Environment (Wales) Act 2016. This will require businesses to present their wastes separately for collection and require waste management companies to separately collect specified materials. The Act also amends our Waste (Wales) Measure 2010 to give power to ban specific waste materials from incineration and ban disposal of food waste to public sewer from business premises in Wales.
- Committed to consulting on a new food waste prevention target by halving the amount of food wasted in Wales by 2025.
- Working with public sector waste and resource efficiency efforts to target support for the public sector on green procurement.
- Contributing to the Interreg Europe funded Circular Economy for SMEs (CESME) project to develop opportunities for small medium enterprises in Wales to adopt more circular economy practices.
- Developed a Circular Economy Capital Investment fund of GBP 6.5 million, which will commence in 2019/20, to ensure waste produced in Wales is re-used and recycled by Welsh manufacturing companies.

The Welsh Government is committed to updating its waste strategy and to developing a route-map for a circular economy. These will be published for consultation in 2019.

In the proposed strategy update we will consult on what the statutory Local Authority recycling targets should be after the 70 per cent target set for 2025. This could perhaps be a new target for 80 per cent recycling by 2035. This would be consistent with a trajectory towards achieving 'zero waste' (100% recycling) by 2050, as set out in Towards Zero Waste. We will also consider the merits of options for alternative types of recycling targets to ensure that we maximise contribution to the Well-being of Future Generations Act goals. By this I mean looking at the merits and practicalities of setting enforceable carbon targets, or specific waste material targets. We will also examine whether we should switch to setting statutory recycling targets for Local Authorities based on the new EU definition of municipal waste that excludes rubble, incinerator bottom ash and wood.

We have already announced that we will include consideration of a target to halve food waste by 2025 (against a 2006 baseline). We are working to establish the exact nature of the target, and the level of the baseline. We are looking to align our approach with what the EU and UN are doing in respect of UN SDG target 12.3 on food waste reduction.

In February 2019 we issued joint consultations with other parts of the UK on proposals to introduce a deposit return scheme for drinks containers, and an extended producer responsibility (EPR) approach to packaging. The outcome of these consultations will inform our waste strategy update with regard to these key waste streams.

At the same time as we consult on an update of our waste strategy we also intend to consult on a Route Map for a Circular Economy. This is likely to build on our existing efforts and include some of the following:

- it will consider other, more niche materials for recycling, for example nappies/absorbent hygiene products, mattresses and carpets;
- it will seek to support the development in Wales of more circular economy infrastructure, leveraging in private investment and UK/EU grant funding where possible;
- it will include the actions necessary to achieve the food waste reduction target;
- it will identify the steps needed to increase recycling markets in Wales, with a big focus on creating more demand in Wales, particularly for plastics and paper/card, including using green public procurement;
- it will include how we intend to tackle waste crime more, especially the leakage from the circular economy of poor quality recyclate, especially if illegally managed;
- there will be strong support for innovation in the circular economy – linking across government, especially with our Economy and Transport colleagues; we will develop and share best practice in innovative approaches.
- we will be increasing high quality recycling in business and the public sector through the introduction of the regulations under Part 4 of the Environment (Wales) Act.

Wales does not have a specifically named circular economy strategy and action plan named as such, but its overarching waste strategy, Towards Zero Waste, the suite of sector plans that overall make up the waste plan for Wales, and the Waste Prevention Programme, contain all of the components of a circular economy approach. The details are described in the previous paragraphs.

The Welsh Government is committed to updating its waste strategy and to developing a route-map for a circular economy that will continue to incorporate the circular economy approach already developed in Towards Zero Waste and the sector plans. These will be published for consultation in 2019.

Overview of dedicated national or sectoral strategies for raw materials

UK - England

UK

In 2012 the government published the Resource Security Action Plan (RSAP), setting out the UK policy position and a number of actions on critical raw materials and resource security.

This document has been developed in response to private sector concerns about the availability of some raw materials. It details how the Government recognises these issues, provides a framework for business action to address resource risks, and sets out high level actions to build on the developing partnership between Government and businesses to address resource concerns.

The risks identified by businesses relate to increasing competition for resources, price volatility and potential interruptions in supply, caused by a combination of growing worldwide demand, concentration

of supply in a small number of countries, trade restrictions in some cases, lack of currently viable alternatives in key applications, and time lags in the supply response to increased demand. Government attention is warranted by a series of market failures: prices for many resources are not reflecting the full environmental cost of extraction, there is a lack of readily available information about resource risks which may affect UK businesses, particularly SMEs, and behavioural barriers impede action to improve resource efficiency.

The scope of this Action Plan covers a broad range of renewable and non-renewable resources not covered by government policies on energy and food. While in practice much of the focus of the short-term actions is on metals and minerals which have been identified as critical by many UK businesses, the analysis and statement of policy are relevant to a wider range of resources that are important to the UK economy.

The Department for Business, Energy and Industrial Strategy (BEIS) now holds responsibility for the policy, while the Department for Environment, Food and Rural Affairs (Defra) has a watching brief. For further detail the RSAP can be viewed online²¹.

There are currently no plans to review this document but where appropriate these issues may be covered in our renewed strategy on waste and resources.

UK - Scotland

Scotland does not have a national policy relating to the supply of raw materials.

However, there has been work undertaken to identify critical raw materials for Scotland, and a report was issued in 2011. A link to the non-technical summary is available online²². This work identified 12 materials as critical, as well as a range of measures to manage and mitigate these material risks. The materials identified were: aggregates, cobalt, copper, fish, indium, lead, lithium, palm oil, phosphorus, rare earth elements, timber and tin.

This report was reviewed further in 2012, as part of the circular economy evidence programme (see the paragraph on Policies which include elements of material resource efficiency for further details), and a survey of businesses across a range of sectors undertaken to understand the impact that raw materials have on the Scottish Economy and the implications to growth strategies. A number of recommendations were made, some of which are reflected within the Making Things Last Strategy. Nevertheless, resource availability and supply chain volatility remains a key driver of Scotland's Circular Economy strategy.

UK - Wales

The Welsh Government has published in 2017 a Natural Resources Policy (NRP)²³, the focus of which is on improving the way Wales manages its natural resources. The NRP includes the following statements on the use of natural resources/raw materials:

'Managed wisely, Wales' natural resources provide a wide range of opportunities to support a low carbon, more resource efficient economy. Our economy relies on inputs of raw materials, especially in the manufacturing of components and final products'.

The NRP identifies that construction is one of the biggest consumers of raw materials, with 80 per cent of all materials produced used in the built environment. Considering the impact of building and the products in them over their entire life-cycle – from concept, design, construction, use and maintenance to demolition – provides a considerable economic opportunity. Our investment as a government to deliver

²¹ <https://www.gov.uk/government/publications/resource-security-action-plan-making-the-most-of-valuable-materials> (English)

²² https://www.sepa.org.uk/media/163166/raw_materials_non-technical_summary.pdf (English)

²³ <http://gov.wales/docs/desh/publications/170821-natural-resources-policy-en.PDF> (English)

20,000 new affordable homes in Wales provides an opportunity for innovative use of materials and methods of construction. This could include furthering the use of timber in construction, which would help develop local supply chains for a modern construction sector.

Included as one of the three key priorities for action under the NRP is increasing renewable energy and resource efficiency. The NRP states that moving towards a more circular economy in Wales, in which raw materials are kept in productive use for longer, is already reducing the demand for materials. It identifies that further progress can significantly reduce our impact on our natural resources whilst providing opportunities for jobs and sustainable economic growth and helping address risks to long-term supply chain security.

A 2013 report *Mapping Critical Resources for Wales* from the Wales Eco-Design Centre²⁴ identified that CRM issues are potentially significant for Wales' advanced materials and manufacturing sector, and may also be significant for the energy and environment sector and the Welsh government's ambition to create a sustainable low-carbon economy, particularly if price rises occur in imported finished products such as wind turbines; solar PV cells; electric vehicles and energy efficient lighting, LEDs due to the use of rare earths in their production.

The planned consultation in 2019 on an update of TZW and on the development of a route map for a circular economy will consider whether there are raw materials of particular concern that need addressing by policy interventions from the Welsh Government.

Policies which include elements of material resource efficiency

UK - England

EU policies implemented under the Waste Framework Directive contribute towards our approach to resource efficiency and circular economy.

The Government's 2013 waste prevention strategy *Prevention is better than Cure: The role of waste prevention in moving to a more resource efficient economy*²⁵ sets out how we link our circular economy/resource efficiency ambitions with waste management approaches.

In 2017 the government published the **Industrial Strategy**²⁶.

The Industrial Strategy was published on 27 November 2017 and sets out a long-term plan to boost the productivity and earning power of people throughout the UK. It sets out four Grand Challenges to put the UK at the forefront of the industries of the future (i) Growing the Artificial Intelligence and Data Driven Economy; (ii) Clean Growth; (iii) the Future of Mobility and (iv) the Ageing Society. The Industrial Strategy recognises the fundamental role that the efficient use of resources has to play in moving to a cleaner, stronger economy and sets out ambitions for zero avoidable waste and a doubling of resource productivity by 2050, including through a 25-year Environment Plan and a new strategy for resources and waste. The Green Paper highlighted the economic benefits that a transition to resource efficiency can secure by ensuring new technologies are explored and created in the UK. It emphasised how business competitiveness can be increased through a drive to reduce raw material demand and waste in our energy and resource systems. The promotion of well-functioning markets for secondary materials and new

²⁴ <http://pdronline.co.uk/Portfolio/mapping-critical-resources-for-wales-mcrw> (English)

²⁵ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/265022/pb14091-waste-prevention-20131211.pdf (English)

²⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf (English)

disruptive business models that challenge inefficient practice can also lead to new markets and increased job creation.

The Government's **Clean Growth Strategy**²⁷ published in October 2017 sets out a pathway to deliver on our carbon commitments and how the UK can reduce emissions across sectors, improve energy efficiency whilst stimulating economic growth. Resource efficiency has key synergies in tackling climate change and the strategy recognises the co-benefits that maximising the value we get from our natural and existing material resource assets can have in meeting our carbon commitments and improving energy efficiency. The strategy highlights the progress the UK has made in increasing resource productivity whilst at the same time reducing emissions, especially in food and agriculture, and outlines how further improvements can be made. For example energy efficiency can be improved by increasing the use of secondary materials.

Through the **25 Environment Plan** we want to be the first generation to leave the environment in a better state than we inherited it. To do this, we need a single plan that brings together anyone with an interest in the environment.

Our 25 Year Environment Plan sets out what we want to achieve in 25 years' time and how we will mobilise action across businesses – from food retailers to housing developers to water companies – as well as individuals, to fulfil our ambition.

Our renewed strategy on resources and waste will review this approach and will be aligned with the Government's new Industrial Strategy, Clean Growth Strategy and the 25-Year Environment Plan.

In our 2017 report *Business Resource Efficiency – Quantification of the no cost/low cost resource efficiency opportunities in the UK economy in 2014*, Defra's previous [research](#) estimated that those businesses could achieve savings of at least GBP 3 billion a year through no-/low-cost measures that would result in waste prevention and waste diversion. For further detail you can view the report online – [Business Resource Efficiency - Quantification of the no cost/low cost resource efficiency opportunities in the UK economy in 2014](#).

WRAP work as part of the Resource Efficient BUSiness (REBus). REBus models project aims to make a significant contribution towards two of the targets highlighted in the EU's study on *Assessment of resource efficiency indicators and targets* (BIOIS 2013) (1) a 30 per cent reduction in domestic material use by 2020, and; (2) a 20 per cent reduction in greenhouse gas emissions by 2020. This report²⁸ outlines how large-scale adoption of the sort of business models which have been piloted throughout the course of the REBus project could deliver substantial economic and environmental benefits across Europe. An indicative quantification of scenarios illustrating the potential impacts on gross value added (GVA) and raw material use are outlined in projections to 2030 for Europe as a whole, and for each of the EU28 member states.

The **Waste Prevention Programme for England** which was published in December 2013 and which responds to a requirement of the EU Waste Stream Work Directive 2008/98 EC. These programmes are run separately in each of the Devolved Administrations.

The Waste Prevention Programme for England articulates the actions for government, the wider public sector, business, civil society and consumers which, together, will move us towards a more resource efficient economy.

The aim of the Programme is to improve the environment and protect human health by supporting a resource efficient economy, reducing the quantity and impact of waste produced whilst promoting

²⁷ <https://www.gov.uk/government/publications/clean-growth-strategy> (English)

²⁸ <http://www.rebus.eu.com/wp-content/uploads/2017/07/Extrapolating-resource-efficient-business-models-across-Europe.pdf> (English)

sustainable economic growth. We want to encourage businesses to contribute to a more sustainable economy by building waste reduction into design, offering alternative business models and delivering new and improved products and services.

The Waste Prevention Programme for England and other related documents can be viewed online²⁹.

A newsletter providing a summary of progress on some of the main actions highlighted for government in the Programme was published in December 2014³⁰.

The **Courtauld Commitment 2025**³¹ is a voluntary agreement which brings together organisations across the food system – from producer to consumer – to make food and drink production and consumption more sustainable. The ambition is to cut the resource needed to provide food and drink in the UK by one fifth in 10 years, increasing value for all. The targeted overall outcomes from 2015 to 2025, calculated as a relative reduction per head of population, are:

- a 20 per cent reduction in food and drink waste arising in the UK;
- a 20 per cent reduction in the greenhouse gas intensity of food and drink consumed in the UK;
- business signatories are monitoring water use in their own operations and have improved efficiency;
- business signatories are participating in collective action to improve the quality and availability of water in key sourcing areas.

UK - Northern Ireland

The Northern Ireland Executive's Programme for Government³², which informs departmental plans, is an outcomes-based approach which includes themes such as We live and work sustainably – protecting the environment and We connect people and opportunities through our infrastructure.

In Northern Ireland, sustainability is already well embedded into public procurement and several programmes have already been set up to improve resource efficiency³³.

In law all public authorities in Northern Ireland must, in exercising their functions, act in the way they consider best calculated to contribute to the achievement of sustainable development for Northern Ireland.

The current Northern Ireland Waste Management Strategy, Delivering Resource Efficiency³⁴, published in October 2013, sets the policy framework for the management of waste in Northern Ireland, and contains actions and targets to meet EU Directive requirements and the department's Programme for Government commitments. The strategy moves the emphasis from resource management towards resource efficiency with a renewed focus on waste prevention.

The 2013 strategy builds on and retains the core principles of the 2006 Strategy and places a renewed emphasis on the waste hierarchy. The new Strategy moves the emphasis of waste management in Northern Ireland from resource management, with landfill diversion as the key driver, to resource efficiency – using resources in the most effective way while minimising the impact of their use on the environment.

