Building a Circular Economy for Scotland
Evidence from Zero Waste Scotland activities 2012–2016
# Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Executive Summary</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Introduction</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Review of activities 2012 to 2016</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>3.1 Development of the Circular Economy Programme</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>3.2 Business model support</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>3.3 Cities and regions</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>3.4 Bioeconomy</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>3.5 Energy sector</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>3.6 Textiles manufacturing</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>3.7 Remanufacturing</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>3.8 Re-use and repair</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>3.9 Procurement</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>3.10 Influencing the circular economy agenda</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>Lessons learned and future considerations</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>4.1 What works best (and doesn’t work) for directly supported businesses?</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>4.2 What wider market factors can help or hinder circular economy ideas?</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>4.3 How can support agencies be most effective?</td>
<td>28</td>
</tr>
<tr>
<td>5</td>
<td>Our current support offering</td>
<td>32</td>
</tr>
</tbody>
</table>
Zero Waste Scotland is the Scottish Government’s lead agency for the circular economy.
Foreword

Scotland is a world leader in delivering a circular economy.

Scotland’s progress in transitioning to a circular economy has been recognised at The Circular Economy Awards 2017, presented at the World Economic Forum Annual Meeting in Davos, Switzerland. As the winner of the Award for Circular Economy Governments, Cities and Regions, Scotland is now seen across the globe as a beacon to follow.

This prestigious international award came just one year after the Scottish Government launched its first circular economy strategy in 2016. Making Things Last highlights those priority areas in which we have the greatest opportunity to eliminate waste as far as possible to deliver meaningful and long-lasting economic, environmental and social benefits. The circular economy is also central to Scotland’s Manufacturing Action Plan – and, in turn, a concerted focus on remanufacturing could revitalise Scotland’s manufacturing tradition.

Zero Waste Scotland first began to deliver the Resource Efficient Circular Economy Accelerator Programme, funded jointly by the European Regional Development Fund (ERDF) and the Scottish Government, in 2016. The ERDF funding has enabled us to significantly scale up our direct support to businesses and other organisations, an approach that took off in earnest as of 2017.

Scotland’s circular economy achievements to date include the flourishing of collaborations between business and academia via the Scottish Institute for Remanufacture; the setting up of large-scale re-use and repair hubs and widespread support for Scottish businesses to develop circular economy models, products and services. Capital investment is made available through the £18 million Circular Economy Investment Fund and our Circular Economy Business Support Service provides bespoke advice.

Laying the foundations for such successes has taken years of groundwork. In this report, we provide insights into the work carried out by Zero Waste Scotland from 2012 to 2016 to establish a firm basis for Scotland’s circular economy. We explore the need to focus on specific sectors such as manufacturing and energy infrastructure, and the broad applicability of re-use, remanufacturing and procurement activities.

Our circular economy work has been bolstered by the European Regional Development Fund and Scottish Government-backed Resource Efficient Circular Economy Accelerator Programme, which has enabled us, since 2017, to significantly scale up our direct support to businesses and other organisations.

Supporting the transition towards a circular economy requires input from more agencies than ours alone. In bringing together our experiences in this report – along with the lessons we’ve learned from them – we hope to help others successfully deliver their own programmes in support of a circular economy for Scotland.

Iain Gulland

Chief Executive
Zero Waste Scotland
Understanding how best to support the move towards a circular economy is as much a work in progress as the transition itself.

The circular economy is about driving innovation in the way products and services are provided – and that is true for the support we offer also, which is constantly evolving. From humble beginnings – building evidence for the approach and awarding grants to fund innovation in sustainable resource management – we have become a global authority in our field. Successfully bidding in to host the Circular Economy Hotspot 2018, a major international event and trade mission, has highlighted Scotland’s progress to date and other countries now look to our example.

Zero Waste Scotland is the Scottish Government’s lead agency for the circular economy, but we can’t achieve the transition for Scotland on our own – collaboration at all levels is crucial. We work closely with the Scottish Government and its agencies, and drive the delivery of Scotland’s first circular economy strategy, Making Things Last. Building a circular economy requires extensive partnership across sectors and between organisations. We’ve built our own collaborations – with the likes of the Ellen MacArthur Foundation, the Scottish Institute for Remanufacture and Scotland’s innovation centres – and we’ve helped those we support to nurture similarly synergistic relationships.

Circular economy opportunities are all around us, but Making Things Last identifies four key areas that demand greater attention: manufacturing, construction, energy infrastructure and food and drink and the wider bioeconomy. Developing Scotland’s bioeconomy will identify localised solutions and increase revenue for waste and by-products, increase resource resilience, provide solutions for unavoidable food waste arisings, and create new business opportunities. Estimated savings of between £500 million and £800 million could be achieved in the beer, whisky and fish sectors alone through better use of waste and by-products.

Re-use, remanufacturing and sustainable procurement are enablers that can be embedded across all sectors and industries. Re-use should be normalised into all business and consumer activity for the circular economy to be successful. Remanufacturing high-value goods retains their value and uses less energy than making new products, and provides sustainable economic growth and skilled employment. Public sector spending across Scotland amounts to circa £11 billion per year – making procurement a powerful means by which to promote circular economy solutions and potentially also achieve better long-term value for money.

The ability of any business to successfully implement a circular economy opportunity is largely determined by its capacity to embrace innovation, its capacity and its existing skills base. External factors – such as the appetite of customers and the market base, regulatory requirements and access to finance – are also significant factors, but these will often be beyond the control of the business. To be most effective, support agencies should understand the nature of the business from the start, and remain flexible and agile as a project progresses. In these ways, support agencies can best help businesses to overcome barriers and take advantage of enablers in the pursuit of a circular economy for Scotland.
2 Introduction

Zero Waste Scotland provides leadership and practical support to encourage the growth in Scotland of a circular economy, in which greater value is placed on resources and waste is eliminated as far as possible.

Zero Waste Scotland has for many years supported activities that contribute to the development of a circular economy, and in 2014 we launched a dedicated programme of work designed to accelerate Scotland’s transition to a circular economy. This report aims to clearly demonstrate the range and nature of our support offering up to the end of 2016.

The report reviews the activities that Zero Waste Scotland has undertaken between 2012 and 2016 and how these have contributed towards developing Scotland’s circular economy strategy and approach. It also provides examples of projects that we have supported and how these projects and programmes have progressed through our more recent support offering. The report then draws together insight on common barriers to and enablers of progress, to inform future programme planning both by Zero Waste Scotland and other organisations considering similar circular economy support programmes. As a leader in this area, we believe our experience of what works – and what doesn’t work – will be of wide interest. Finally, there is a short review of ongoing and current activity areas, from 2017 onwards, to demonstrate how we continue to progress the circular economy in Scotland, building on the foundations laid through earlier activities.

Impacts and savings are not systematically quantified in this report due to the diverse nature of the activity reviewed and because many of the initiatives and projects are still in progress, with final outcomes not yet known. Instead, this report focuses on describing how our work has contributed to the development of a circular economy in Scotland.