²⁹ <https://www.gov.uk/government/publications/waste-prevention-programme-for-england> (English)

³⁰ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/385049/wppe-1yearon-newsletter201412.pdf (English)

³¹ www.wrap.org.uk/content/courtauld-commitment-2025 (English)

³² <https://www.northernireland.gov.uk/programme-government> (English)

³³ <https://www.finance-ni.gov.uk/articles/sustainable-construction-procurement> (English)

³⁴ <https://www.daera-ni.gov.uk/articles/waste-management-strategy> (English)

The Strategy highlights a number of policy and legislative proposals of which the most significant are:

- the development of a waste prevention programme;
- the development of a new recycling target for local authority collected municipal waste;
- the introduction of a statutory requirement on waste operators to provide specified data on commercial and industrial waste;
- new and more challenging collection and recycling targets for packaging and WEEE;
- the introduction of a landfill restriction on food waste;
- the implementation of legislation on carrier bags;
- the development of detailed proposals for an Environmental Better Regulation Bill.

UK - Scotland

As described in section on Dedicated national strategies or roadmaps for material resource efficiency and a circular economy, the Making Things Last, Circular Economy Strategy built on earlier zero waste and waste minimisation policies. It was also informed by a circular economy evidence programme, which ran over the course of a year, and considered Scotland's key sectors and the potential circular opportunities within those sectors. Whilst driven by the Scottish government's Waste Policy team, the evidence programme consulted and involved cross-government departments and its Steering Group comprised government, enterprise agencies, the Scottish Environment Protection Agency and Zero Waste Scotland.

As a result of this cross-government engagement, circular economy and resource efficiency objectives also form a key part of other policies, the key ones being: Scotland's Economic Strategy; the Manufacturing Action Plan; The Litter Strategy; the National Plan for Industrial Biotechnology; the Climate Change Plan; the Scottish Energy Strategy: The Future of Energy in Scotland. A brief summary of how each policy document includes resource efficiency or circular economy is given below:

Scotland's Economic Strategy commits to prioritising investment in infrastructure and assets to ensure that Scotland captures the opportunities offered by the transition to a more resource efficient economy. This is delivered through the Resource Efficient Scotland programme, which supports businesses to boost productivity by using energy, materials and water more efficiently. It also underlines the work to create conditions for a more circular economy, including supporting companies to embrace new business models and manufacturing processes; and transforming used products into assets that support industries like remanufacturing, reuse, product disassembly and reprocessing.

The **Manufacturing Action Plan**, *A Manufacturing Future for Scotland*, sets out an action plan to work with industry to:

- deliver concrete initiatives to boost productivity including leadership, employee engagement and skills, energy efficiency and the adoption of circular economy approaches across the manufacturing sector;
- Stimulate innovation and investment in Scottish manufacturing sectors to better compete globally.

The circular economy and energy efficiency are two of the eight identified workstreams under the plan.

Towards a Litter free Scotland³⁵ is complementary to the Making Things Last strategy, focussing on litter prevention and recognising the lost value of littered materials which could otherwise be recycled.

The National Plan for Industrial Biotechnology has a mission to: grow industrial biotechnology related turnover in Scotland to GBP 900 million by 2025. In doing this, it seeks to drive the transition from an oil-based economy to a bio-based one, through innovation and the development of new markets. Whilst not referencing the circular economy directly, the features of the plan reflect circular thinking and objectives.

³⁵ <http://www.gov.scot/Resource/0045/00452542.pdf> (English)

Climate Change Plan (2018-2032)³⁶

This plan recognises that over the longer term, emissions reductions will be delivered through a circular economy approach, meaning more productive businesses, new markets and reduced reliance on scarce resources.

The three key policies referred to within the plan under industry are MAP, SEEP (see below) and Making Things Last. Also specifically referenced are the RES programme, C2025 and the CEIF.

The aim of the plan is to reduce energy demand and overall greenhouse emissions through improving resource efficiency.

Scottish Energy Strategy: The future of energy in Scotland³⁷

Within this strategy energy efficiency has been designated a National Infrastructure Priority. SEEP (renamed Energy Efficient Scotland) is a 15-20 year programme which aims to make Scotland's buildings near zero carbon wherever feasible by 2050, in a way that is socially and economically sustainable. Initial priority is to reduce energy demand and encourage district heating where that is the most appropriate low regrets heat decarbonisation technology.

The plan takes a whole system view, taking a broader focus across the energy system 'to include heat and transport, alongside electricity and energy efficiency, creating an integrated approach which recognises the effect that each element of the energy system has on the others.

The plan also refers directly to creating new business models – '*Our Circular Economy Strategy maps out opportunities and actions to reduce unnecessary waste in the energy system, and across the wider Scottish economy. The circular economy approach is already having an effect in the manufacturing sector, with more thought given to the use and re-use of materials in manufacturing processes*'.

UK - Wales

Welsh Government corporate commitments to a circular economy and resource efficiency are included in the following documents.

- The **Well-being of Future Generations (Wales) Act's** goal of A Prosperous Wales includes resource efficiency as follows: '*an innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work*'.
- **Programme for Government, Taking Wales Forward 2016–2020** contains the action to '*further our lead over other nations in recycling and minimising landfill*'.
- **National Strategy, Prosperity for All** (2017) includes a commitment to '*set out a route map for a more resource efficient economy, building on our success in recycling and reducing the environmental impacts of production and consumption*'.
- **Natural Resources Policy for Wales** (2017) (under Environment (Wales) Act – Part 1) includes the headline opportunity to support a more resource efficient economy and includes resource efficiency/circular economy as one of the three key priorities, namely, '*increasing renewable energy and resource efficiency ... Moving towards a more circular economy in Wales, where raw materials are kept in productive use for longer is already reducing the demand for materials. Further progress can significantly reduce our impact on our natural resources whilst providing*

³⁶ [The Scottish Government's Climate Change Plan, Third Report on Proposals and Policies 2018-2032 \(RPP3\)](#) (English)

³⁷ <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (English)

opportunities for jobs and sustainable economic growth and helping address risks to long-term supply chain security’.

- **Economic Action Plan** (2017) priorities, include the following related to resource efficiency:
 - *publish our route map for a more resource efficient economy;*
 - *developing a support package for businesses to improve their energy and resource efficiency, through ... working with businesses to ensure the more resource efficient use of materials;*
 - *providing a GBP 6.5 million capital fund for 2019–2020 to help Wales move towards a circular economy;*
 - *working with the private sector to increase investment in reuse, recycling and reprocessing infrastructure;*
 - *embedding resource efficiency within our programme of innovation support to SMEs by using public sector procurement to create new opportunities for resource efficient manufacturing in Wales; and*
 - *developing the regulations under Part 4 of the Environment (Wales) Act 2016 in order to increase recycling by businesses in Wales.*
- **Innovation Wales**, the Welsh Government’s regional innovation strategy for smart specialisation (RIS3) for Wales, published in 2013 includes:
 - the aim to reduce the amount and type of material used in production and addresses whole-lifecycle issues such as reuse and re-manufacture and notes that these activities often incorporate the principles and concepts of eco-innovation and eco-design;
 - the identification of how eco-innovation can be used to target the reduction in the use of natural resources in a process;
 - that an eco-design approach may lead to solutions both contributing to business resilience and economic growth.

The Welsh Government’s Towards Sustainable Growth: an Action Plan for the Food and Drink Industry 2014-2020 contains a commitment that Wales must deliver an innovative and productive, low carbon emission, economy that makes more efficient and more proportionate use of resources; and which generates wealth and provides employment opportunities for a skilled and well-educated population. The transition in the food chain must encompass new drivers of economic growth that deliver:

- resource efficiency;
- low carbon pathway;
- cost effective and affordable energy through the transition;
- investment in natural capital;
- resilience.

Institutional setup and stakeholder engagement

UK - England

Institutional set-up:

Defra work with Environment Agency, in the performance of its regulatory duties on waste activities and in tackling waste crime and poor compliance, and with WRAP to support businesses, civil society organisations, local authorities and households become more efficient in the way that they manage and use resources.

There is also considerable contact on a day-to-day basis between Defra policy officials and their counterparts in other government departments, particularly the Department for Business, Energy and Industrial Strategy (BEIS). Defra also regularly consults with the Ministry of Housing Communities and Local Government (MHCLG). There is also regular engagement with counterparts in Scotland, Wales and Northern Ireland.

Stakeholder engagement:

Sustainable Resource Management Forum: this is a bi-annual Defra-led meeting with external stakeholders, made up of resource sector industry representatives, trade bodies, non-governmental organisations (NGOs) and other relevant bodies. Membership is aimed at senior level. The meeting is hosted by Defra in London and chaired at Director level. The purpose of the Forum is to enable regular communications between the sector and government, including updates from each party.

There is also considerable contact on a day-to-day basis between Defra policy officials and a range of business, trade and NGO stakeholders.

UK - Northern Ireland

Institutional set-up:

The Department of the Economy is the lead department for creating a future Circular Economy strategy with the Department for Agriculture, Environment and Rural Affairs in support.

Stakeholder engagement:

Northern Ireland has a Circular Economy group consisting of governmental and non-governmental stakeholders to advance the Circular Economy agenda.

The Collaborative Circular Economy Network, funded by Invest NI as part of its Collaborative Networks Programme is an example of co-operation between a diverse range of stakeholders. The network was led by a social enterprise and four local manufacturing companies who together employ over 1,000 people and recycle plastics, glass, paper and food waste respectively. Five local councils have also participated in the study³⁸.

Northern Ireland's Prosperity Agreement programme (see section on Examples of good practice and innovative approaches for further details) uses voluntary partnerships that seek to improve the relationship between the Northern Ireland environmental regulator and key stakeholders whilst facilitating mutual gains in economic and environmental performance.

UK - Scotland

Scotland's circular economy programme is delivered collaboratively with Scotland's enterprise, and environmental protection agencies and Zero Waste Scotland, with the Scottish government's Waste Policy Team responsible for policy development and delivery.

Together, Scotland have created a portfolio of evidence on chemical sciences, industrial biotechnology, food and drink and renewable energy. Some of the opportunities identified are reflected within the Scottish government's Circular Economy Strategy, and specialist Industry Leadership Groups are also helping to deliver the opportunities identified.

Industry Leadership Groups are managed and run by Scottish Enterprise and are responsible for developing and delivering forward looking industry strategies. The groups provide strategic leadership and advice to industry and the public sector in Scotland, drawing on their members' national and international expertise on global trends and issues and the niche areas where Scotland has global competitiveness.

Industry Leadership Groups comprise leading business figures drawn from across the private sector as well as senior representatives from the public sector including Scottish Enterprise, Scottish Government and key stakeholders

³⁸ <http://www.brysonrecycling.org/news/the-collaborative-circular-economy-network-ccen-scoping-study> (English)

Zero Waste Scotland is Scotland's Circular Economy expert delivery body and is funded by the Scottish Government Waste Policy team to support delivery of the Scottish Government's Circular Economy strategy and the EU Action Plan for the Circular Economy. Zero Waste Scotland is also the lead partner for the Resource Efficient Circular Economy Accelerator Programme in the current round of European Structural Funds in Scotland.

Circular economy thinking and approaches are increasingly being integrated into Scottish Enterprise's and Highlands and Islands Enterprise's mainstream support to business, working with Zero Waste Scotland.

UK - Wales

Both environmental, including waste, and economic policy are devolved to the National Assembly for Wales, the elected representative body, and the Welsh government, the executive.

In the Welsh government, environment and economic policies currently come under the Economy, Skills and Natural Resources Group, led by the Director General.

We have a dedicated Waste and Resource Efficiency Division in the Welsh government which works closely with other areas such as water, energy, natural resources including food, and the economy. We are all based in one group where we work with each other and liaise closely.

The regulatory body for waste, and for environment protection in general, is Natural Resources Wales.

There is regular contact between Departments, agencies, NGOs, local councils, the waste management sector, academia, and other organisations and businesses connected to waste prevention, resource efficiency and the circular economy.

We have a **Ministerial Programme Board (MPB)** for municipal waste, which consists of Local Authorities' representatives, Welsh Local Government Association, WRAP Cymru and internal departments within Welsh Government to progress a more resource efficient/circular approach for municipal waste collected by local authorities. It includes advising the minister and officials on the Food Waste Treatment Procurement Programme and the Residual Waste Treatment Procurement Programme which involved collaborative procurement of contracts for groups of Local Authorities across Wales.

The MPB is also advising the minister and officials on the development of a new, enhanced behaviour change programme to further increase household waste recycling levels in Wales, to help Local Authorities achieve the statutory recycling target of 70 per cent set for 2025.

The **Circular Economy Task Force** is a forum for stakeholders in Wales to help WRAP Cymru and Welsh government to assess the feasibility of the circular economy opportunities, and take steps to realise them. The initial focus for the Task Force is increasing the demand for plastic recycle through increasing the recycled content of plastic products, components and packaging manufactured in Wales. The Task Force will also advise the Welsh government on the development of the planned route map for a more resource efficient Wales. Membership of the Task Force currently includes WRAP, Business in the Community, Wales Retail Consortium, the Manufacturers Organisation (EEF), Constructing Excellence in Wales, Natural Resources Wales, Wales Aerospace Forum, Federation of Small Businesses, Alupro, Wales Environmental Services Association, Chartered Institution of Wastes Management, Resource Association, Recoup, Welsh Local Government Association, Local Partnerships, the British Plastics Federation, and the Welsh government.

WRAP Cymru has set up a **Courtauld 2025 Wales Working Group** whose aim is *'to ensure the benefits of Courtauld Commitment 2025 (C2025) are realised in Wales and that there are opportunities and a clear path to collaborate, share good practice, cascade change and inspire action in line with the priorities of the*

C2025 and those of the members of the Wales Working Group (WWG)'. Membership includes the British Hospitality Association, National Health Service (NHS) Wales Shared Services Partnership, the Food Standards Agency, Transition Bro Gwaun (TBG), Fareshare Cymru, Hybu Cig Cymru (HCC), Hospital Caterers Association (HCA), Zero Waste Scotland (ZWS), several companies who are signatories to Courtauld 2025, Welsh Local Government Association (WLGA), WRAP and the Welsh government.

Recent examples of stakeholder engagement initiated by the Welsh Government on resource efficiency policy interventions includes:

- December 2017 – 4 stakeholder workshops held on options for extended producer responsibility for six key food and drink packaging types;
- April 2018 – 2 stakeholder workshops held on packaging waste regulation reform and the call for evidence on a single-use plastics tax.

Approaches to resource efficiency and circular economy policy evaluation

UK - England

Announced in the England Waste Prevention Programme of 2013, the Re-use of Government Assets Scheme went live in April 2016. The project enabled a number of departments and agencies to sustainably manage surplus office furniture and equipment. It functioned through a digital platform where unwanted assets were advertised and offered for free by and to all participants. By the end of the pilot scheme in July 2017, it was estimated to have saved departments more than GBP 103,000 in procurement costs, diverted 26 tonnes of materials from landfill and saved over 55 tonnes of carbon dioxide equivalent. The scheme is being continued by a number of Departments.

Defra will be developing an evaluation plan as part of our forthcoming Resources and Waste Strategy. In the past year we have conducted post implementation reviews of relevant regulations such as the Waste (England and Wales) 2011 Regulations and the Producer Responsibility Obligations (Packaging Waste) Regulations 2007. Government guidelines on evaluation design can be found online³⁹.

Information on the approach taken across UK government on evaluation, can be viewed under the Green Book guidance⁴⁰.

UK - Northern Ireland

Northern Ireland has a generic approach to policy evaluation. Reviews and evaluations of policies are published on Departmental websites. Northern Ireland has no recent relevant policy evaluations.

UK - Wales

The development of TZW, the accompanying sector plans, and the waste prevention programme were all subject to an ex-ante sustainability appraisal that also included the requirements of the SEA Directive. For example, the Post Adoption Statement of the sustainability appraisal for Towards Zero Waste can be found online⁴¹

We have commissioned a study to evaluate Towards Zero Waste which will inform updates to the strategy and the production of the forthcoming route map for Resource Efficiency in 2018. The study will report later in 2018.

³⁹ <https://www.gov.uk/government/publications/the-magenta-book> (English)

⁴⁰ <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government> (English)

⁴¹ <https://gov.wales/docs/desh/publications/100621wasteappraisalen.pdf> (English)

This *ex-post* evaluation includes the following.

- To conduct an evaluation the HM Treasury Magenta and Green Book and European Commission Better Regulation⁴² evaluation approaches were used to identify how far the objectives and targets as set out in the Wales Waste Plan have been achieved over the period from 2010 to 2015 and whether it has delivered the desired outcomes and benefits, linked to the well-being goals and proposed indicators, including the ecological footprint of waste.
- A key part of the evaluation is an impact assessment of financial, economic, environmental and social outcomes and benefits, including an economic evaluation providing a cost-benefit analysis to measure value for money and meet strategic objectives laid down in the Wales Waste Plan, along with the EU Waste Framework Directive. It identified lessons learned, what has worked well and not so well, and any gaps in interventions – using Defra’s 4Es model where practicable.
- The evaluation of work should be underpinned by eight essential evaluation criteria, based on principles defined by Organisation for Economic Co-operation and Development (OECD)/Development Assistance Committee (DAC) and the European Commission, including an assessment against the seven well-being goals and five ways of working laid down in the Well-being of Future Generations Act.

Monitoring and targets

Targets for resource efficiency and circular economy

UK - England

Industrial Strategy Targets

Moving towards a regenerative circular economy:

The economy exists within the natural world and cannot be separated from it. Energy and materials are essential contributions to the production of goods and services, and a healthy society depends on a healthy environment. The Natural Capital Committee has advised that carefully planned and targeted investments in natural capital – such as woodland planting, peatland restoration and wetland creation – can deliver significant economic growth and generate returns of up to nine times the costs. A linear take, make, dispose economy risks eroding the natural capital central to its long-term growth through resource depletion and environmental pollution.

We are committed to moving towards a more circular economy – to raising productivity by using resources more efficiently, to increasing resilience by contributing to a healthier environment, and to supporting long-term growth by regenerating our natural capital. Our measures to achieve this will include:

- an approach to infrastructure investment that aims to regenerate natural capital, as set out in this chapter;
- raising the resource productivity of businesses, including through the promotion of recycling and strong secondary materials markets where products are designed with efficiency and recyclability in mind;
- working in partnership with food businesses, from farm to fork, through the Courtauld Commitment to deliver a 20 per cent per person reduction in food waste by 2025;
- supporting innovative and highly efficient precision agriculture through the Industrial Strategy programme Transforming food production, from farm to fork;
- a new Bioeconomy Strategy that will set out a framework for growth in the sector to develop new low carbon bio-based products and processes; and
- continually strengthening our policies in line with our national ambitions of zero avoidable waste and a **doubling of resource productivity by 2050**, including through our 25-year Environment Plan and a new strategy for resources and waste.

⁴² http://ec.europa.eu/smart-regulation/guidelines/tool_42_en.htm (English)

The circular economy replaces extraction and waste with restoration and regeneration. Products, components and materials are reused in ways that maintain their utility and value as they move through biological and technical cycles.

25 Year Environment Plan Targets:

- The 25 Year Environment Plan sets out our ambition to make sure that resources are used more efficiently and kept in use for longer to minimise waste and reduce its environmental impacts by promoting reuse, remanufacturing and recycling.
- Our plan sets out our ambition to eliminate all avoidable plastic waste by the end of 2042, including extending the 5p plastic charge to all retailers.
- We will work with retailers to encourage their efforts to reduce waste and explore options to introduce plastic-free supermarket aisles in which all the food is loose – giving consumers the choice to make greener decisions and promoting the use of less damaging plastic packaging.
- As part of this we will also explore how we can develop our producer responsibility schemes, to better incentivise producers to design more resource efficient products.
- We will set out our plan for how we will work towards no food waste entering landfill by 2030, ensuring a valuable resource remains in our economy.
- We wish to accelerate consistency and make it easier for people to recycle and will focus on how to ensure quality recyclate for use by domestic reproducers and for exports.
- These challenging objectives will be delivered by the ambitious policy initiatives outlined as part of a Resources and Waste Strategy due out later this year.

WRAP operates several voluntary agreements which bring industry sectors together to collaborate on resource challenges. Some of these have targets:

The Courtauld Commitment 2025⁴³

The Courtauld Commitment 2025 is a voluntary agreement which brings together organisations across the food system – from producer to consumer – to make food and drink production and consumption more sustainable. The ambition is to cut the resource needed to provide food and drink in the UK by one fifth in ten years, increasing value for all. The targeted overall outcomes from 2015 to 2025, calculated as a relative reduction per head of population, are:

- a 20 per cent reduction in food and drink waste arising in the UK;
- a 20 per cent reduction in the greenhouse gas intensity of food and drink consumed in the UK; and
- business signatories are monitoring water use in their own operations and have improved efficiency;
- business signatories are participating in collective action to improve the quality and availability of water in key sourcing areas.

The Sustainable Clothing Action Plan (SCAP) 2020 Commitment⁴⁴

The Sustainable Clothing Action Plan (SCAP) is a voluntary agreement which brings leading organisations from across the UK clothing sector – supply, re-use and recycling – together to collaborate in reducing the environmental footprint of clothing. Starting from a baseline year of 2012, SCAP signatories have committed to achieving, by 2020:

- a 15 per cent reduction in carbon footprint;
- a 15 per cent reduction in water footprint;
- a 15 per cent reduction in waste to landfill; and
- a 3.5 per cent reduction in waste arising over the whole product life-cycle.

⁴³ www.wrap.org.uk/content/scap-2020-commitment (English)

⁴⁴ <http://www.wrap.org.uk/sustainable-textiles/scap> (English)

Recycling targets set by the Mayor of London and national government

Recycling targets of 65 per cent of municipal recycling by 2030⁴⁵ have been set by the Mayor of London and national government.

UK - Northern Ireland

Northern Ireland has included the EU Waste Framework Directive and Landfill Directive targets in the Northern Ireland Waste Management Strategy – Delivering Resource Efficiency. Northern Ireland has not gone beyond these Directive targets. It is anticipated that an updated Waste Management Strategy will take account of the latest targets and revisions in the recently agreed Circular Economy Package.

UK - Scotland

The Waste (Scotland) Regulations 2012 were passed by the Scottish Parliament on 9 May 2012 and make the following provisions.

- All businesses, public sector and not-for-profit organisations are required to present metal, plastic, glass, paper and card, including cardboard, for separate collection from 1 January 2014.
- Food businesses (except in rural areas) which produce over 50 kg of food waste per week to present that food waste for separate collection from 1 January 2014.
- Food businesses (except in rural areas) which produce over 5 kg of food waste per week to present that food waste for separate collection from 1 January 2016.
- Local authorities to provide a minimum recycling service to householders.
- Waste contractors to provide collection and treatment services which deliver high quality recycling.
- A ban on any metal, plastic, glass, paper, card and food collected separately for recycling from going to incineration or landfill from 1 January 2014.
- All new incinerators must ensure that metals and dense plastics have been removed from residual municipal waste prior to incineration.
- A ban on biodegradable municipal waste going to landfill from 1 January 2021.

These were supplemented by further targets relating to resource efficiency under the Circular Economy Strategy in 2016. The key targets applicable in Scotland are summarised below:

- 60 per cent recycling/composting and preparing for re-use of waste from households by 2020;
- reduce waste arising by 15 per cent against the 2011 baseline of 13.2 million tonnes by 2025;
- no more than 5 per cent of all waste to go to landfill by 2025. This will be followed by a ban on biodegradable municipal waste to landfill from 2021;
- 70 per cent recycling/composting and preparing for reuse of all waste by 2025;
- to reduce all food waste arising in Scotland by 33 per cent by 2025 and work with industry to reduce on-farm losses of edible produce.

UK - Wales

One Wales: One Planet, the 2009 Sustainable Development Scheme of the Welsh Government, set visions for sustainable resource use of *'within the lifetime of a generation we want to see Wales using only its fair share of the earth's resources'* and for a sustainable economy of *'a resilient and sustainable economy for Wales that is able to develop whilst establishing, then reducing, its use of natural resources and reducing its contribution to climate change'*.

One Wales: One Planet set the following resource efficiency goal for 2050: Within the lifetime of a generation, we want to see Wales using only its fair share of the Earth's resources, and where our

⁴⁵ <http://resourcelondon.org/> (English)

ecological footprint is reduced to the global average availability of resources – 1.88 global hectares per person.

In order to achieve this, One Wales: One Planet identified the following material efficiency actions as needing to be addressed, alongside actions to reduce carbon emissions.

- Have a radically different approach to waste management, moving towards becoming a zero waste nation. By this, we mean a society where we focus on eliminating waste, and waste that can't be eliminated must be recycled in "closed loop" systems that achieve the best reduction in ecological and carbon footprints. This will build on our stated goal of achieving 70 per cent recycling across all sectors and diverting waste from landfill by 2025.
- Have a resilient and sustainable economy that is able to develop whilst stabilising, then reducing its use of natural resources, reusing sites and buildings and reducing its contribution to climate change.

The ecological footprint of Wales is number 14 of the statutory National Indicators for Wales set under section 10(1) of the Well-being of Future Generations (Wales) Act 2015⁴⁶.

The statutory waste plan for Wales, Towards Zero Waste (2010), and the accompanying suite of sector plans set a 2050 goal of a one planet level of waste, and a series of intermediary targets to include this. There is a target to reduce waste by 65 per cent by 2050. A recycling target of 70 per cent is set for 2025. Energy from waste is capped at 25 per cent by 2025, and there is a target to reduce landfill to less than 5 per cent by 2025. **All of these targets exceed the latest EU targets set through the Circular Economy Package.**

Number 15 of the statutory National Indicators for Wales⁴⁷ set under section 10(1) of the Well-being of Future Generations (Wales) Act 2015 is the amount of waste generated that is not recycled, per person.

In addition, we intend to consult on the following new proposed targets.

- On the 17 August 2017, the Welsh Government announced a proposed new target to halve the amount of food being wasted in Wales by 2025. The proposed target will be consulted upon as part of the update of Wales' Waste Strategy.
- In October 2017 during a Welsh government plenary debate on the circular economy, the Cabinet Secretary for Environment and Rural affairs stated the government's commitment to consult on the recycling target for municipal of 80 per cent by 2030.

Indicators to monitor progress towards a resource-efficient circular economy

UK - England

The waste prevention metrics and ratios of economic performance to resource such as GDP/RMC are monitored.

Defra published a compendium of statistics on waste and resource which can be viewed online⁴⁸.

WRAP monitors progress against the targets in its voluntary agreements and regularly reports that progress on its website.

The main policy initiatives in this area are around reducing waste generally, and more specifically, reducing waste going to landfill. There are also policies to encourage recycling, for example, EU recycling targets and producer responsibility schemes but they are predicated on waste being created in the first place and so are perhaps less relevant here.

⁴⁶ <https://gov.wales/docs/desh/publications/160316-national-indicators-to-be-laid-before-nafw-en.pdf> (English)

⁴⁷ <https://gov.wales/docs/desh/publications/160316-national-indicators-to-be-laid-before-nafw-en.pdf> (English)

⁴⁸ <https://www.gov.uk/government/statistics/digest-of-waste-and-resource-statistics-2017-edition> (English)

On waste prevention, this is monitored through indicators based on metrics looking at:

- Raw material consumption (RMC) per unit of GDP;
- waste arising per unit of gross value added from the commercial and industrial sector;
- waste arisings by sector – construction and demolition, commerce, industry and households;
- waste from households;
- hazardous waste arisings by sector;
- gross value added of the repair and reuse sector;
- greenhouse gas emissions from landfill.

Note that no specific targets are set for any of these but developing metrics to serve as indicators to monitor progress on waste prevention is a key part of the Waste Prevention Programme for England. More information is available online⁴⁹.

UK - Northern Ireland

Municipal waste arisings, recycling and landfill diversion indicators are currently used.

The Northern Ireland Environment Agency publishes quarterly and annual data on municipal waste arisings. These reports also include data on individual waste streams⁵⁰.

UK - Scotland

SEPA is responsible for reporting national waste statistics to the Scottish government and European Union among others.

To do this, SEPA collects and verifies data from a number of sources, mainly:

- operators of all licensed and most permitted waste management sites;
- operators of certain activities exempt from full waste management licensing;
- local authorities.

Data is reported on an annual basis and available online⁵¹.

Zero Waste Scotland provides an annual report on the carbon impacts of Scotland's waste, based on the SEPA waste data. Further information and a copy of the latest report can be found online⁵².

Zero Waste Scotland reports on the outcomes of its work at least annually across all programmes to the Scottish Government and the European Regional Development Fund using a range of indicators such as: cost and carbon savings; tonnage diverted from landfill; tonnages reused; jobs created; private investment leveraged; as well as an accompanying narrative on progress. A brief overview of recent achievements can be found online⁵³.