From the start of 2016, key areas of our circular economy work have been part funded by the European Regional Development Fund (ERDF), enabling us to significantly scale up our direct support to organisations. This report does not cover activities undertaken in 2016 as part of the new ERDF Resource Efficient Circular Economy Accelerator Programme, but does reflect on how the early activities have either informed or progressed through our more recent, ERDF funded programmes. All of the activities described in this report have provided insight that is directly relevant to our ongoing ERDF-funded support offering. This support includes:

- The Circular Economy Business Support Service (CEBSS): Providing bespoke one-to-one support to help businesses develop their ideas for circular economy products and services.
- The Circular Economy Investment Fund (CEIF): Providing capital investment to support the implementation of business models. Key areas of interest are plastics, the bioeconomy, re-use and flat glass recycling solutions, but this is by no means an exhaustive list.

The support described within this evaluation has been delivered to specific industries or activity areas and has included both direct support, including grants, advice and training, and indirect sector support such as research activities, opportunity scoping, collaborations and networking (see Figure 1).

Figure 1: Direct and indirect sector support provided by Zero Waste Scotland
A wide range of Zero Waste Scotland support that is beyond the scope of this report is also contributing to the development of a circular economy in Scotland. We have excluded from this report any activities that are subject to separate evaluation and reporting, including work to improve resource efficiency, prevent food waste and increase recycling and sustainable construction. Also excluded is the detail around our activity to upskill the resource management industry, as this will be covered in a forthcoming Resource Management Programme evaluation report.

The extensive list of work areas that we do cover in this report includes:

- business model support – covering a variety of sectors
- cities and regions approach – working across a range of sectors in a small geographical area
- bioeconomy – stretching across several industries, including food and drink manufacturing, organic waste management and agriculture
- energy sector – with a focus on oil and gas decommissioning
- textiles manufacturing
- remanufacturing – across a range of industries
- re-use – primarily focused on retail of products for re-use
- procurement – within public sector organisations
- resource management – innovative improvements.

Other activities covered in this report include overall stakeholder engagement, communications campaigns, research and opportunity scoping studies. The structure of this report reflects our internal approach to engaging stakeholders and delivering support. There is overlap between many of these work areas, as will become clear throughout this report.

In considering the lessons learned from our review, we look at how businesses behave and can interact, what external pressures are felt by these businesses, and how support organisations can most effectively provide support.

Finally, the report provides a short overview of ongoing Zero Waste Scotland activities and of how our experience of previous work has shaped the design of our current programme and support offering.

The strategic backdrop
In early 2016, the Scottish Government launched an explicit circular economy strategy with Making Things Last and Scotland’s Manufacturing Action Plan, A Manufacturing Future for Scotland. These documents built upon a direction of travel in material and waste policy already established by Scotland’s Zero Waste Plan (2010), Safeguarding Scotland’s Resources (2013) and Scotland’s Economic Strategy (2015). Scotland was the first nation to join the Ellen MacArthur Foundation (EMF) Circular Economy 100 (CE100) Programme in 2013, demonstrating the nation’s commitment to the development of a sustainable economy. At the international level, 2015 saw the publication of the initial European Union (EU) Circular Economy Package and the agreement of the United Nations Sustainable Development Goals. Goal 12, which refers to sustainable production and consumption, is directly relevant to circular economy activities.

Zero Waste Scotland’s work in this area has likewise evolved over time since we were named a key partner agency in the Scottish Government’s circular economy strategy. Our first explicit involvement was our participation in the Circular Economy Evidence Programme in collaboration with the Scottish Government, the Scottish Environment Protection Agency (SEPA) and Scotland’s enterprise agencies. This programme focused on understanding the specific sector-level opportunities in Scotland following high-level work conducted in 2013 by EMF, which provided a headline value for circular economy opportunities in Scotland.

During the period covered by this report, 2012-16, Zero Waste Scotland largely focused on exploring how circular economy support could operate and on identifying the best opportunities to provide support – activities informed by, and that have helped to inform, evolving policy priorities. Today, Zero Waste Scotland is the lead agency for the circular economy in Scotland – but it is not something that we can achieve alone. Building a circular economy requires extensive partnership working across sectors and between organisations and we aim to be a catalyst for change. Many of the achievements described in this report would not have been possible without the hard work and commitment of various other parties.

Since 2016, our role in the development of Scotland’s circular economy has become more formal. Scotland’s Manufacturing Action Plan named Zero Waste Scotland as a lead agency for the circular economy workstream within the plan, while Making Things Last formally laid out the circular economy ambitions for Scotland as a whole. These strategic documents have brought our circular economy support into sharper focus since 2016 and, in conjunction with ERDF support, led to a significant scaling up of some support streams. As discussed, this later, ERDF-funded work will be subject to a separate evaluation – a key outcome for the earlier work, however, was that it should inform what came next, so some overlap is unavoidable.
Review of activities 2012 to 2016

3.1 Development of the Circular Economy Programme

Before we established a Zero Waste Scotland programme and team dedicated to the circular economy, our Market Development Programme was already exploring better value recyclates and how to keep that value in Scotland. For example, a research report profiling the plastics industry confirmed that most plastics were leaving the country rather than Scotland retaining this resource so that it might be reabsorbed into our economy.

As the concept of the circular economy and the appetite to move towards it began to grow, Zero Waste Scotland recognised that significant opportunities were emerging for Scottish businesses. To help them realise these opportunities, we formed our dedicated Circular Economy Programme and delivery team in 2014.

Relationship building

It is widely recognised that a circular economy requires collaboration, and Zero Waste Scotland has from an early stage built relationships with organisations it sees as essential partners in the transition to a circular economy. In 2013, the Scottish Government formed the Circular Economy Steering Group, comprising SEPA, Zero Waste Scotland, Scottish Enterprise, Highlands and Islands Enterprise (HIE) and the Scottish Government. Although the group no longer formally exists, the agencies continue to communicate and collaborate as required to accelerate the development of the circular economy.

As our Circular Economy Programme has developed, the new relationships we have founded – including with EMF and the Industrial Biotechnology Innovation Centre (IBioIC) – have led to collaborative projects, which we detail later in this report. By establishing good relationships with key partner organisations and tapping into their connections, we’ve been able to promptly access and influence sectors that may otherwise have required years of engagement before progress could be made. Other relationships have enabled knowledge sharing and opportunities to showcase Scotland as a leader in the movement towards a circular economy.

Opportunity scoping, research and evidence gathering

Before developing its circular economy strategy for Scotland, the Scottish Government created the steering group and evidence programme (mentioned above) to review relevant sectors and potential opportunities. The key objectives of the evidence programme were to identify the drivers and opportunities related to a circular economy in Scotland and to quantify the benefits. Zero Waste Scotland took the lead in identifying opportunities for some of these relevant sectors. This work has informed the thinking of all of the agencies involved and the development of both Scottish Government policy and our own programme of work. We’ve typically highlighted key individual pieces of research work undertaken by Zero Waste Scotland in the thematic subsections that follow, but we believe that the systematic approach that identified priority areas for research, and the coordination of parallel projects, added significant value. The research focused on key sectors but also explored common themes, like barriers and enablers, and looked at some cross-cutting topics such as critical raw materials – in fact, the latter work, which SEPA had already begun, showed the value of the collaborative approach in transferring knowledge and avoiding overlap.