UK - Wales

We have published the TZW progress report (2010–2015) which highlights our progress in meeting the actions and targets set in the strategy. This includes data from surveys on the industrial and commercial

⁴⁹ www.gov.uk/government/publications/waste-prevention-programme-for-england (English)

⁵⁰ <https://www.daera-ni.gov.uk/articles/northern-ireland-local-authority-collected-municipal-waste-management-statistics> (English)

⁵¹ <https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/> (English)

⁵² <https://www.zerowastescotland.org.uk/content/scotland's-carbon-metric-impact> (English)

⁵³ <https://www.zerowastescotland.org.uk/content/who-we-are> (English)

and the construction and demolition waste streams and also data from our quarterly reporting of municipal waste. The progress report can be found online⁵⁴.

The recycling figures are also available online⁵⁵.

We have also published the TZW Sector Plan and Waste Prevention Programme Actions Summary Progress Report June 2010–March 2016⁵⁶.

Resource efficiency, circular economy and the 2030 Sustainable Development Goals

UK - England

Courtauld 2025

The Waste and Resources Action Programme (WRAP), supported by Defra, launched the Courtauld Commitment 2025 in March 2016. This is an ambitious voluntary agreement that brings together organisations across the food system – from producer to consumer – to make food and drink production and consumption more sustainable and resource efficient. It is a ten-year commitment to identify priorities, develop solutions and implement changes at scale, both within signatory organisations and by spreading new best practice across the UK. The commitment goes further than ever before with ambitious industry targets to be reached by 2025. One of these is a 20 per cent per person reduction in food and drink waste arising in the UK. These ambitious targets will put the UK on track to meet UN SDG 12.3.

Redistribution

The Government is taking action to support the redistribution of unsold edible and nutritious surplus stock food from businesses to individuals in need. Under Courtauld 2025 signatories have agreed an ambition to work collaboratively with WRAP to double the amount of surplus food they redistribute by 2020 against a 2015 baseline of 15,000 tonnes. The Government and WRAP announced, at the end of last year, a new GBP 0.5 million fund for charities who redistribute surplus food from food businesses to those in need.

Food waste hierarchy

All waste operators are required to follow the waste hierarchy in managing waste (including food waste). This means that they should take all such measures as is reasonable in the circumstances to prevent, reuse or recycle food waste before considering recovery through incineration or sending to landfill. Where food waste cannot be prevented it should be recycled through first anaerobic digestion or second composting where reasonable before incineration. Sending food waste to landfill can lead to significant greenhouse gas emissions and is therefore a last resort. Many local authorities have introduced separate collection of food waste and we will work to support an increase in numbers so that the amount of food waste sent to landfill continues to decline. The Government has announced an ambition to work towards sending zero food waste to landfill by 2030.

UK - Northern Ireland

The introduction of the Food Waste Regulations (Northern Ireland) 2015⁵⁷ seeks to address food waste arising from households and businesses. The Regulations focus on food waste recycling and landfill diversion, but evidence has shown that food waste recycling results in a wider public understanding of the amount of food waste produced which in turn leads to improved prevention and minimisation of food waste. These Regulations are also supported by a communications campaign tackling food waste recycling and prevention. These initiatives support SDG 12 Ensure sustainable consumption and production

⁵⁴ http://gov.wales/topics/environmentcountryside/epq/waste_recycling/zerowaste/?lang=en (English)

⁵⁵ <http://gov.wales/statistics-and-research/local-authority-municipal-waste-management/?lang=en> (English)

⁵⁶ <https://gov.wales/docs/desh/publications/170712-towards-zero-waste-sector-plan-and-waste-prevention-programme-actions-summary-report-en.pdf> (English)

⁵⁷ <https://www.legislation.gov.uk/nisr/2015/14/contents/made> (English)

patterns. which includes amongst its objectives to **halve per person global food waste at the retail and consumer level, and reduce food losses along production and supply chains by 2030.**

UK - Scotland

Global Citizenship: Scotland's International Development Strategy⁵⁸ stemmed from the public consultation on the future shape of the Scottish government's international development work which took place from 24 February until 20 May 2016. This International Development Strategy (IDS) sits within, and is aligned with, wider well-developed Scottish Government policy frameworks.

A vision of this strategy is to embed the SDGs, to ensure that Scotland contributes to sustainable development and the fight against poverty, injustice and inequality internationally. Scotland's First Minister pledged to implement the SDGs and made a dual commitment to tackle poverty and inequality at home in Scotland and to help developing countries to grow in a fair and sustainable manner.

In January 2017, the Scottish Council for Voluntary Organisations, with support from the Big Lottery Fund UK and the Scotland Malawi Partnership, initiated setting Scotland's Sustainable Development Goals Network. This is a coalition of over 250 people and organisations from across Scotland committed to making sure that the Global Goals for Sustainable Development become every Scot's business and to provide a unified voice speaking out on the Sustainable Development Goals across the country⁵⁹.

The Scottish food waste reduction target to reduce all food waste arising in Scotland by 33% by 2025 and work with industry to reduce on-farm losses of edible produce, as identified in the Circular Economy Strategy, specifically puts Scotland on a path to deliver the SDG Goal 12 target related to food waste.

UK - Wales

The SDGs were published after the Welsh government published its waste strategy TZW, and accompanying sector delivery plans. However, all of the policies, targets and actions map across well to the relevant SDGs. Table below maps our activities against each relevant goal / target.

Goal / target	Wales activity
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
Target 8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead	Towards Zero Waste 2010 (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/zerowaste/?lang=en) and associated Sector Plans (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/bysector/?lang=en) are the Wales contribution towards this target.
Goal 12 Ensure sustainable consumption and production patterns	
Target 12.1 Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	Towards Zero Waste 2010 (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/zerowaste/?lang=en) and the associated Sector Plans (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/bysector/?lang=en) are the Wales contribution towards this target.

⁵⁸ <http://www.gov.scot/Topics/International/int-dev/IDconsultation/SDGsbackground> (English)

⁵⁹ <https://globalgoals.scot/> (English)

Goal / target	Wales activity
Target 12.2 By 2030, achieve the sustainable management and efficient use of natural resources	<p>Towards Zero Waste 2010 (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/zerowaste/?lang=en) and associated Sector Plans (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/bysector/?lang=en) are the Wales contribution towards this target.</p> <p>We have set waste prevention and recycling targets to achieve this, with the ultimate goal of using only one planet's worth of resources by 2050. We have also committed ourselves to achieving a circular economy (http://gov.wales/about/cabinet/cabinetstatements/2016/circulareconomy/?lang=en)</p>
Target 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	<p>Towards Zero Waste 2010 (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/zerowaste/?lang=en) and associated Sector Plans (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/bysector/?lang=en) are the Wales contribution towards this target.</p> <p>Specific actions include funding WRAP for the Love Food, Hate Waste campaign, and the Courtauld 2025 food sector Agreement, with a number of food companies in Wales engaged in reducing food waste.</p> <p>The Welsh Government has declared its intention to consult in 2018 on a target to halve food waste by 2025, against a 2007 baseline.</p>
Target 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	<p>The Environmental Permitting regime achieves the environmentally sound management of waste and chemical manufacturing.</p> <p>Chemicals are controlled through product use under the existing EU chemicals regimes (REACH, Persistent Organic Pollutants, and Plant Protection Products).</p>
Target 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	<p>Towards Zero Waste 2010 (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/zerowaste/?lang=en) and associated Sector Plans (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/bysector/?lang=en) are the Wales contribution towards this target.</p> <p>We have set waste prevention and recycling targets to achieve this, with the ultimate goal of using only one planet's worth of resources by 2050. We have also committed ourselves to achieving a circular economy (http://gov.wales/about/cabinet/cabinetstatements/2016/circulareconomy/?lang=en)</p>
Target 12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	<p>The Welsh Government has funded the Resource Efficient Wales advice service that provides advice on sustainable practices to businesses.</p> <p>http://resourceefficient.gov.wales/?lang=en</p>
Target 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities	<p>Sustainable procurement is recognised as the best practice approach for Wales, ensuring that maximum value is achieved for the Welsh pound by delivering the maximum social, economic and environmental benefits. This focus demands both professional and pro-active procurement functions.</p> <p>http://prp.gov.wales/planners/general/strategy/procstrat/sustainabledevelopment/?skip=1&lang=en</p>

Examples of innovative approaches and good practice

Examples of good practice and innovative approaches

UK - England

UK

Embedding Sustainability into Public Procurement

The UK Government is proactive in embedding sustainability into public procurement with the continuation of several important policies and new initiatives. Such policies include the **Public Contracts Regulations** of 2015⁶⁰, transposing the EU Public Sector Procurement Directive of 2014⁶¹, as well as the **Social Value Act** of 2012⁶², last updated in 2016 and requiring public sector procurers to include environmental and social considerations when making their procurement decisions. The Treasury's **Green Book**⁶³ provides guidance to departments on how to consider environmental and social impacts when making public funds allocation decisions.

The **UK Timber Procurement Policy**⁶⁴ makes it mandatory for all central government departments, executive agencies and public organisations to buy timber products from legal and sustainable sources. The same criteria apply for wood products.

In 2010 the UK government set a target for all imports of **palm oil** being from sustainable sources by 2015. That target was reached. Further detail can be found online⁶⁵.

The UK government has enshrined greener public procurement within its public commitments for reducing the environmental impacts of its own estate and operations, the **Greening Government Commitment targets**⁶⁶. The Commitments set targets for reducing the generation of greenhouse gas emissions from estate and transport, the reduction of waste, and reduction of water consumption. The government is committed to reporting on its actions to buy more sustainable and energy-efficient products, and to engage with its suppliers to understand and reduce the impacts of its supply chain. The Commitments require departments to report transparently on actions in relation to climate change adaptation, biodiversity conservation, catering services, sustainable construction and people. We publish annual reports on [performance against the Greening Government Commitments](#) which can be found online⁶⁷.

Finally, the **Government Buying Standards** (GBS) set criteria to be met when buying goods and services, such as energy and water in use, end of life costs and resource efficiency. They are mandatory for the UK government and encouraged for other stakeholders.

The GBS are part of [public procurement policy](#)⁶⁸, with individual standards developed with input from across government, industry and wider stakeholders. The standards have been extensively reviewed with

⁶⁰ <https://www.gov.uk/guidance/public-sector-procurement-policy#public-contracts-regulations-2015> (English)

⁶¹ <https://www.gov.uk/government/consultations/transposing-the-2014-eu-procurement-directives> (English)

⁶² <https://www.gov.uk/government/publications/public-services-social-value-act-2012> (English)

⁶³ <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government> (English)

⁶⁴ <https://www.gov.uk/guidance/timber-procurement-policy-tpp-prove-legality-and-sustainability> (English)

⁶⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/477236/cpe-t-annual-review-consumption-palm-oil-2015.pdf (English)

⁶⁶ <https://www.gov.uk/government/publications/greening-government-commitments-2016-to-2020> (English)

⁶⁷ <https://www.gov.uk/government/collections/greening-government-commitments> (English)

⁶⁸ <https://www.gov.uk/guidance/public-sector-procurement-policy> (English)

market research and analysis to establish criteria that take long-term cost effectiveness and market capacity into account. Further information can be found online⁶⁹.

Landfill Tax

Landfill tax is the main mechanism for diverting waste from landfill. It increases the cost of sending waste to landfill, making it more expensive than other waste management options such as re-use, recycling and energy recovery, which are generally preferable in terms of environmental impact. The tax is currently levied at a standard rate of GBP 86.10/tonne and lower rate of GBP 2.70/tonne. The Treasury has a commitment to increase landfill tax in line with the Retail Price Index until 2019. The UK remains on course to meet obligations to reduce landfilling of biodegradable municipal waste under the Landfill Directive, limiting this to 35 per cent of the 1995 level by 2020.

Aggregates Levy

The Aggregates Levy is an environmental tax on the commercial exploitation of materials for bulk fill in construction, such as rock, sand and gravel in the UK. The rate is currently set at GBP 2 per tonne and the levy was designed with various exemptions and reliefs to shift demand towards more environmentally friendly sources of aggregates. For example, aggregates produced as a by-product of other industrial processes and recycled aggregate produced by crushing construction waste, are both exempt.

Environmental Technology Verification (ETV) pilot programme

The UK is participating in the European Environmental Technology Verification (ETV) pilot programme via a partnership led by Defra and including the Scottish Environment Protection Agency (SEPA), the UK Accreditation Service, Environment Agency, accredited verification bodies and other UK bodies/experts involved in a technical capacity. The scheme aims to help SMEs developing innovative new technologies with environmental benefits accelerate their market entry by providing independent verification of their performance claims. Through independent verification by an accredited third party, manufacturers can provide credible evidence of the reliability of their products' performance, buyers can more easily identify innovations that suit their needs and investors are provided assurance that a technology meets its performance claims. Further information can be found online⁷⁰.

The North Sea Resources Roundabout

The UK is one of the four current signatories to the North Sea Resources Roundabout (NSRR), along with the Netherlands, France and Flanders. The NSRR is an International Green Deal agreement based on the Dutch Green Deal approach and is an instrument to promote sustainable economic growth that makes use of voluntary bottom-up initiatives from businesses, NGOs and civil society. The participating governments' role is to facilitate these innovative initiatives by bringing parties together and creating an environment of trust and/or resolving (real or perceived) legislative barriers. The overall objective is to make it easier for cross-border trade in secondary resources between a sender in one participating country and a receiver in another.

England

The Knowledge Transfer Network (KTN)

The KTN continue to link to and support European activities to help business understand the risk and issues around the availability of resources, and what they can do in response. The KTN is working directly, as partners, on various European funded projects, including SCREEN⁷¹ which aims at the definition of a replicable systemic approach towards a transition to Circular Economy in EU regions within the context of the Smart Specialization Strategy, thus contributing to novel future eco-innovative and horizontal business

⁶⁹ <https://www.gov.uk/government/collections/sustainable-procurement-the-government-buying-standards-gbs> (English)

⁷⁰ https://ec.europa.eu/info/consultations/evaluation-environmental-technologies-verification-pilot-programme_en (English)

⁷¹ <http://www.screen-lab.eu/> (English)

models across different value chains, CRM Recovery⁷² the Critical Raw Material Recovery project is working to ensure that a wide range of minerals and metals are recovered during recycling of WEEE in Europe and Resource Efficient Business Models⁷³ (REBMs) a guide to implementing REBMs. These all directly draw on the KTN experience built up through projects.

Action Based Research (ABR) Programme

ABR uses a combination of research, participation and action to solve a social problem. It is an iterative process, which aims to improve a situation or practice through collaboration between researchers and practitioners through action in practical or real environments (such as in a business or community). It requires the implementation of change and the continuous analysis and reflection of changes that have been implemented. The aim of the **ABR programme** is to take new insights and innovative approaches and explore how they can be applied to a particular policy problem.

We have recently funded and supported ABR projects to explore issues such as: innovative ways to encourage SMEs to be more resource efficient; product longevity for high impact products re-use and repair systems for household appliances; and the benefits of new business models, such as product service systems, where the consumer purchases the use of a product rather than the materials.

One example, Defra commissioned a **research** project as part of one of its early phases of **ABR**. In this case encouraging students to become energy efficient. The full report can be viewed online⁷⁴.

Re-use of Government Assets pilot scheme

Announced in the England Waste Prevention Programme of 2013, the Re-use of Government Assets Scheme went live in April 2016. The project enabled a number of departments and agencies to sustainably manage surplus office furniture and equipment. It functioned through a digital platform where unwanted assets were advertised and offered for free by and to all participants.

5 pence Plastic Carrier Bag Charge

On 5 October 2015 England introduced a 5 pence single-use carrier bag charge to apply to retailers with 250 or more employees. The scheme aims to reduce the use of single-use plastic carrier bags and the litter associated with them, by encouraging people to re-use bags. Since the introduction of the charge there has been a reduction in overall use of single use carrier bags of around 9 billion with approximately GBP 95 million from retailers towards good causes. The soon to be published Bio-economy strategy will set out a commitment to explore the development of standards for biodegradable plastics that go beyond the existing standards related to industrial composting. We estimate that over 10 years the benefits of the scheme will include:

- an expected overall benefit of over £780 million to the UK economy;
- up to GBP 730 million raised for good causes;
- GBP 60 million savings in litter clean-up costs;
- carbon savings of GBP 13 million.

Great Recovery Project

The current economic and environmental challenges of take, make, dispose manufacturing are becoming ever more apparent. Increasing supply risk and rising costs of materials is putting pressure on businesses to change. We need to shift towards more circular systems and good design thinking is pivotal to this transition. The Great Recovery Project built new networks to explore the issues, investigated innovation gaps and incubated new partnerships. The project was a Royal Society of Arts and Manufacturing project,

⁷² <http://www.criticalrawmaterialrecovery.eu/> (English)

⁷³ <http://www.rebus.eu.com/> (English)

⁷⁴ [https://s3-eu-west-](https://s3-eu-west-1.amazonaws.com/nusdigital/document/documents/36453/af52171f9b4e3f6a298965cab5250131/13417_DefraEV0515NUS_FinalReport_Jan2016.pdf)

[1.amazonaws.com/nusdigital/document/documents/36453/af52171f9b4e3f6a298965cab5250131/13417_DefraEV0515NUS_FinalReport_Jan2016.pdf](https://s3-eu-west-1.amazonaws.com/nusdigital/document/documents/36453/af52171f9b4e3f6a298965cab5250131/13417_DefraEV0515NUS_FinalReport_Jan2016.pdf) (English)

working in partnership with Innovate UK. The stakeholder networks and learning generated by the collaboration shaped several Innovate UK funding calls and its ongoing approach to funding innovation.

Litter Strategy for England

In April 2017 the Government published the first Litter Strategy for England. Our ambition is to be the first generation to leave the natural environment of England in a better state than it found it. Our strategy is to apply best practice in education, enforcement and infrastructure to deliver a substantial reduction in litter and littering behaviour, so that in the coming years we see demonstrable improvements against the figures above. We will send a clear and consistent anti-litter message, improve enforcement against offenders, and clean up the country. Further details can be found online⁷⁵.

Campaigns on specific issues

The **Crime Not to Care** campaign launched by Keep Britain Tidy recognises that two-thirds of fly-tipped material is household waste. It is a national, social media-led campaign by available as an off-the-shelf campaign to local authorities, with a variety of digital and print assets. Further details are available online⁷⁶.

Every Can Counts is a behaviour change communications programme, developed and funded by a partnership between drinks can manufacturers, the recycling industry and leading brands. The programme aims to help people to recycle more of the approximately 40 per cent of drinks cans that are used outside the home. Further details can be found online⁷⁷.

Examples of WRAP initiatives

The Waste and Resources Action Programme (WRAP), established as a not-for-profit-company in the year 2000 and backed by government funding from Defra, as well as other UK national Governments, gives advice and support to businesses, consumers and public agencies to address innovation, resource and waste challenges in products and supply chains. Its objective is to minimize resource use, divert materials from landfill and create a market for recycled materials. WRAP operates in England, Wales (WRAP Cymru) and Northern Ireland. A similar body, Zero Waste Scotland⁷⁸, performs a similar role in Scotland.

WRAP offers various **programmes of financial support to resource efficiency** and circular economy projects. These vary over time, but currently include the following.

- **Litter Innovation Fund** – a GBP 450,000 programme, jointly funded by Defra and Ministry for Housing Community and Local Government, to reduce litter by funding innovative approaches to pilot, implement and evaluate small scale local research projects that could be replicated more widely.
- Financial support for local authorities under the **Consistency Programme** – WRAP is able to support local authorities in England to assess the business case for implementing recycling collection services in line with the Framework and to work towards implementation of collection service changes.
- **Rural Community Energy Fund (RCEF)** – This is a GBP 15 million programme, jointly funded by Defra and BEIS. It supports rural communities in England to develop renewable energy projects which provide economic and social benefits to the community.

Up to date details of the financial support programmes available from WRAP are available online⁷⁹.

⁷⁵ <https://www.gov.uk/government/publications/litter-strategy-for-england> (English)

⁷⁶ <https://www.keepbritaintidy.org/> (English)

⁷⁷ <http://www.everycancounts.co.uk/resources/> (English)

⁷⁸ <https://www.zerowastescotland.org.uk/> (English)

⁷⁹ <http://www.wrap.org.uk/category/what-we-offer/funding> (English)

WRAP delivers **research and innovation projects** across the entire spectrum of its programmes. Some key examples include the following.

- **Electrical and electronic equipment:** *Switched on to value: powering business change*, research report by WRAP, July 2017⁸⁰.
- **Textiles:** *Valuing our clothes: the cost of UK fashion*, research report by WRAP, July 2017⁸¹.
- **Food:** *Food Futures: from business as usual to business unusual*, research report by WRAP, November 2015⁸².
- **Food waste prevention:** *Strategies to achieve economic and environmental gains by reducing food waste*, research report by WRAP, February 2015⁸³.
- **Organic waste recycling through composting and anaerobic digestion:** the Digestate and Compost in Agriculture (DC-Agri) research project carried out a series of field experiment on the use of quality digestate and compost in agriculture, in order to provide a robust evidence base to support the confident use of digestate and composts as renewable fertilisers by farmers and growers⁸⁴.
- **Innovation in business models:** see information on REBus project below.

WRAP is the lead partner in the **Developing resource efficient business models (REBus) project** - an EU LIFE+ funded partnership project which aims to demonstrate how both large organisations and SMEs can work with their supply chains to implement resource efficient business models (REBMs) in four key markets: electrical and electronic products, clothing and textiles, furniture and construction products. REBus has funded 26 pilot projects, which delivered EUR 5.5 million in financial benefit, 63,000 tonnes in material savings and 2,000 tonnes of greenhouse gas reductions. Subsequent WRAP analysis suggests that widespread, transformational adoption of REBMs has the potential to deliver over EUR 320 billion in net gross value added (GVA) gains across the EU by 2030. Further details can be found online⁸⁵.

This study *Extrapolating resource efficient business models across Europe*⁸⁶ calculates the UK potential from a transformational adoption of REBMs to be:

- net GVA gain by 2030: EUR 86 billion;
- materials avoided: 21 million tonnes;
- Materials diverted: 38 million tonnes;
- Net reduction in greenhouse gases: 15 million tonnes of carbon dioxide equivalent.

WRAP runs several **consumer behaviour change campaigns**, including the following.

- **Recycle Now**⁸⁷: the national recycling campaign for England, supported and funded by government, managed by WRAP and used locally by over 90 per cent of English authorities. Recycle Now is here to help people to recycle more things, more often.
- **Love Food Hate Waste**⁸⁸: managed by WRAP, LFHW aims to raise awareness of the need to reduce food waste and help consumers to take action. It shows that by doing some easy practical everyday things in the home we can all waste less food, which will ultimately benefit our finances and the environment.

⁸⁰ www.wrap.org.uk/content/electricals-industry-could-realise-%C2%A3billions-financial-benefit (English)

⁸¹ www.wrap.org.uk/content/landfill-falls-out-fashion-uk-embraces-sustainable-clothing (English)

⁸² www.wrap.org.uk/content/food-futures (English)

⁸³ www.wrap.org.uk/content/benefits-reducing-global-food-waste (English)

⁸⁴ www.wrap.org.uk/content/digestate-and-compost-agriculture-dc-agri (English)

⁸⁵ www.rebus.eu.com (English)

⁸⁶ <http://www.rebus.eu.com/wp-content/uploads/2017/07/Extrapolating-resource-efficient-business-models-across-Europe.pdf> (English)

⁸⁷ www.recyclenow.com (English)

⁸⁸ www.lovefoodhatewaste.com (English)

- **Love Your Clothes**⁸⁹: aims to raise awareness of the value of clothes and encourage people to make the most of the clothes they already have. The campaign is managed by WRAP and has been developed as part of the Sustainable Clothing Action Plan.

The Recycle Now consumer campaign run by WRAP provides **educational resources** for schools through the Recycle at School project⁹⁰, including teaching material for classroom use and practical advice on how to set up recycling collections in school.

ENWORKS

Launched in 2001 ENWORKS is supporting thousands of businesses in North West England with the transition towards a vibrant, sustainable and low-carbon economy for the future. The aims are to (i) improve the competitiveness and productivity of companies in North West England by reducing their exposure to environmental risk and (ii) reduce carbon dioxide emissions, water and material usage and divert waste from landfill. Advice has been provided to more than 13,000 businesses, including intensive resource efficiency support to over 5,500. Since its launch ENWORKS has recorded GBP 316 million in cost savings to businesses by improving environmental performance; over 1 million tonnes of waste diverted from landfill; and savings of more than 1 million tonnes of carbon dioxide equivalent, more than 30 million tonnes of solid, liquid and gaseous materials and nearly 15 million cubic metres of water. Further details can be viewed online⁹¹.

UK - Northern Ireland

In Northern Ireland the majority of resource efficiency initiatives have tended to stem from the NI Waste Management Strategy, including the Rethink Waste Programme and WRAP Northern Ireland Delivery programme. Rethink Waste was launched in 2010 by the then Department of the Environment as a call to action in Northern Ireland.

Rethinking Waste means:

- improving the resource efficiency of all sectors of society, addressing the problem of waste production at its very outset; and
- maximising the benefits of reuse, recycling and recovery, especially for materials which contribute significantly to carbon emissions.

The Rethink Waste Programme is the principal resource efficiency delivery programme in Northern Ireland.

The Waste and Resources Action Programme (WRAP) Northern Ireland is funded by DAERA to deliver the Rethink Waste Programme to:

- prevent waste and minimise the use of primary resources;
- increase recycling and recovery of materials from the waste stream, diverting them from landfill and maximising their economic value; and
- reduce the impact that waste can have on climate change.

Partnership working is at the heart of how WRAP works - identifying organisations or individuals that can make the biggest impact and bringing them together to make change happen.

Examples of some of the outworkings of these projects include: funding resource efficiency projects; developing resource efficiency guidance to businesses through the NetRegs website⁹² run jointly by the

⁸⁹ www.loveyourclothes.org.uk (English)

⁹⁰ www.recyclenow.com/recycling-knowledge/getting-started/recycling-at-school (English)

⁹¹ <http://enworks.com/> (English)

⁹² <http://www.netregs.org.uk/> (English)

Northern Ireland Environment Agency and the Scottish Environment Protection Agency, and requiring separate collection of food waste from households and businesses.

Northern Ireland has continued to operate the Carrier Bag Levy, which has continued to reduce the consumption of disposable bags⁹³, with the proceeds being used to fund environmental projects⁹⁴.

The Northern Ireland Environment Agency's programme of Prosperity Agreements has continued, with three more high profile businesses entering into commitments to go beyond compliance in their environmental performance⁹⁵. Through Northern Ireland's Prosperity Agreement programme, the Northern Ireland Environment Agency supports responsible businesses to move beyond minimum compliance and towards harnessing value from innovation, particularly in energy use and resource management. Prosperity Agreements are voluntary partnerships that seek to improve the relationship between the NI environmental regulator and key stakeholders whilst facilitating mutual gains in economic and environmental performance.

Authorities in Northern Ireland are also supporting initiatives through collaborative networks aimed at increasing the quality and value of recyclates. Further detail can be viewed online⁹⁶.

With the rise in use of social media, the way in which we communicate has dramatically changed. Politicians and other influential stakeholders are much more accessible to the public and the speed at which central government needs to react, adapt and make new policies is accelerating. Research needs to be taken across the EU so that this new way of doing business is better understood and can be harnessed for the benefit of our environment.

Northern Ireland has launched a social web pilot project that includes food waste and other recycling messages. The social web is potentially Government's response to the enormous technological changes that have changed the needs, expectations and behaviour of digital citizens today. It places today's digital citizen at the heart of Government communications, and it will allow citizens to receive and engage with the information that they need, at the time they need it and in a way that fits in with their lives. The social web platform aims to: contribute to Programme for Government outcomes; amplify the uptake of Government services and information; inform Government on how to improve these services and information, so that they meet actual and real-time citizen needs & expectations; increase savings and efficiencies for Government; and build trust between Government and citizens and all other stakeholders.

The pilot uses social media to target messages to particular demographic groupings in NI in response to surveys identifying different user needs for information and where the focus of attention should be to try to increase recycling across the demographic groupings. The social media pilot has been running for several months since late 2017 and will be evaluated in the second half of 2018. The pilot sends messages via Facebook, Twitter, Instagram and Pinterest and has a web presence online⁹⁷.