The outcomes from the evidence programme helped to shape policy and operational thinking, and have also been useful in raising the profile of specific opportunities when engaging directly with the sectors in question. Evidence has remained key to progressing the circular economy since – and is likely to remain so for the foreseeable future. This is an emerging area both in Scotland and internationally, involving a significant element of ‘learning by doing’ as well as more explicit research.
In addition to the sector-specific reports mentioned elsewhere in this document, the overarching research into a circular economy in Scotland includes:

- **Circular Economy Scotland** (2015): This report identifies the great potential for Scotland’s food and drink manufacturing industry to benefit from circular opportunities. A selection of projects were subsequently taken forward by the RSA’s Great Recovery Project to explore how circular economy opportunities can be applied in the sector.
- **The Carbon Impacts of the Circular Economy** (2015): Using Scotland’s Carbon Metric, this research quantifies the potential carbon impacts of a more circular economy in Scotland. Material consumption is responsible for over two thirds of Scotland’s carbon emissions and a more circular economy could significantly reduce Scotland’s carbon footprint without sacrificing economic prosperity.
- **Circular Economy Thinking and Action at the University of Edinburgh** (2015): Research to review the opportunity to develop a ‘circular economy university’, both through teaching and by making changes to facilities. It includes life cycle impact mapping and a procurement plan, and discusses how the university could adopt a circular economy approach, with the concept introduced in taught modules.
- **Jobs and the Circular Economy: Three Scenarios for Scotland** (2015): This considers how Scotland’s labour market could benefit from a more circular economy, and proposes ways to accelerate its development. The report is now out of date, however, due to changes in the labour market since the study was conducted.

**Precursors to the Circular Economy Programme**

Before we launched our Circular Economy Programme, Zero Waste Scotland provided support to increase Scottish reprocessing of recyclates and to develop markets for recycled materials through innovation grants. Among those to receive support were projects that aimed to recycle plastic to create a material of virgin quality, divert shellfish shells from landfill to produce a lime fertiliser, and develop a new remanufacturing line.

Our objectives in dispensing the grants were to stimulate innovation in recycling technologies, support product development to rapidly bring new ideas to market, and ensure that products that yielded positive results would be widely shared and adopted by the industry.

The overarching goal was to enable the re-processing of better quality recyclates in Scotland and to increase the recycled content of Scottish manufactured goods.

Individual grants were typically relatively small in value but many were nevertheless instrumental in kicking off a programme of work. Some of the projects that received a grant are now just starting to bear fruit, having received ongoing support via other Zero Waste Scotland funding streams or from alternative investors. Several significant game changers first entered development thanks to our grants, but their relatively recent success highlights the time and support required to take an innovative project from design to operation. In addition, early indicators of success (measured immediately after the grant funding is dispensed) do not necessarily result in projects with the most significant longer term impact (as measured at least five years following the end of the support).

**Three key projects to come out of the Market Development Innovation Grants:**

**Impact Recycling** was given funding to construct a demonstration unit of its patented polymer separation technology, BOSS (Baffled Oscillation Separation System). This disruptive technology is now being rolled out across the UK. It is a key part of Project Beacon, a series of four projects being supported under our current ERDF programme.

**Eco ideaM** received funding to evaluate the potential for dense plastics separation facilities that use infrared optical sorting systems. Along with the Impact Recycling project, this has directly informed Project Beacon.

**Celtic Renewables** received a grant at the demonstration stage of its project, which involves fermenting pot ale into biobutanol. The grant covered the cost of equipment and time for design, trials, testing and reporting. Since this initial grant, the business has gone on to commercialise biofuel production using by-products of the Scottish malt whisky industry. Celtic Renewables has now received funding from the UK Department for Transport to build a biofuel facility at Grangemouth, which is under construction and expected to be operational by the end of 2018 – six years after Zero Waste Scotland provided initial support to develop the idea.

The support we currently offer through the Circular Economy Investment Fund (CEIF) – and to some extent, the related business support service – is based on what we learned from these early grants.
3.2 Business model support

During 2014 and 2015, Zero Waste Scotland offered support to businesses across all sectors to develop circular economy opportunities through the Circular Economy Business Models (CEBMs) programme. Types of opportunities supported included:

- re-use
- remanufacturing
- leasing models
- resource sharing
- circular procurement
- manufacturing process change.

Support was provided to a range of industries including food and drink, manufacturing, fashion and textiles, agriculture, oil and gas, and health care. Businesses were provided with various types of support including help with:

- calculating environmental benefits
- developing business plans
- policy development
- stakeholder engagement
- market research and consultation
- financial analysis.

Six organisations were supported during CEBMs 1, the first phase of the support programme, and lessons learned from its delivery were applied to the second and third phases (CEBMs 2&3). These were to:

- provide more structure to the support (e.g. through project plans), but allow for flexibility within this
- understand the commitment and ability of the business at the outset of the support
- increase the duration of each package of support (from 25 to 30 days).

CEBMs 2&3 supported 16 businesses in total, their collective carbon saving potential estimated at 176,470 tonnes CO₂e per annum.

Many of these businesses are continuing to progress their circular economy initiatives - examples of successful CEBMs supported companies which have gone on to receive a CEIF award or further business support through our more recent ERDF programmes include:

*Recycling Technologies* produces Plaxx® (an ultra-low sulphur oil with applications in multiple industrial sectors) from previously unrecyclable plastic, with estimated scaled-up potential annual savings of 5000t resource, 7000t waste and 11,500t carbon. The enterprise received support with its business plan and marketing, life cycle analysis and assurance around
feedstock availability. In addition, the support provided exposure and raised the profile of the project. As part of Project Beacon, the project continues to progress with CEIF funding behind it.

**UniGreenScheme (Universal Resource Trading)** is establishing a Scottish arm of its UK business model, which collects used laboratory equipment (mainly from universities) and stores and tests it before selling it on to be re-used. The support delivered included a feasibility study, financial business case, market assessment and market engagement exercise. The project continues to receive support through CEIF.

**Revive Eco** collects spent coffee grounds to extract oils and potentially produce a biomass fuel. Zero Waste Scotland support provided a review of the market, competition, financing, pricing, risk management and long-term sustainability to inform the development of a business case. With an estimated future saving of 312 t waste, the next stage is to obtain premises and conduct a pilot for processing waste coffee grounds to extract high-value chemicals, this time for the cosmetics industry. They have also been successfully awarded a CEIF investment.

**Icecream Architecture** wanted to consider the brokering of surplus assets such as furniture and soft furnishings for re-use within the New Gorbals Housing Association. The group received support to quantify carbon savings, supervise the adaptation and functionality design of a sharing portal, facilitate workshops, and develop the pilot and launch event. Seventy-seven members of the group shared soil, furniture, skills and information about funding, and other housing associations have shown interest in adopting the portal. Estimated future savings are 120 t carbon and £200,000 per annum.

The CEBMs activity was a precursor to the ERDF-funded CEBSS now offered to SMEs to support the development of circular economy opportunities. The learnings from CEBMs delivery were key to the development of CEBSS.

### 3.3 Cities and regions

A key element of a functioning circular economy is to keep resources within Scotland and, where possible, within local areas. This is particularly beneficial to remote communities and islands, where there tends to be a range of relevant sectors and industries, including food and drink, manufacturing, fishing and agriculture. These communities also often have a reputation for innovation and a vibrant enterprise culture, which can support a developing circular economy. A regional approach isn’t just for remote communities, however – cities can also benefit from local circular opportunities. Given the concentration of businesses across a range of sectors in built-up areas such as the central belt, the opportunities for symbiotic approaches to business are significant. In addition, lease models become more attractive in high-density areas where regular maintenance can be easily and efficiently provided, and re-use and repair hubs are more likely to succeed where there is a greater number of potential suppliers and customers. By taking up circular economy opportunities, local communities could tackle potential waste disposal pollution, preserve valuable natural assets, reduce carbon emissions and use of raw materials, and become more resilient to fluctuations in the market.