UK - Scotland

Zero Waste Scotland is Scotland's Circular Economy expert body and is funded by the Scottish Government to support delivery of the Scottish Government's Circular Economy strategy and the EU Action Plan for the Circular Economy. Zero Waste Scotland is also the lead partner for the Resource Efficient Circular Economy Accelerator Programme in the current round of European Structural Funds in Scotland. This strategic intervention has a total value of GBP 73 million, funded by the European Regional Development Fund

⁹³ <https://www.daera-ni.gov.uk/articles/northern-ireland-carrier-bag-levy-statistics> (English)

⁹⁴ <https://www.daera-ni.gov.uk/articles/daera-niea-challenge-fund-201617> (English)

⁹⁵ <https://www.daera-ni.gov.uk/articles/prosperity-agreements> (English)

⁹⁶ <http://www.brysonrecycling.org/news/the-collaborative-circular-economy-network-ccen-scoping-study> (English)

⁹⁷ <https://www.myni.life/> (English)

(ERDF), and will run to December 2019. It aims to improve the economic performance of SMEs while at the same time reducing their impact on the natural environment by accelerating circular economy and resource efficiency work.

We have highlighted a few good practice examples of relevant initiatives underway in Scotland below.

Financial assistance to SMEs (funded through the Scottish Government and the European Regional Development Fund under the Resource Efficient Circular Economy Accelerator Programme):

- ***Resource Efficiency Advice & Support Service***
 - Resource Efficient Scotland is a programme delivered by Zero Waste Scotland. The programme offers free advice and technical support as well as the sharing of best practices and new technologies. Embedding resource efficiency within Scottish organisations makes a significant contribution to the achievement of the Scottish Government's strategic economic objectives, climate change, energy efficiency and zero waste targets. Each year more than 34,000 individuals from a range of organisations access the programme for support from the Resource Efficient Scotland Advice and Support Service.
 - The service has a proven track record of saving money. In 2013–2014, an audit of 600 Scottish businesses receiving one-to-one support from the Resource Efficient Scotland programme resulted in implemented savings of almost GBP 12 million - an average saving of GBP 19,000 per business.
 - the Resource Efficient Scotland website has some examples from the SMEs supported⁹⁸.
- ***The Circular Economy Business Service***
 - The Circular Economy Business Support Service delivers tailored, expert, one-to-one consultancy directly to SMEs across all sectors in Scotland. It's designed to help companies explore more circular ways of doing business which can result in improved profitability, higher quality products, an increased customer base and alternative supply chains. The service is open to businesses and organisations seeking to develop and/or implement new business models, technologies, practices, products or services which can embed circular economy principles.
 - The bespoke one-to-one consultancy service can provide support with:
 - Innovation/opportunities identification;
 - market assessment;
 - stakeholder engagement;
 - business plan support;
 - business case development;
 - commercial case development;
 - support in identifying funding opportunities;
 - communications and marketing support;
 - implementation support.
 - The service has supported 80 SMEs since its commencement in early 2017.
- ***The Circular Economy Investment Fund***
 - The circular economy investment fund is a major grant fund (£18million), set up to invest in innovative projects which will accelerate a circular economy in Scotland, reducing carbon emissions, increasing investment in low carbon technologies and creating jobs.
 - The investment fund has three key strands:
 - directly supporting relevant projects emerging from the Circular Economy Business Service, as well as from referrals from across Zero Waste Scotland and partners;

⁹⁸ [Case studies | Resource efficient Scotland](#) (English)

- providing development grant support for ‘early stage’ applications, or for strategic infrastructure;
 - developing and delivering strategically-targeted funding calls for priority sectors.
- The objectives of the fund are as follows:
 - stimulate the development and uptake of innovative and resource efficient technologies, products and services to support a circular economy in Scotland;
 - encourage the collaboration of organisations across value chains, including enterprises and academia, to exploit the opportunities, and confront the challenges, of a circular economy in Scotland;
 - provide support and capacity building to enable the development and adoption of innovative and creative business models for a circular economy in Scotland.
 - The Zero Waste Scotland website has some examples of the SMEs supported under the fund to date⁹⁹.
 - See this recent press release as a further example of some innovative plastics projects being funded through the CE Fund¹⁰⁰.

Other Financial Assistance

The SME Loan Fund

The SME Loan provides unsecured, interest free loans of GBP 1,000–100,000 for the installation of energy efficient measures, and can be used for:

- **heating, ventilation and air conditioning upgrades** – from single improvements to controls to complete system replacements;
- **lighting systems** – fitting and controls;
- **building fabric** – including insulation, draft-proofing, double and secondary glazing;
- **water saving** – be it installing a grey water system, harvesting rain water or simply installing water efficient taps;
- **waste reduction** – installation of equipment to improve handling and reduce waste at source.

Since its launch in 2008, the SME Loan has provided Scottish businesses with more than GBP 24 million in loans for over 800 projects. The estimated financial savings to businesses is more than GBP 36 million.

Product-related policies, including on repair and reuse

National Reuse Standard

Revolve is Scotland’s national reuse quality standard for shops that sell second-hand goods in Scotland. Its aim is to increase re-use across Scotland by driving up standards in re-use and instilling confidence in consumers.

Revolve has been operational since 2011 and over that six-year period of development has achieved significant progress in its establishment including;

- robust and respected process for certification and recertification developed, tested and rolled out, with interest in the standard from across Europe;
- 122 stores currently certified to Revolve standards;
- successfully piloted in two high street charities and two private sector companies and demand for certification from a further 2 UK high street charity retailers;
- consumer brand and campaign developed and piloted achieving increased footfall through Revolve stores and recognition by consumers.

⁹⁹ [Investments to date Circular Economy Investment Fund | Zero Waste Scotland](#) (English)

¹⁰⁰ [Beacon of hope for recycling as major funding agreement signed on plastics plant | Zero Waste Scotland](#) (English)

Further details on certified stores and the consumer campaign can be found on the Revolve Reuse website¹⁰¹.

Change in consumption patterns and consumer behaviour

Recycle for Scotland¹⁰² provides advice and information on how to recycle, helping to protect Scotland's natural environment and make our communities nicer places to live in.

Love Food Hate Waste¹⁰³ aims to raise awareness of the need to reduce food waste and help us take action. It shows that by doing some easy practical everyday things in the home we can all waste less food, which will ultimately benefit our purses and the environment too.

Research and Innovation

The Scottish Institute for Remanufacture (SIR)¹⁰⁴ was established in May 2015 and funded initially for 3 years by both Scottish Funding Council and Zero Waste Scotland, for a total of GBP 1.3 million – Zero Waste Scotland providing GBP 300,000.

The objectives for the first three years of operation were as follows:

- increased innovation in remanufacturing through stimulating and co-funding collaborative projects between industry and HEIs;
- increased activity and engagement from the academic community to build capacity;
- establishing the Scottish Remanufacturing community.

These objectives have broadly been met, with SIR funding 34 industry projects across a range of sectors; involving 8 academic institutions in the work of the institute; and creating a network of more than 60 organisations.

Other Initiatives:

MRF Code of Practice¹⁰⁵

The Scottish Government's Code of Practice on Sampling and Reporting at Materials Recovery Facilities aims to improve the quality of materials processed through qualifying facilities by developing standardised testing processes and reporting mechanisms for all input and output materials.

Charter for Household Recycling¹⁰⁶

The Scottish Government and the Convention of Scottish Local Authorities (COSLA) have agreed a [Household Recycling Charter](#) that aims to bring more consistency to recycling services and to make it easier for residents to recycle.

The Charter and associated Code of Practice was agreed by COSLA Leaders on 28th November 2015. Further details are provided in the Charter for Household Recycling Code of practice and Code of practice for household recycling in Scotland.

To date 27 of Scotland's 32 local authorities have signed up to the Household Recycling Charter.

¹⁰¹ [Revolve Re-use | Zero Waste Scotland](#) (English)

¹⁰² [About us | Recycle for Scotland](#) (English)

¹⁰³ [About Us | Love Food Hate Waste Scotland](#) (English)

¹⁰⁴ [Scottish Institute for Remanufacture](#) (English)

¹⁰⁵ [MRF Code of Practice | Zero Waste Scotland](#) (English)

¹⁰⁶ [Charter for Household Recycling | Zero Waste Scotland](#) (English)

UK - Wales

In addition to the initiatives identified in the section on Dedicated national strategies or roadmaps for material resource efficiency and for circular economy, we have a number of other examples.

- **Waste and Resources Action Programme (WRAP) Cymru:** WRAP Cymru were awarded GBP 9.5 million core grant funding by the Welsh Government to deliver a programme aimed at increasing materials resource efficiency, achieving the outcomes specified in the Wales waste plan and to contribute towards developing a more circular economy in Wales by:
- contributing to greater resource efficiency in Wales-produced products and packaging throughout their lifecycle of production, use and end of use;
- preventing waste and maximising reuse and high quality recycling and increasing recycled content from the public sector and business. This includes a dedicated programme to increase resource efficiency and achieve a circular economy transition in public sector procurement, with dedicated support and guidance provided to the public sector in Wales (see details below);
- delivering the necessary behaviour change in respect of waste prevention, reuse and recycling through the Recycle for Wales and Love Food, Hate Waste campaigns;
- working on programmes for delivery of waste prevention methods in households and improving evidence that supports delivery of waste services and resource efficiency in local authorities.

WRAP Cymru is part of WRAP who deliver similar programmes in England and Northern Ireland, and who also lead on UK voluntary agreements with key sectors, including those in retail (Courtauld 2025), electronics (ESAP) and textiles (SCAP).

To help embed circular economy and sustainability into procurement policies and practice into public sector organisations, the Welsh Government has funded WRAP Cymru to deliver support programmes to help the sector rethink the way it procures goods and services, delivering a step change in its approach to waste and resource efficiency. Details of the support available can be found online¹⁰⁷. Components of the support programme to the public sector by WRAP Cymru includes the following.

- **Organisational Support:** provision of consultancy support to individual public sector organisations and influential bodies such as the National Procurement Service to implement resource efficiency (materials and waste) activities.
- **Supportive Case Study Evidence:** development of viable pilot projects – this includes looking at cost-effective decarbonisation initiatives and assessing the role of low carbon supply options, and exploring opportunities for procuring more recycled and/or reused materials. Publishing case studies to demonstrate best practice will enable these to act as exemplars for other public sector organisations.
- **Networking Events:** organising events to showcase organisations that deliver services/products that work towards meeting the needs of a circular economy and sustainable practices to provide inspiration/example to others.
- **Procurement Frameworks:** development of frameworks that enable public sector organisations to identify and employ alternative procurement practices embedding principles of circular economy and sustainability.

Some examples of case studies produced by WRAP Cymru are:

- resource efficient offices for Swansea Council¹⁰⁸;
- turning recycled plastic into beer kegs¹⁰⁹;

¹⁰⁷ <http://www.wrapcymru.org.uk/public-sector> (English)

¹⁰⁸ [http://www.wrapcymru.org.uk/sites/files/wrap/20180305 Swansea Council Case Study Final V1.pdf](http://www.wrapcymru.org.uk/sites/files/wrap/20180305_Swansea_Council_Case_Study_Final_V1.pdf) (English)

¹⁰⁹ <http://www.wrapcymru.org.uk/sites/files/wrap/EcoKeg%20Case%20Study%20ENGLISH.pdf> (English)

- Swansea start-up diverts 250 tonnes from landfill¹¹⁰;
- how Public Health Wales became a circular office exemplar¹¹¹.

WRAP Cymru has developed a Route Map for Plastics Recycling in Wales to increase the demand for recycled content in plastic products, components and packaging manufactured in Wales, including through public sector procurement¹¹².

- **Enabling Zero Waste**¹¹³ – this is a Constructing Excellence in Wales initiative, grant funded by the Welsh Government, designed to work with the construction industry to provide practical, positive and active intervention via professional waste management solutions to assist in enabling zero waste in construction projects. The initiative offers collaboration at all stages of the design, development and construction of sites providing mentoring and practical operational assistance, enabling a reduction in waste arisings and producing a detailed evidence base to demonstrate the achievability of zero waste to landfill. The scheme encompasses problem solving, overcoming behavioural, cultural, practical and where possible, technical obstacles to achieve zero waste to landfill with a circular economy approach. A key part of the work is the publication of case studies for wide dissemination and adoption throughout the construction sector in Wales.
- **Ecodesign Centre for Wales** – grant funded by the Welsh Government. Established in 2006, the Ecodesign Centre (EDC) works with businesses, industry groups, academia, educators and policy makers on a national and international scale through collaborative eco-design projects. EDC are at the forefront of eco-design research and knowledge, and support organisations of all kinds to improve their environmental performance. EDC were identified as a Welsh Government Centre of Excellence in 2008.
- **The Welsh Government's Strategic Waste Management Grant** to fund the improvement of local authority recycling services - provided about GBP 600+ million in annual ring-fenced funding to our local authorities since 2002.
- **Resource Efficient Wales**¹¹⁴ – this is a Welsh Government funded service providing people – domestic, business, community, voluntary and the public sector – with a single point of contact for support on using resources (energy, materials and water) more efficiently.
- **Accelerating Reprocessing Infrastructure Development (ARID)**¹¹⁵ – GBP 14 million ERDF capital support programme which WRAP Cymru ran from 2011 until 2015 to help Wales achieve its target of recycling 70 per cent of all waste by 2025 and address areas of market failures identified in the Welsh Government's Collections, Infrastructure and Markets Sector Plan, especially in creating markets for recycle in Welsh manufacturing.
- **Carrier bag charge**¹¹⁶: we were the first UK nation to introduce a carrier bag charge, in 2011.

¹¹⁰ <http://www.wrapcymru.org.uk/sites/files/wrap/20171215%20Techlan%20Case%20Study%20Final%20V1.pdf> (English)

¹¹¹ [http://www.wrapcymru.org.uk/sites/files/wrap/Public%20Health%20Wales%20Sustainable%20Workplace%20\(4\).pdf](http://www.wrapcymru.org.uk/sites/files/wrap/Public%20Health%20Wales%20Sustainable%20Workplace%20(4).pdf) (English)

¹¹² <http://www.wrapcymru.org.uk/plastic-route-map> (English)

¹¹³ <http://www.cewales.org.uk/current-programme/enabling-zero-waste/> (English)

¹¹⁴ <http://resourceefficient.gov.wales/?skip=1&lang=en> (English)

¹¹⁵ www.wrapcymru.org.uk/ARID (English)

¹¹⁶ http://gov.wales/topics/environmentcountryside/epq/waste_recycling/substance/carrierbags/?lang=en (English)

We are committed to reducing the number of single use carrier bags used in Wales. The single use carrier bags charge legislation came into force in Wales on 1 October 2011¹¹⁷. Single use carrier bags are no longer given away for free when people buy goods.