Taking a cities and regions approach, Zero Waste Scotland has been exploring how to identify circular economy opportunities in a specific locale and supporting businesses to identify and develop their own circular opportunities. By conducting research, introducing potentially synergistic businesses to one another and raising the profile of the circular economy, it is hoped that innovation and progress will be mobilised in local areas. In addition, the activities will increase the knowledge, skills and experience of local support agencies, such as Chambers of Commerce, to allow them to continue to support their local businesses in relation to the circular economy and/or refer them on to the existing national support system.

**Between 2012 and 2016, two projects have approached the introduction of circular economy opportunities in this way:**

A study on the islands of Orkney developed potential project ideas by engaging with stakeholders to understand waste management issues in the relevant sectors, identifying opportunities to better manage biowastes and by-products, and identifying potential research centres, start-ups and innovations for biowaste treatment. Potential opportunities included:

- diversification of products
- cost reduction of biowaste disposal
- transformation of waste into new products and services
- production of animal and fish feeds and fertilisers
- substitution of fossil fuels with biowaste.

A workshop delivered in partnership with HIE and the Orkney Islands Council (OIC) in March 2016 brought together businesses from across the islands to develop the key recommendations for transformational change.

**Glasgow City Project** Zero Waste Scotland has been working in partnership with Glasgow Chamber of Commerce on a two phase project. Phase 1, which completed in June 2016, included a launch workshop and dinner, the identification of circular opportunities in
the city, a workshop with networking opportunities and a final recommendations report. Phase 2 is being delivered as part of the ERDF programme and will be reported elsewhere.

One particularly successful pairing to result from the Glasgow project is between Aulds the Bakers and Jaw Brew, who were introduced by Glasgow Chamber of Commerce in 2016. The businesses went on to develop a synergistic business model in 2017, whereby waste bread from the bakery is now delivered to the brewery and used to produce a new, commercially available beer.

In both of the cities and regions projects undertaken to date, food and drink manufacturing has been identified as a key industry with significant circular economy potential at a local scale, focussing particularly on the bakery, meat and fish, and beer and spirit industries. This works particularly well when biowaste management, agriculture and fisheries are also present in the locale.

More recently, there has been the opportunity to expand and scale up both of these projects through the ERDF programme. In Orkney, Zero Waste Scotland continues to work with HIE and OIC to identify circular economy opportunities within the islands, increase understanding of available resources and identify potential circular economy projects. One Orkney business has since received support through CEBSS and funding through CEIF to develop local uses for the glass collected through the household recycle collection service. In Glasgow, Glasgow Chamber of Commerce continues to work on its Circular Glasgow project, launched in November 2017, raising awareness of the circular economy locally, introducing potential partners, developing case studies and referring small and medium-sized enterprises (SMEs) to CEBSS and CEIF.

Our initial explorations to consider how best to support local areas in regard to the circular economy have informed the delivery of our current support offering. Zero Waste Scotland is now building on this experience to undertake similar projects in other cities and regions through the ERDF funded programme.

3.4 Bioeconomy

Maintaining the highest value of bio-based resources is a key part of the circular economy. Expanding the bioeconomy includes developing new products and processes to support the transition away from petrochemical-based systems. Activities occur in a range of industries including food and drink manufacturing, animal feed production, bioenergy and industrial biotechnology. It is estimated that the UK industrial biotechnology market will be worth up to £12 billion by 2025 and that savings of between £500 million and £800 million could be achieved in the beer, whisky and fish industries through better use of waste and by-products.

Developing Scotland’s bioeconomy will:
- identify localised solutions for waste and by-products
- increase resource resilience
- add value and increase revenue for waste and by-product materials
- provide solutions for unavoidable food waste arisings
- create new business opportunities.

Scotland is well placed to develop these opportunities given the coordinated approach promoted by Zero Waste Scotland, support from policymakers and funding bodies, world-leading centres of research excellence, large volumes of bio-based resources and wide industrial base.

Zero Waste Scotland has played a significant role in building awareness of and providing advice and support for bio-based opportunities in Scotland. Reports from early opportunity scoping work led by Zero Waste Scotland provide evidence of the importance of these activities in establishing a strong circular economy in Scotland. Many of the projects and programmes delivered by or in partnership with Zero Waste Scotland demonstrate that working collaboratively with partners can deliver valuable outcomes.

Our key bioeconomy activities and outputs between 2012 and 2016 include:

Publication of the Sector Study on Beer, Whisky and Fish in June 2015 as part of the Circular Economy Evidence Programme. This has been a key document for driving the bioeconomy as it feeds into the Making Things Last strategy and highlights that the bioeconomy is a key area of growth for the circular economy in Scotland. Many subsequent activities have built on the findings in this report.

Optimising the value of digestate and digestion systems, research delivered in partnership with WRAP (Waste and Resources Action Programme) and Cranfield University in the 2015/16 financial year, identifies opportunities for the valorisation of digestate. The objective of this work was to inform plans for potential investment in the organic sector and it resulted in 18 potential technologies being considered against a list of criteria.

Separately to CEBM’s business support was delivered to nine bio-based businesses from 2014 to 2016 to develop and promote projects, create case studies to increase awareness of the bioeconomy, and enable the businesses to progress their ideas and access further support and funding. Many of the projects are continuing to progress using support and funding from Zero Waste Scotland and other support agencies.

The Scottish Biofuel Programme was delivered by Edinburgh Napier University with funding from Zero Waste Scotland, Scottish Enterprise and Transport Scotland. The business support provided was mainly one-to-one advice and development grants for technical support given to more than 50 businesses of varying sizes to develop biofuel and bioenergy projects, including pyrolysis, biochar, whey and micro-anaerobic digestion opportunities (see further details below). The programme also involved research and the development of case studies. Zero Waste Scotland continued to fund the programme up to March 2017, and identified potential material diversion of 46,530 t across the three phases of delivery.

A call for phosphorus recovery and priority substance removal technologies was issued by the Small Business Research Initiative on behalf of HIE, Zero Waste Scotland and the Scottish Government’s Hydro Nation team. This was a partnership project that engaged with other agencies and organisations to fund seven projects to recover phosphorus from wastewater for re-use and priority substances from water. The projects raised the profile of nutrient recovery and water quality opportunities. Some of the businesses supported have since been supported or funded by Zero Waste Scotland or other funders.

Examples of successful projects supported by the Scottish Biofuel Programme:

Celtic Renewables: Following on from previous grant support, Celtic Renewables received further support through the Scottish Biofuel Programme to develop applications for the IBioIC Accelerator Programme, to optimise its fermentation process, and for a Scottish Enterprise SMART: SCOTLAND grant, to investigate the potential of plastic-coated paper as a feedstock for its fermentation process.

A shortbread manufacturer: The Scottish Biofuel Programme identified that waste and residues from confectionery and biscuit-making might be useful materials for conversion to biofuels as they contain sugar and fats. Shortbread dough was tested in two different conversion processes to determine its potential to produce biofuel. It was calculated that 15 t waste could be diverted, resulting in savings of 6 t carbon and £7,000. This waste could be used to fuel the new Celtic Renewables facility that is due to be operational by the end of 2018.

Three of the bioeconomy projects that have stemmed from our early support activities are currently being implemented using CEIF funding. Two of these are outlined below:

Pennotec received a grant through the phosphorus recovery and priority substance removal call and was successful in securing funding via the Bioeconomy Accelerator 2017, a funding call through CEIF, to commercialise chitin extraction from crustacean shell waste. High-value applications include cosmetics, surgical stitches and food (as a thickening agent). The prominence of Scotland’s shellfish industry ensures a sustainable waste stream for harvesting.

Xanthella’s ENBIO (Energy and the Bioeconomy) project received circular economy business support in 2015/16 and the project was successful in securing funding via the Bioeconomy Accelerator 2017 funding call to develop an algal production process using whisky distillation residues. This project will stimulate new industrial activity and strengthen the circular economy in rural areas by enabling better use of stranded timber and distillery residues.

Bioeconomy activities operate in innovative industries that are open to pushing boundaries and moving to circular economy business models. Some of the most
successful circular economy projects to date are related
to the bioeconomy, demonstrating the appetite and
potential for progress in this area.

Zero Waste Scotland continues to operate an active
programme of support for and research into the
bioeconomy, based on the earlier activities described
above. Recent activity has included putting out a
funding call for the Bioeconomy Accelerator, delivered
through CEIF in 2016/17, and partnership delivery of the
Biorefinery in Scotland report in 2017, which has been
instrumental in identifying the level and potential of
bioresources across Scotland.

3.5 Energy sector

The Scottish energy sector is very broad and diverse,
with a wide array of businesses and stakeholders
involved in a variety of activities. However, provision
of employment is quite concentrated, with non-SMEs
(1.6% of all companies) employing almost 78% of energy
sector workers. This results in a two-pronged approach
to facilitating the circular economy within the sector,
focusing simultaneously on developing “ground-up”
solutions directly with SMEs and developing “top-down”
solutions with the SME supply-chains of large players
in the energy sector e.g. energy utilities and oil and gas
service providers.

Up to 2016 the programme focused on research,
opportunity scoping, business support and stakeholder
engagement around the decommissioning of oil and
gas installations. These activities were instrumental in
raising awareness and engaging oil and gas companies
with the idea of re-use and repurposing, and moving it up
the sector’s agenda.

To the end of 2016, Zero Waste Scotland has supported
the production of seven research reports and guidance
documents on oil and gas decommissioning and re-use,
mainly by providing funding to the trade association
Decom North Sea to research and write the reports.
Our delivery team has used the published reports to
demonstrate the potential opportunities, engage with the
sector and stimulate innovation. As part of this, the team
has repurposed report content for use in presentations at
conferences and events, and for inclusion in case study
collateral for follow-up activity.

The reports that have been most useful to
date are:

The Circular Economy in the Oil and Gas Sector (2015):
This booklet of re-use case studies has proved useful for
engaging businesses.

North Sea Oil and Gas Rig Decommissioning and
Re-use Opportunity Report (2015): Produced by the
RSA’s Great Recovery Project, this report identifies
materials, components and equipment from offshore
facilities that could be re-used or reconditioned at the
end of their life. It also proposes several feasibility
studies (steel, pipeline, anchor chain, vessels and tanks,
accommodation blocks and winches) to develop the
business case for re-use and reconditioning.

Decommissioned Steel Re-use in Construction (2016):
Produced by Decom North Sea and Amec Foster
Wheeler, this report identifies opportunities to re-use
decommissioned steel from offshore facilities in onshore
construction applications.

These research reports have helped to shape the
programme’s current direction internally at Zero Waste
Scotland, and Decom North Sea is keen to implement
some of the key recommendations.
We have provided direct business support to four oil and gas projects through the CEBMs programme: The four (anonymised) projects are outlined below:

**Project A:** A provider of pipe-end protectors to the oil and gas industry, was considering an on-site injection moulding process to achieve closed-loop recycling of the pipe-end protectors. The business accessed Zero Waste Scotland support to identify the financial and environmental opportunities as well as the benefits and risks of the process. The proposed model could increase profit by £425,000 per year, reduce throughput of materials on site by 12% and reduce overall carbon emissions by 650 t per year. In addition, two new full-time jobs would be created at the business.

**Project B:** A company that provides drilling and oilfield equipment, was looking to accelerate re-use by marketing materials online whilst they were still in situ in the North Sea to avoid the current rushed salvage approach i.e. discovering and trying to deal with materials when they arrive in port for onshore dismantling. Zero Waste Scotland provided support by modelling cost and income scenarios, creating a business plan, and researching and engaging with the market. For the company, this resulted in a greater understanding of its target markets, new sales routes to explore and a new suite of marketing materials.

**Project C:** The company was looking to develop an online marketplace for the oil and gas sector to facilitate and broker the resale of decommissioned and surplus assets and equipment for re-use within the global oil and gas market.

**Project D:** A provider of mobile asset management software that uses radio-frequency identification (RFID) technology was considering the potential market application of RFID technology, in the oil and gas decommissioning sector, to support the efficient collection and management of asset and equipment inventory. Support was provided to investigate the market appetite for the technology, the perceived benefits of the technology for improving equipment re-use, and the potential routes to market.

Some elements of the programme have been hindered by risks associated with environmental regulation. Zero Waste Scotland continues to work closely with SEPA to ensure that all circular opportunities fall within current regulations and to highlight any potential projects that should be reviewed from a regulatory perspective.

Our circular economy energy activities continue to grow, with a dedicated member of staff now on board to forge new relationships and raise awareness of Zero Waste Scotland, the circular economy agenda and opportunities for the energy sector. The sectoral focus has also widened as a result of the approach developed in Making Things Last, going beyond oil and gas decommissioning alone to also encompass renewable energy [e.g. wind infrastructure], heating and energy storage infrastructure and engagement with energy utility companies and their supply chains.

### 3.6 Textiles manufacturing

Scotland’s textiles industry is significant to the Scottish economy: it employs over 8,000 individuals and exports high quality products to more than 150 countries. This activity is complemented by the breadth of further and higher education courses in textiles, fashion and design available at Scottish universities and colleges. In 2014, Zero Waste Scotland began to collaborate with John Lewis and Young Scot to support WRAP’s Sustainable Clothing Action Plan. In support of this, we commissioned independent research consultants to examine the academic and industrial textile landscape in Scotland, including developments in technical textiles and research into innovations in textile design.

This opportunity scoping exercise extensively informed Zero Waste Scotland’s 2014 to 2016 work programme. No examples of circular economy or innovative business models in Scotland were identified and a need for training was highlighted. Technical textiles and computer-aided design were identified as key areas for innovation. Further research investigated innovative ways to protect and conserve resources and develop closed-loop manufacturing and high-value products and services, all of which would contribute to a sustainable circular economy for the textiles sector.

The key objectives from 2014 to 2016 were to:
- scope the potential for fibre processing in Scotland
- consider a sustainability standard
- showcase and pilot circular economy models and resource efficient practice
- bring academia and industry together to consider circular economy theory and practice.

To support these objectives, Zero Waste Scotland provided evidence, support and incentives to the sector, including barrier identification, training events and masterclasses, business support and funding, and stakeholder engagement.
Some examples of these activities are outlined below:

Stakeholder engagement and communications activities have helped the textiles programme to gain traction. Zero Waste Scotland initially introduced the concept of the circular economy to the Scottish textiles sector through a series of events in 2013 and 2014. These events were delivered in partnership with the Scottish Textiles and Leather Association (now Textiles Scotland) and the Scottish Textiles Academic Group.