A provision was included in the Environment (Wales) Act 2016 which requires the single use carrier bag regulations to place a duty on all retailers to donate the proceeds from the sale of carrier bags to an environmental charitable purpose that directly or indirectly benefit the whole or any part of Wales. However, an exception must also be provided to allow those sellers with existing arrangements with non-environmental good causes to continue. This new duty has yet to commence. The Welsh Government's 2016 Post-Implementation Review of the Single Use Carrier Bag Charge in Wales reported: single use carrier bag usage between 2011 and 2014 had declined by an estimated 71 per cent and an estimated overall reduction in all bag use by 57 per cent during the same period.

Consumer support for the charge had increased since 2011 from 61 per cent to 74 per cent in 2015.

From when the 5 pence charge was introduced in October 2011 to October 2014 additional donations to good causes were estimated to have been at between GBP 17 million and GBP 22 million.

- **Collaborative Change Programme:** GBP13 million was also provided to local authorities under the Collaborative Change Programme for them to improve their recycling services. The programme helps ensure the consistent supply of high quality recycle from all sources, especially from households, that can then be used by Wales based reprocessors and manufacturers. The programmes also seek to create a greater demand for goods with a high recycled content, and sustainable public sector procurement will play a key role.
- **FareShare Cymru – Redistribution of surplus edible food waste**¹¹⁸: FareShare Cymru was established in 2010 in South East Wales supported by just over 1 million pounds worth of Welsh Government grant funding. FareShare's aim is to fight hunger/food poverty by tackling food waste. Between 2011 and 2015 FareShare Cymru delivered over 70 million meals to people in need, diverted 1,408 tonnes of food from disposal, supported 40 charities and organisations and provided volunteering and skills opportunities to 368 volunteers. The food FareShare Cymru distributes saves its Community Food Members (CFMs) a combined GBP 1,150,000 per year in food bills, money which CFMs can then divert to provide other vital support.
- **The Circular Economy Capital Investment Fund for Wales:** A Circular Economy Capital Investment Fund (**GBP 6.5million**) that will start in 2019/20 has been approved by Welsh Ministers. A key policy priority in order to maximise the contribution towards the well-being goals of the Well-being of Future Generations (Wales) Act 2015) is to increase the reuse and recycling elements of the circular economy approach for Wales. This activity will help ensure a greater proportion of waste produced in Wales is reused and recycled by Welsh manufacturing companies. This helps create and protect jobs, especially by making Welsh manufacturing companies more resource efficient and resilient in terms of security of supply of raw materials.

Seeking synergies with other policy areas

UK - England

There are a range of policies across government where resource efficiency is integrated with wider benefit. The Government's **Industrial Strategy** aims to address long-term challenges to the UK economy in order to improve living standards, increase productivity and drive growth across the whole country. The Green

¹¹⁷ [The Single Use Carrier Bags Charge \(Wales\) Regulations 2010](#) (English)

¹¹⁸ <http://www.fareshare.cymru/> (English)

Paper highlighted the economic benefits that a transition to resource efficiency can secure by ensuring new technologies are explored and created in the UK. It emphasised how business competitiveness can be increased through a drive to reduce raw material demand and waste in our energy and resource systems. The promotion of well-functioning markets for secondary materials and new disruptive business models that challenge inefficient practice can also lead to new markets and increased job creation. Further details can be viewed online¹¹⁹.

The Government's **Clean Growth Strategy** published in October 2017 sets out a pathway to deliver on our carbon commitments and how the UK can reduce emissions across sectors, improve energy efficiency whilst stimulating economic growth. Resource efficiency has key synergies in tackling climate change and the strategy recognises the co-benefits that maximising the value we get from our natural and existing material resource assets can have in meeting our carbon commitments and improving energy efficiency. The strategy highlights the progress the UK has made in increasing resource productivity whilst at the same time reducing emissions, especially in food and agriculture, and outlines how further improvements can be made. For example, energy efficiency can be improved by increasing the use of secondary materials. Further details can be viewed online¹²⁰

The Government is currently working with industry and the research community on a new **bio-economy strategy**, which intends to outline how the UK can foster a world leading bio-economy. It will look at how industrial biology and synthetic biology can provide a platform for industries like agri-food, clean energy, chemicals, materials and pharmaceuticals manufacturing to add value to the British economy. The bio-economy and bio-based approaches have strong links with resource efficiency and can facilitate a more circular, resource efficient economy through more sustainable resource use, for example the use of waste derived feedstock as an alternative to virgin materials.

In our 2017 report *Business Resource Efficiency – Quantification of the no cost/low cost resource efficiency opportunities in the UK economy in 2014*, Defra's previous [research](#) estimated that those businesses could achieve savings of at least GBP 3 billion a year through no-/low-cost measures that would result in waste prevention and waste diversion. For further detail you can view the report online¹²¹.

WRAP work as part of the Resource Efficient BUSiness (REBus). REBus Models project aims to make a significant contribution towards two of the targets highlighted in the EU's study *Assessment of resource efficiency indicators and targets* (BIOIS 2013) (1) a 30 per cent reduction in domestic material use by 2020, and; (2) a 20 per cent reduction in greenhouse gas emissions by 2020. This report¹²² outlines how large-scale adoption of the sort of business models which have been piloted throughout the course of the REBus project could deliver substantial economic and environmental benefits across Europe. An indicative quantification of scenarios illustrating the potential impacts on GVA and raw material use are outlined in projections to 2030 for Europe as a whole, and for each of the EU28 member states.

Additional information on more current estimates of benefits from Resource Efficiency and Circular Economy, can be found in Defra's Resources and Waste Digest 2018¹²³.

¹¹⁹ <https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future> (English)

¹²⁰ <https://www.gov.uk/government/publications/clean-growth-strategy> (English)

¹²¹ [Business Resource Efficiency - Quantification of the no cost / low cost resource efficiency opportunities in the UK economy in 2014](#) (English)

¹²² <http://www.rebus.eu.com/wp-content/uploads/2017/07/Extrapolating-resource-efficient-business-models-across-Europe.pdf> (English)

¹²³ <https://www.gov.uk/government/statistics/announcements/digest-of-waste-and-resource-statistics-2018-edition> (English)

A good example of a specific initiative which seeks to make imports of materials and products more sustainable is with Sustainable Palm Oil, whereby in 2010 the UK government set a target for all imports of palm oil being from sustainable sources by 2015. That target was reached.

There are not many other examples of government-led specific initiatives although there will be some at business level where companies have specific policies on sustainability.

In terms of relevant research, the University of Leeds is looking into the feasibility of establishing new metrics to measure material flows, such as greenhouse gas emissions per tonne of materials, which would have more relevance environmentally than the traditional measure of tonnes of physical weight. This work is very promising but has not been completed yet. We hope to have the project finished during the next six months or so.

UK - Northern Ireland

The draft Programme for Government¹²⁴ seeks to identify and harness synergies and co-benefits, to achieve sustainable, resilient inclusionary growth and improvement Outcomes. There will be a further focus on creating synergies between resource efficiency, circular economy and other policy areas in the forthcoming Circular Economy Strategy for Northern Ireland.

UK - Scotland

There are two examples of deliberate initiatives to integrate policies across different policy domains given below.

The first is **the Procurement Reform (Scotland) Act of 2014**¹²⁵, which establishes laws about sustainable public procurement to maximise the social, environmental and economic benefits through effective and efficient procurement activity. This is through a sustainable procurement duty.

Smart use of procurement can play a key role in promoting jobs and growth, encouraging innovation, boosting training and apprenticeship opportunities and helping SMEs third sector organisations and supported businesses to compete effectively for contracts.

The second example is **the Manufacturing Action Plan**, which embeds both resource efficiency and circular economy as workstreams within the plan, the overall objectives of which are to:

- deliver concrete initiatives to boost productivity including leadership, employee engagement and skills, energy efficiency and the adoption of circular economy approaches across the manufacturing sector;
- stimulate innovation and investment in Scottish manufacturing sectors to better compete globally.

UK - Wales

There are three areas of policy integration within the Welsh government that we would particularly like to highlight:

Innovation

The Waste and Resource Efficiency team within the Directorate of Environment and Rural Affairs is working closely with the Innovation team within the Department of Economy and Transport to ensure that resource efficiency and a circular economy approach are embedded in the programme of innovation support to Welsh businesses. This collaboration was brought about through the Local Support Group for

¹²⁴ <https://www.northernireland.gov.uk/programme-government> (English)

¹²⁵ [Procurement Reform \(Scotland\) Act 2014](#) (English)

the Circular Economy for SMEs (CESME) project. This is an Interreg Europe funded project to develop policy interventions to enable SMEs to turn environmental challenges into opportunities. The Welsh Government is one of the ten partners from a region in each of six European countries. The project in Wales involves close working and the development of synergies between the Environment and Rural Affairs Directorate and the Department of Economy and Transport, specifically the Innovation team, as follows:

- a workshop training event for the innovation support team on resource efficiency / circular economy;
- a workshop held on the world's first circular economy standard, BS8001¹²⁶;
- working with 3 Academic Institutes in Wales to develop interventions to support SME's to adopt more circular economy practices;
- best practice case studies have been developed for circular economy innovation projects as a result of the collaborative working on the CESME project¹²⁷.

Public Sector Procurement

The Waste and Resource Efficiency team within the Directorate of Environment and Rural Affairs is working with Value Wales and the National Procurement Service on developing more resource efficient public sector procurement, with the technical support of WRAP Cymru. Details of the support provided by WRAP Cymru are provided online¹²⁸.

Construction

The Welsh Government has set up an internal Construction Alignment Group to ensure that construction activities across the Welsh government and the bodies it funds are aligned to core Welsh government policies, including those for resource efficiency and a circular economy. A very useful guide on the opportunities for a circular economy approach within the construction sector has been produced by Constructing Excellence in Wales under grant funding from the Welsh Government, *Closing the circle - Circular economy: Opportunity for the Welsh-built environment*¹²⁹.

Resource efficiency and circular economy policy initiatives from subnational to local level

UK - England

City Partnership Groups

In England, more so than other UK regions, there has been a trend towards cities developing local actions to promote the circular economy, for example, in London and Peterborough. The London Waste and Recycling Board has produced a Circular Economy Route Map to help direct activity, introduced programmes to help support circular businesses and the Mayor of London has incorporated circular economy into land use planning policy, whilst Peterborough has developed a app to promote sharing amongst local businesses.

¹²⁶ <https://www.bsigroup.com/en-GB/standards/benefits-of-using-standards/becoming-more-sustainable-with-standards/BS8001-Circular-Economy/> (English)

¹²⁷ <https://www.interregeurope.eu/CESME/> (English)

¹²⁸ <http://www.wrapcymru.org.uk/public-sector> (English)

¹²⁹ http://www.cewales.org.uk/files/1714/9372/0995/Closing_the_circle_Circular_economy_Opportunity_for_the_welsh_built_environment_Summary.pdf (English)

London's circular economy route map case study

The London Waste and Recycling Board (LWARB) was established in 2007 by the Greater London Authority (GLA) Act to provide a strategic approach to waste management in London. LWARB's Circular London programme works to create the right conditions for circular economy businesses to flourish in London. An economic analysis of the circular economy in London demonstrates the potential for net benefits to the city of up to GBP 7 billion a year by 2036 as well as 12,000 new jobs in the areas of reuse, remanufacturing and materials innovation by 2030.

In June 2017, LWARB published the circular economy route map for London. This document was created with stakeholders from across different sectors, to set a pathway for London to accelerate its transition towards a circular economy through a series of recommended actions for LWARB and its stakeholders.

The focus of the route map is based on analysis of economic impacts and residual waste streams within the city. The route map includes 100 practical actions across five focus areas –the built environment, food, electricals, textiles and plastics.

The route map also identified eight cross cutting themes: communications, collaboration, finance, demonstration, innovation, policy, procurement and business support.

The route map has allowed LWARB to create a strategic plan for facilitating the transition towards a circular economy and has been a catalyst in helping LWARB drive actions. This includes the development of a range of pilot projects, as well as evidence to embed circular economy concepts in London policies and investment opportunities.

Examples of this have been to embed circular economy into the Greater London Authority's responsible procurement policy – which includes the Metropolitan Police, London Fire Brigade and Transport for London; a large housing redevelopment project in south London where circular economy is being considered from demolition through to the design and construction; and a circular offices campaign, partnering with an organisation called Business in the Community, which encourages circular thinking within the offices of businesses across the capital. LWARB also delivers a project called Advance London that provides finance and business support to SMEs developing innovative circular economy models. Monitoring the impact and benefit of these examples should provide key evidence and case studies to encourage the broader adoption of circular thinking and policies within London.

The route map sets out London's vision and pathway towards circularity. Creating this document with stakeholders allows cities to have a bigger and wider impact by gaining buy-in and commitment from different sectors and organisations. It has provided direction for organisations, and an opportunity to convene people to focus and deliver action towards the circular economy – to act together rather than individually. LWARB is creating a 'collaboration hub' to bring interested actors together to collaborate and develop their own circular economy projects. We hope to create a community of the willing to share a stake in shaping London's circular trajectory.

clare.ollerenshaw@lwarb.gov.uk

<https://www.lwarb.gov.uk/what-we-do/circular-london/circular-economy-route-map/>
@CircularLondon @LWARB

The following are two other examples of city partnership projects, in London and Manchester.

WRAP and the London Waste and Recycling Board (LWARB) have jointly set up **Resource London**¹³⁰, a support programme for local authorities in London aimed at helping them to achieve recycling targets set by the Mayor of London and national government.

WRAP and the Greater Manchester Waste Disposal Authority (GMWDA) have jointly set up **Resource Greater Manchester**¹³¹ to provide a strategic programme of work to help GMWDA achieve its ambitions towards zero waste by achieving improvements and greater efficiencies in waste prevention, reuse and recycling.

Campaigns in industry sectors

The Food and Drink Federation (FDF) and the Industry Council for research on Packaging and the Environment (INCPEN) published their **Packaging for People, Planet and Profit – Sustainability Checklist** in March 2017¹³². The checklist helps companies choose and optimize their packaging systems in order to improve the sustainability of their value chain.

Bio-economy Cluster Groups

Biovale is a not for profit company supported by regional industry, research organisations, higher education and government. It provides support to the Yorkshire and Humber region's capability and reputations as an **innovation cluster for the bio-economy** and ensures that it fully exploits new business opportunities in the sector.

The **BioVale Special Interest Group on Anaerobic Digestion (AD)** aims to serve those with an interest in anaerobic digestion (AD) in the Yorkshire and Humber area. It enables those working in the industry to make valuable local contacts, share best practice, develop knowledge in specialist areas, discuss important local developments and issues, and help promote regional expertise and assets.