Training events and the Masterclass Skills Series were delivered in 2015 by UK and international experts, to connect industry, academia and higher education professionals. Attendance was by invitation and application, and applicants were asked to evidence how they would cascade the learning within their business or department. The objective of the programme was to enable resource efficiency and hone skills for a circular economy. Areas covered included design for disassembly and fibre reprocessing, and resource efficiency topics such as zero-waste pattern design and new dyeing and printing technologies.

The Circular Economy Textile and Apparel Fund provided five businesses each a small capital grant and mentoring support to experiment with closed-loop technologies, conduct pilots for disassembly, explore new fibre opportunities and consider new business models such as leasing. The funding covered capital and revenue costs such as studio and manufacturing time, equipment hire, testing facilities and research trips.

The CEBMs programme supported five textiles projects to consider clothes rental models, the recovery of leather from vehicles, and the introduction of re-usable hospital garments.

From 2014 to 2016, the Love Your Clothes campaign run by WRAP focused on engaging individuals with textiles issues. Scottish campaign activity included a Spring Clean Your Wardrobe Weekend to encourage the passing on of old clothes for re-use. In 2015, a Love Your Clothes event at the Edinburgh International Fashion Festival was used to promote sustainable fashion to the industry and to highlight the opportunities for circular economy business models within the sector in Scotland.

Some examples of our successful textiles projects are:

The feasibility of the recovery and re-use of upholstery leather from high-grade post-consumer uses, supported through CEBMs 1. A local leather designer was able to produce several prototype items (e.g. passport cover, luggage tags) from the used upholstery leather extracted from Ryanair aircraft. The carbon impact of using refurbished or remanufactured leather was calculated at less than 10% of that involved in manufacture from virgin leather.

Diggory Brown was awarded funding from the Circular Economy Textile and Apparel Fund to research and develop a range of practical workwear garments and accessories made from Yarnover wool, a by-product collected from the Uist Wool spinning mill.

In 2016, the textiles programme opened out to include the wider manufacturing sector, based on Scottish Government priorities as laid out in Making Things Last and Scotland’s Manufacturing Action Plan.
The manufacturing programme used lessons learned from the textiles programme to accelerate the mobilisation of circular economy support to the sector. A focus was placed on engagement with the sector through a variety of relevant partners and, following the success of the Textiles Masterclass Series, a general Manufacturing Masterclass Programme is now being delivered through the current ERDF programme.

3.7 Remanufacturing

Remanufacturing is a key part of a well-functioning circular economy and is already commonplace in the automotive, aircraft and defence industries. Remanufacturing high-value goods retains the value of the products and uses less energy than producing new, whilst providing sustainable economic growth and high quality, skilled employment. But while the practice is ingrained in some industries, there are still some sectors, product lines and services that have not fully considered the opportunities for remanufacturing.

The remanufacturing programme at Zero Waste Scotland aimed to stimulate innovation, influence academic partners, build capacity and establish a remanufacturing network in Scotland. Support was primarily delivered through the Scottish Institute for Remanufacture (SIR). As this activity cuts across several industries, however, some remanufacturing activity occurred elsewhere, for example, within the CEBMs or textiles support.

Examples of our remanufacturing activity include:

**Circular Economy Evidence Building Programme:** Remanufacturing Study (2015) carried out as part of the Circular Economy Evidence Programme: Delivered jointly with the Scottish Government, Scotland’s enterprise agencies and SEPA, this opportunity scoping exercise reviewed 14 sectors – including aerospace, automotive, energy and medical equipment – to quantify the potential economic benefit of remanufacturing. It predicted that an increase in remanufacturing will increase employment and estimated that remanufacturing could be more valuable to the Scottish economy than to the UK as a whole.

**The Scottish Institute for Remanufacture** is a collaboration between the University of Strathclyde and two key funders: Zero Waste Scotland and the Scottish Funding Council (SFC). Zero Waste Scotland supported the University to develop their proposal into a fundable venture and brought the SFC to the table as a co-funder. Other partners are the Scottish Manufacturing Advisory Service, who chair the steering board, and Interface. Scottish Enterprise has also been engaged when appropriate. Since May 2015, SIR has provided support to businesses interested in remanufacturing products by helping them to identify projects and pairing them with the most suitable academics to support the development of those projects. Zero Waste Scotland supported SIR up to the end of the 2017/18 financial year and future support is currently under consideration by SFC and Zero Waste Scotland. The majority of the activity that took place before the end of 2016 (and so within the scope of this report) was in setting up the institute and developing a pipeline of projects, which were then progressed in 2017 and 2018. In total, funding and support were awarded to 32 projects spanning a range of areas, including the renewable energy industry and the automotive, oil and gas, information and communications technology, and marine industries. SIR found that there wasn’t a pent-up demand for this support and so it was necessary to drive industry to engage. Initially, the support largely went to established remanufacturers to help them extend or broaden their processes. But later in the delivery, new players who hadn’t previously been involved in remanufacturing were starting to engage and receive support.

The following two examples of SIR-supported projects provide an insight into the type of activity undertaken by the institute:

**Weir Group** identified a potential opportunity to optimise the time and costs associated with testing and commissioning of remanufactured pumps. With support from the University of Strathclyde to redesign an essential piece of testing equipment, it was determined that the Weir Group could save in excess of £22,000 and 233 hours per unit test cycle. The redesign could generate an additional £500,000 per annum and create 4 new operator roles at the Weir Alloa facility through an increased throughput of remanufactured pumps.

**Turbo Guy** received support to identify process efficiency improvements to increase remanufacturing production of turbochargers. Identified efficiencies included better costing models, improved flow layout of the workshop and improved stock management. If implemented, these measures would increase productivity by 21%, allowing more units to be remanufactured and diverting 2 t of material from recycling to re-use per year.

The institute’s most significant impact to date has been to raise the profile of remanufacturing in Scotland, as evidenced by the increased interest in this area among both academia and the business community. SIR representatives have also raised awareness of remanufacturing internationally, by attending and presenting at conferences. More recently – and so beyond the scope of this report – SIR has sponsored the...
Remade in Scotland category at the Made in Scotland Awards.

Other highlights include the creation of a network of partners, good engagement with businesses that had not previously considered remanufacturing, and the development of the Design for Remanufacture tool, which will continue to exist as a legacy support offering.

Scotland’s Manufacturing Action Plan mentions both remanufacturing and the need to support the scaling up of such activity. Zero Waste Scotland has provided remanufacturing support since the mobilisation of SIR and throughout its delivery up to the end of 2017/18. In this way, Zero Waste Scotland has provided an impetus to expand Scotland’s remanufacturing activity and left a legacy that will continue into the future.

3.8 Re-use and repair

Just like remanufacturing, the act of repair and re-use has the potential to cut across sectors and is at the heart of the circular economy in retaining and achieving the most potential from product and materials. Re-use should be normalised into all commercial services and consumer activity for the circular economy to be successful. Within the Circular Economy Programme at Zero Waste Scotland, all sector-focused work considers re-use as part of the solution to transition towards circularity. Previously, a dedicated re-use programme focused on the organisations whose primary activity was re-use and repair and influencing consumer behaviours.

Zero Waste Scotland’s Re-use and Repair Programme aimed to increase the profile of re-use in Scotland by supporting businesses to meet high standards with a recognised certification, which can help to increase customer and partner confidence and awareness. The programme also provided a suite of support to organisations including business support and grant funding for infrastructure and capacity building to support growth of re-use activities and organisations.

Between 2011-17, Zero Waste Scotland worked closely with Community Resources Network Scotland (CRNS) through partnership projects and grants for delivering strategic support to the sector. CRNS is a charity that has membership drawn from the community re-use, repair and recycling sector in Scotland. Our support enabled CRNS to consolidate its advocacy and representation work for the sector through regional forums, sponsoring its annual conference and supporting research including its State of the Sector Reports and providing capacity to support the mobilisation of the Revolve quality standard for shops that sell second-hand goods in Scotland.

Below are some examples of the type of activities we have undertaken to support re-use organisations (more detail can be found in our recently published Re-use and Repair Activity Review):

**Revolve certification and support:** Revolve is a certified re-use quality standard for shops selling second-hand goods in Scotland. Re-use stores receive support and training to improve their operations and, once certified, can display the Revolve logo to demonstrate their commitment to quality and excellent customer service. The aim is to encourage greater re-use by increasing customer confidence in purchasing second-hand goods. Launched in 2011, the certification and support programme has been gaining traction year on year, with 99 stores in Scotland certified by the end of the 2016/17 financial year.

**Re-use Line:** This referral service connects householders wishing to donate re-usable bulky furniture or electrical/electronic equipment with re-use organisations. The service is free to call or it can be accessed online. The Re-use Line has steadily extended its reach since it was first trialled in 2012, and the service now covers 30 local authority areas and is supported by 60 re-use organisations. Since July 2014, Zero Waste Scotland has had responsibility for all Re-use Line marketing campaigns with the aim of spreading the word still further. By the end of 2016, the service had been contacted more than 40,000 times, resulting in 12,000 referrals and over 1,000 t of re-usable household goods being diverted to re-use organisations.
Re-use sector grants: Revolve-certified organisations have been able to access a range of grants to support various activities including business development, capacity building, repair training and collection trials.

Re-use Infrastructure Grant for Household Waste Recycling Centres (HWRCs): These capital grants enabled councils to invest in the infrastructure needed to divert items within HWRCs for re-use. A later grant (2016/17) provided funding for signage to improve diversion to re-use. Collectively, the supported HWRCs have donated 873 t of potentially re-usable items to re-use organisations between 2015 and 2017.

Re-use Shop Grant: A specific grant, to support the development of re-use shops at local authority HWRCs, allowing suitable goods to be collected, prepared for sale and sold, all within the footprint of an HWRC. A new, purpose-built re-use shop was constructed by the Furniture Project (Stranraer) on the Dumfries and Galloway Council Zero Waste Park in Stranraer. Both the organisation and the shop itself are now known as the Community Re-use Shop.

Re-use and Repair Hub Grant: This grant was launched in 2015 to trial different models for increasing the scale and visibility of re-use retail. The vision was to create ‘destination shops’ through large-scale and collaborative regional projects funded by a two-phase grant. The grant led to three hubs opening between 2015 and 2017, each of them piloting a different business model – from a guaranteed commercial offtake model to an e-commerce approach. An evaluation and review of lessons learned is in development to inform future activity of this nature.

Repair training: As part of a programme to help increase repair skills, Zero Waste Scotland has funded access to repair training courses for seven organisations operating in Scotland’s third sector. The courses spanned furniture, textiles and electronics repairs. The aim was to mainstream repair activity and so facilitate a higher level of re-use activity by increasing the skill level and knowledge base around repair.

Stakeholder engagement events: Two re-use events were held in Stirling, one in 2014 and one in 2016. Up to 120 delegates attended each event, representing a range of organisations including local authorities, private companies and the third sector.

The programme also supported the NHS Greater Glasgow and Clyde (NHSGGC) health board with a major decommissioning project. From 2014 to 2016, NHSGGC received support to maximise the re-use value of items taken from its decommissioned hospitals prior to the opening of the new Queen Elizabeth University Hospital Glasgow. This project highlights the importance of and potential for normalising re-use within large public sector bodies which have an internal demand for products and an ability to re-deploy goods. Initially, Zero Waste Scotland employed three interns (via the Bright Green Business internship programme) to create a catalogue of 40,000 mobile assets held by the hospitals, with 90% of these deemed suitable for re-use. Re-usable items included cleaning equipment, furniture, office goods, small electricals and textiles. Zero Waste Scotland then influenced the development of a strategic approach to maximise the value of these displaced items, which was employed from spring 2015 and throughout the decommissioning process. Zero Waste Scotland provided NHSGGC with a part-time project manager who provided ongoing advice and support and delivered a Make Use Week, where re-use organisations could see and reserve items for collection. This resulted in the collection of 1,000 items by 11 organisations. Re-use is now embedded in NHSGGC procurement processes, which make use of the Warp It network, and this approach has been replicated in other NHS locations.

Re-use organisations have been receptive to Zero Waste Scotland messaging and the support offer. The next step is to engage other industries and sectors to focus on re-use in their business development strategies and to influence householders to increase donation and acquisition behaviours. While the Revolve programme will continue to certify re-use stores and engage with the general public, the Circular Economy Programme will promote re-use through the cities and regions approach, CEBSS and by engaging with specific sectors such as energy, manufacturing and construction.

3.9 Procurement

Public sector procurement offers a significant lever to shape our economy and society for the better. Public sector spending on goods and services across Scotland, including health and education services, amounts to circa £11 billion per year – almost 10% of Scotland’s gross domestic product. As such, procurement is a powerful means by which to promote circular economy solutions while providing similar, or better, value for money in cost terms. Circular procurement choices may result in direct economic and environmental savings, and pursuing this approach in the public sector may provide a transformative push for the wider economy. As public sector procurement both shows what is possible and also incentivises suppliers to develop circular economy solutions to win contracts, others may follow suit.

Zero Waste Scotland’s procurement work to date has focused on upskilling public sector professionals and organisations engaged in procuring goods and
services. This has involved raising their awareness of sustainable alternatives and, ultimately, enabling them to take measures to incorporate this knowledge into their procurement practice. This aligns not only with an explicit priority in Scotland’s Making Things Last strategy, but also with the pre-existing objectives of Scottish procurement policy. Zero Waste Scotland has supported landscape interventions (such as general training for professionals), individual procurements, and interventions that sit between these two extremes, with a particular focus on the development of procurement frameworks (which specify requirements for extensive categories of products for a number of individual procurement exercises).

Some specific support streams include:

Training: A focus on training procurement professionals from 2014 to 2016 led to more than 700 individuals being trained on the international Marrakech standards for sustainable procurement, and almost 400 people completing an e-learning module co-delivered with the Scottish Government’s Procurement Team.

Guidance: Development of sector- and product-specific procurement best practice guidance to encourage the procurement of various products on a leased, re-used or remanufactured basis. These include electrical and electronic goods, furniture, construction materials, textiles, catering and cleaning equipment, flooring, power and hand tools, vehicles and tyres, outdoor playground equipment and medical devices.

Mentoring: One-to-one mentoring from 2014 to 2016 aided the development of Scottish Government procurement tools (on life cycle impact mapping, prioritisation, sustainability and flexible framework assessment) by supporting individual procurements from start to finish, as well as providing 10 case studies of circular procurement in action, all of which are now actively managed live contracts. Subsequent work has built on this approach with a further 22 mentored projects.