UK - Northern Ireland

In Northern Ireland businesses and householders are required to separately collect food waste¹³³. Separately collected food waste is prohibited from landfill. The aim is to push the management of food waste up the waste hierarchy, and indirectly lead to behaviour change including waste prevention and minimisation. Throughout 2017, Northern Ireland local authorities rolled out food waste collection services to households in their areas. Central government provided financial assistance and each authority determined its own timetable and communications approach. Some of the local authorities reported that after an initial surge in tonnages for the food waste collection service some reductions were observed as householders were able to identify how much food they were wasting and took action to reduce the amount of food wasted.

The Industrial Symbiosis Service in Northern Ireland is funded by Invest Northern Ireland. Industrial symbiosis is a systems approach to a more sustainable and integrated industrial economy that identifies business opportunities to improve resource utilisation – materials, energy, water, capacity, expertise, assets, etc. By identifying profitable links between its members, the IS service ensures that previously unused or discarded resources from one organisation are recovered, reprocessed and reused by others.

¹³⁰ <http://resourcelondon.org/> (English)

¹³¹ <https://www.gmwda.gov.uk/resource-greater-manchester/> (English)

¹³² <https://www.fdf.org.uk/packaging-checklist.aspx> (English)

¹³³ <http://www.legislation.gov.uk/nisr/2015/14/made> (English)

UK - Scotland

Circular Economy Cities and Regions programme

As well as taking a sectoral approach to driving circular economy developments across Scotland in line with the priorities outlined in Making Things Last, Zero Waste Scotland is also trialling a cities and regions approach, making the most of synergies at a more local level. Due to the population and resource density in a small geographic area, cities are an ideal location for new circular business models, such as reverse logistics, material recovery, re-use, leasing and sharing. Over half of Scotland's population lives in cities. It allows for cross-sectoral focus which takes advantages of the benefits and potential synergies between businesses from different sectors. This not only encourages innovation but also can help create jobs.

By concentrating on a specific geographical area, we can understand and raise awareness of the benefits of a circular approach, support opportunities in 'horizontal' sectors, build relationships with local stakeholders and link with other relevant activity taking place on a regional basis. e.g. City Region Deals, economic development priorities, sustainability goals and meeting National Outcomes.

With funding from both the Scottish Government and the European Regional Development Fund, Zero Waste Scotland is currently supporting four Circular Cities and Regions: Glasgow, Tayside, North-east Scotland and Edinburgh. Across each city and region, the project aims to open new revenue streams, increase competitive advantage, and realise financial savings. These initiatives are being driven in each area by Business Engagement Partners, and more details can be found on the partners websites at the following links:

[circularglasgow;](#)

[Circular Tayside | Dundee and Angus Chamber of Commerce;](#)

[Circular North-east;](#)

[New Edinburgh initiative to help SMEs go circular | Resource Magazine.](#)

Zero Waste Towns

Larger communities across Europe have demonstrated the power of building waste awareness in conjunction with a sense of civic pride and community action. Having explored this in Scotland in communities based around one rural town (Dunbar) and one island (Bute) with some success, the model is now starting to be trialled in higher density urban communities.

With the support of the European Regional Development Fund, Zero Waste Scotland is now funding three additional Zero Waste Towns – one in Perth and two in specific areas of Edinburgh – Leith and Edinburgh Southside. These are designed as transformative projects that can be disseminated to other communities wishing to pursue the goals and aspirations of becoming Zero waste Town communities.

Further details of the Zero Waste Towns project can be found at the following links:

[Zero Waste Town | Sustaining Dunbar;](#)

[Isle of Bute becomes a Zero Waste island | Zero Waste Scotland;](#)

[Three communities celebrate Zero Waste Town title | Zero Waste Scotland.](#)

Litter Prevention

In September 2017, Dundee was announced as Scotland's first city/town in which a group of organisations and businesses have committed to work together and take key actions to prevent litter spoiling the local area. These organisations have signed up to Zero Waste Scotland's Litter Prevention Action Plans initiative to work together on a city-wider preventative approach to tackling litter. Further details can be found online¹³⁴.

¹³⁴ [Dundee Takes National Lead on Litter Prevention | Zero Waste Scotland](#) (English)

UK - Wales

The Welsh government has published the following sector plans for resource efficiency and waste:

- Municipal Waste Sector Plan¹³⁵ looks at waste that each local council collects and includes household waste and recycling;
- Collection, Infrastructure and Markets Sector Plan¹³⁶ looks at what happens to the waste once it has been put out for collection and how Wales deals with its waste without sending it to landfill;
- Food, Manufacture, Service and Retail Sector Plan¹³⁷ looks at food waste and packaging in Wales and how to reduce it within the food and manufacturing industry;
- Construction and Demolition Sector Plan¹³⁸ looks at the waste produced in the building industry and how to manage this;
- Commercial and Industrial Sector Plan¹³⁹ looks at waste in business, retail and manufacturing and how to reduce and manage this.

Constructing Excellence Wales was awarded GBP 1.1 million by the Welsh Government for its programme for sustainable waste management in the construction sector, to help deliver against the targets established in the Wales waste plan. The programme is working towards shifting the industry towards a circular economy in line with the principles outlined within the Well-being of Future Generations (Wales) Act. The construction programme aims to reduce waste arisings; increase reuse through preventing materials from becoming a waste; increase high quality recycling; and improve available evidence to support the delivery of waste services and efficiency in the construction sector in Wales.

Other resources

Examples of policies which go beyond “material resources”

UK - England

We are committed to publishing a **25-year environment plan** to deliver our commitment to being the first generation to leave the environment in a better state than we inherited it. It sets out how over the next quarter of a century the government will improve the environment. The 25-year environment plan will ensure that we use the insights of natural capital thinking to develop an approach which will help guide us in every area. The plan was launched by the Prime Minister and Environment Secretary on 11 January 2018. Further details can be found online¹⁴⁰.

UK - Northern Ireland

In the creation of a Circular Economy Strategy Northern Ireland will be considering a wide range of initiatives which will support a transition to more sustainable models of consumption. It has not yet been ascertained whether the approach will be sector-based, resource-stream based or some other alternative.

¹³⁵ https://gweddill.gov.wales/topics/environmentcountryside/epq/waste_recycling/publication/municipalsectorplan/?skip=1&lang=en (English)

¹³⁶ https://gweddill.gov.wales/topics/environmentcountryside/epq/waste_recycling/publication/cimsectorplan/?lang=en (English)

¹³⁷ https://gweddill.gov.wales/topics/environmentcountryside/epq/waste_recycling/publication/food-manufacture-service-and-retail-sector-plan/?lang=en (English)

¹³⁸ https://gweddill.gov.wales/topics/environmentcountryside/epq/waste_recycling/publication/canddsectorplan/?lang=en (English)

¹³⁹ https://gweddill.gov.wales/topics/environmentcountryside/epq/waste_recycling/publication/industrial-and-commercial-sector-plan/?lang=en (English)

¹⁴⁰ <https://www.gov.uk/government/publications/25-year-environment-plan> (English)

UK - Wales

We have a number of other initiatives that will support Wales in achieving resource efficiency:

- Goals of the Well-being of Future Generations Act¹⁴¹;
- Prosperity for All: the national strategy¹⁴²;
- Climate Change Strategy;
- Natural Resources Policy¹⁴³;
- Water Strategy¹⁴⁴;
- Fly-tipping Strategy, tackling small-scale illegal deposits of waste¹⁴⁵;
- Innovation strategy¹⁴⁶;
- ERDF Operational Programme¹⁴⁷.

The way forward

Reflections on future directions of policies on resource efficiency and circular economy

UK - England

We have observed a range of barriers and challenges that need to be addressed if we are to meet our objectives regarding resource efficiency and the transition to a more circular economy. Four in particular are as follows:

Economic barriers

There are a range of fundamental economic barriers facing policy makers and companies seeking to transition to a more circular approach: First, the relative cost of virgin versus secondary materials, coupled with high levels of price volatility often make the long-term infrastructure investments highly risky and payback poor. This is particularly true of materials such as plastics, which have significant end of life impacts if not managed correctly. Second, financing and capital investment is often hard to access for this type of activity – given a poor industry understanding of the potential long-term benefits of the move to a more circular model. Third, mainstream accounting and financial reporting procedures often do not favour circular business models such as product service systems that require businesses to maintain larger quantities of stock. We need more intelligent forms of accounting for the benefits of a circular system to be fully recognised.

Misaligned incentives

Linked to the economic barriers listed above, a fundamental barrier relates to the misalignment of the costs and benefits associated with product design decisions. To fully enable a more circular economy, products and services need to be designed with the full lifecycle impacts of those products in mind. However, currently, neither the costs of end of life waste nor the benefits associated with better product design fully accrue to those making design decisions. To enable a more circular economy, product designers need to be incentivised and rewarded for taking action to reduce the lifecycle impacts of their products.

¹⁴¹ <http://gov.wales/topics/people-and-communities/people/future-generations-act/?lang=en> (English)

¹⁴² <http://gov.wales/docs/strategies/170919-prosperity-for-all-en.pdf> (English)

¹⁴³ <https://gweddill.gov.wales/docs/desh/publications/170821-natural-resources-policy-en.PDF> (English)

¹⁴⁴ <https://gweddill.gov.wales/topics/environmentcountryside/epq/waterflooding/publications/water-strategy/?lang=en> (English)

¹⁴⁵ <https://gweddill.gov.wales/topics/environmentcountryside/epq/cleanneighbour/flytipping/?lang=en> (English)

¹⁴⁶ <https://gweddill.gov.wales/topics/science-and-technology/innovation/innovation-wales-strategy/?lang=en> (English)

¹⁴⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/342297/ERDF_Operational_Programme.pdf (English) and <https://gweddill.gov.wales/funding/eu-funds/2014-2020/?lang=en> (English)

Behavioural barriers/Consumer demand

Consumers need to create demand and understand the benefits that resource efficient products and circular business models can bring. We need a greater understanding of where and how consumer benefits can be realised and how to enable consumers to make informed choices when purchasing products and services. We have an active research programme across government which looks to build and apply behavioural insights to improve the performance and impact of policies and consumer information.

Capacity and capability

Despite the potential for significant economic benefits, business often do not have the capacity (in terms of time and money) or capability (skills) to identify and realise these benefits. This is particularly true of SMEs. To unlock this potential, action is needed across supply chains – with SMEs supported by larger businesses and in localised clusters – where businesses can share knowledge and expertise to build capacity.

UK - Scotland

Some of the challenges that Scotland has encountered when implementing resource efficient and circular economy policies are summarised below:

1. *Making the case for change (circular economy)*

Whilst the case for the circular economy is evident at a national level, we have found that individual companies can find it difficult to understand the opportunities for them, and the benefits that a circular approach will bring. Our Circular Economy Business service aims to tackle this, both by helping companies understand and develop opportunities, but also through showcasing what individual companies have achieved.

2. *Businesses capacity to innovate*

Even where businesses have recognised the benefits in taking a more circular approach, often (particularly for smaller businesses), their capacity to develop and trial a new business model alongside their existing business is limited, and the perceived risks of doing so are high. Again, our circular economy business service aims to tackle this.

3. *Existing legislation (circular economy)*

Existing legislation (such as end of waste regulations), can be a barrier to reuse, repair, and remanufacture – whether or not this is real or perceived. In Scotland, SEPA is working closely with business and industry to tackle this through it's 'One Planet Prosperity' approach. Further details online¹⁴⁸.

4. *Monitoring*

Developing suitable indicators to measure progress and set targets is challenging, particularly for circularity. Demonstrating progress by monitoring initiatives at a company level through material use, carbon savings, etc., turnover, etc. is one of the approaches taken by Zero Waste Scotland, but this raises other challenges due to the often-extended timescales needed for a new approach to be developed, implemented and the benefits realised.

The focus on emission-based carbon targets for nations, rather than consumption-based targets, also hinders progress on designing circular systems for products and services.

5. *Uptake and use of secondary resources*

We've found that health & safety legislation, consumer protection and general perception can all undermine opportunities for using recycled or reused materials or products. Zero Waste Scotland works

¹⁴⁸ <https://www.sepa.org.uk/regulations/how-we-regulate/delivering-one-planet-prosperity/> (English)

closely with industry groups, individual companies etc to overcome these barriers, but nevertheless, this remains a significant barrier to circulation of products and materials.

UK - Wales

The 2013 *Wales and the Circular Economy: Favourable system conditions and economic opportunities* report produced by the Ellen MacArthur Foundation for the Waste & Resources Action Programme (WRAP) and the Welsh government identified the following barriers for the development of a more circular economy in Wales:

- a. Potential ambiguity: circular economy seen as a cost: traditional perspectives can view waste as a burden rather than a resource, but circular economy invites a systems vision based on economic growth and waste as food.
- b. Danger of polarising language and framing: Polarising terminology and the prevalence of recycling over reuse may negate the message of value ultimately brought by circular economy.
- c. Inconsistency of approach: certain discrepancies between government policy and action on the ground imply difficulties in implementing some measures that could support circular economy.
- d. Lack of clarity or practicality in supporting mechanism: existing business support initiatives and forums are manifold but do not specifically encourage circular economy practices. Support mechanisms can be aligned around the opportunity and communicated effectively to business.
- e. Education, skills and training channel the reductionist approach: approaches to ESD and adult education can vary across the country, and SMEs may lack commercial or technical expertise and interdisciplinary perspectives.
- f. Business as Usual lock-in: traditional, linear models of marketing and anxieties around collaborating with competitors may contribute to a status-quo bias and prevent businesses innovating for circular economy.
- g. Limited access to appropriate resource flows, qualitatively and quantitatively: access to steady flows of quality recyclate and availability of reprocessing plants are important for businesses pursuing reuse and remanufacturing, and it is difficult to attract investment if recyclate supply is volatile.
- h. Limited take up of public procurement drivers: Insufficient awareness of or fragmented approaches to sustainable public procurement may limit Welsh business adoption of circular economic innovation.
- i. Ineffective implementation of legislation: the case of EPR. European legislation that could nominally support a circular economy, such as EPR, may prove a barrier to innovative design and material valorisation if implemented ineffectively in member states.
- j. Perceived business risk of transition and underestimated hazard of maintaining the *status quo*: Immediate concerns about brand image or health and safety may prevent some companies from innovating around circular economy, though equally there is a poor understanding of the risks of maintaining business as usual.
- k. Limited influence of Wales on fiscal policy and dependence on external markets: as a small country, Wales can be the unwitting recipient of legislation or supply chains dictated from elsewhere, and its influence on global materials markets is limited.

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