Raising awareness: Forums and events have been used to promote dissemination of and active engagement with the circular procurement agenda. Such occasions offer a chance to reach procurement professionals at all levels to increase their awareness of circular economy opportunities.

Partnership working: Key partner organisations we have worked with include NHSScotland, universities and colleges, centres of procurement expertise for the public sector (i.e. Advanced Procurement for Universities and Colleges, Central Government Procurement Shared Services, Scotland Excel), local authorities and the Scottish Procurement and Commercial Directorate of the Scottish Government.

Our training materials and guidance have shaped best practice in procurement beyond our direct support, and the partnership work above has been a key driver in this regard. Sustainable procurement training is now incorporated and delivered via the Scottish Government’s own procurement support services. Our work on construction procurement is being incorporated into guidance being developed by the Scottish Government’s Construction Procurement Policy Unit. Our e-learning module has been adopted in its entirety by in-house programmes elsewhere (e.g. Scottish Borders Council). And our guidance documents are referenced in the European Commission guidance on Public Procurement for a Circular Economy and have been uploaded to the Sustainable Procurement Platform, which targets local authorities around the world.

The procurement spend under frameworks that we have influenced via 15 projects in 2015/16 could be as much as £641 million. The frameworks we have helped to
develop will shape the procurement of a huge variety of goods and services over their lifetime – from playground equipment to electrical services – and will inform organisations as diverse as Police Scotland and the Royal Botanic Garden Edinburgh. For example, we supported the creation of a quality re-use lot within Scotland Excel’s domestic furniture framework, which in its first year diverted 210 t (worth £428,726) from landfill. The furniture was distributed among 1,735 families in need and more than 10 jobs were created, helping Scotland Excel to win a Scottish Public Service Award for its efforts in 2017.

Zero Waste Scotland has also helped Scotland to establish expertise in this area internationally. The use of our guidance has already been mentioned above, but our involvement in these forums has also enabled Scotland to build links with the Dutch Ministry of Infrastructure and Water Management (a global leader in circular procurement), which resulted in a joint bid for European funding to support further work, working with eight partner organisations from five countries.

Our work has developed from a broader focus on sustainable procurement to a more explicit focus on circular procurement. In practice, these terms are often used interchangeably. We believe, however, that circular procurement does imply going beyond ‘traditional’ sustainable procurement by actively helping to close energy and material loops within supply chains and embedding behaviours such as buying equipment to last longer, leasing of services rather than purchasing outright & incentivised return models. Deciding which term is most appropriate for the purposes of initial engagement will usually depend on the audience and the specific opportunities.

### 3.10 Influencing the circular economy agenda

Zero Waste Scotland has not just delivered direct support to build the circular economy. We have also played a key role as a continuing centre of expertise, available to answer questions, promote the issues at stake, and exchange and disseminate knowledge. This is true of our partnerships with the Scottish Government, other government agencies, trade bodies, expert networks and international forums. Our relationship with government is particularly close: Zero Waste Scotland staff have been seconded to support the Scottish Government’s Waste Policy team and we played a proactive role in helping to develop, and now to deliver, Making Things Last. We have been involved in discussions around extended producer responsibility, and all levels of government can call on our sectoral and analytical expertise as necessary. Zero Waste Scotland has been asked to represent the Scottish Government on the Ellen MacArthur Foundation (EMF) CE100 programme, and we are able to access some non-governmental networks that the Scottish Government cannot (e.g. EU Platform on Food Losses and Food Waste). This section highlights key areas where partnerships and networking have been critical in allowing Zero Waste Scotland to promote circular economy thinking – or simply thinking about the circular economy.

#### 3.10.1 Building strategic partnerships within and beyond Scotland

Collaboration at the national and international level is crucial if Scotland is to transition to a circular economy. One of the most successful elements of the Circular Economy Programme at Zero Waste Scotland is our engagement with stakeholders and partnership working. The team has worked with the Scottish Government and its agencies, universities, trade bodies and technical specialists and has been a part of leadership groups both nationally and around the world. These partnerships have led to the delivery of successful projects, a recognition of Scottish expertise across the UK, the EU and the globe, and the opportunity to both share and acquire knowledge from other nations. Where such partnerships relate to specific sectors, they have been included in the relevant sections of this report.

As well as the partnerships already mentioned, Zero Waste Scotland also works with Scotland’s innovation centres to promote circular economy innovation via research and development, particularly in the key sectors identified in the Making Things Last strategy – i.e. food and drink and the bioeconomy, manufacturing, construction and energy infrastructure. Innovation centres aim to help businesses of all sizes accelerate innovation to grow and strengthen our economy for the future. In particular, we have worked with the Industrial Biotechnology Innovation Centre (IBioIC), Construction Scotland Innovation Centre (CSIC) and Oil and Gas Innovation Centre (OGIC).

Recognising the importance of bringing organisations together to achieve positive impacts, and building on the network created by the EMF CE100 programme, Zero Waste Scotland, Scotland’s enterprise agencies and SEPA began to develop a network of businesses that were making progress on circular economy issues. The Scottish Circular Economy Business Network (SCEBN) launched in 2015 with a well-received event. A year later, the network began to gain traction following the provision of more focussed resource courtesy of the ERDF programme. SCEBN supports peer-to-peer learning to lead and accelerate the transition towards a circular economy, and provide the space and opportunities to help build responsive and networked supply chains.

#### 3.10.2 Sharing our knowledge overseas

In 2014, we began to forge relationships with EMF, through Zero Waste Scotland secondments to the
charity as part of the work to develop a Global Plastics Protocol. Two members of staff were each seconded for six months, which both provided EMF with Zero Waste Scotland expertise and cemented relationships that have since led to new opportunities. As well as establishing connections with senior staff from international and influential companies, Zero Waste Scotland formed links with the World Economic Forum.

Scotland was the first country to join the EMF CE100 programme, and Zero Waste Scotland is the Scottish Government’s main representative (along with Scottish Enterprise and SEPA) on this global programme, which brings together leading companies, emerging innovators and regions to accelerate the development of the circular economy across the globe. As part of the CE100, the Scottish Government can share its successes with others and play a leadership role in circular economy development. Membership also helps Scotland to build partnerships with businesses, innovators and regions to capitalise on emerging opportunities. The CE100 has an interesting and varied membership, including senior executives from global companies, which provides the opportunity to make a marked difference, particularly through changes to supply chains. Zero Waste Scotland has provided case studies on procurement and Revolve certification for the EMF website, helped to raise Scotland’s profile and shared our examples of best practice while also learning from the experience of others. Membership has also provided access to training and networking events and acceleration workshops, which up to 10 Scottish SMEs could attend. This enabled small businesses to share their experience, learn from each other, access training and make contact with global players to raise their profile.

Zero Waste Scotland is a member of the New Plastics Economy initiative, which aims to work with countries and international companies to reduce the volumes of plastic produced and make any remaining plastic valuable beyond its original use. These objectives have so far been delivered through a number of reports – which include quotes from Iain Gulland, Chief Executive of Zero Waste Scotland – on commitments to making changes in national legislation (including in Scotland) and on the potential solutions to the international plastics problem that are being trialled by seven countries.

We share our knowledge and experience, and provide technical advice to the initiative, both by attending meetings and by leading one of these seven pilots, Project Lodestar. Also known as Project Beacon, it is trialling a new plastics recycling technology that was initially supported by our Market Development Innovation grants in 2012 and is now funded through CEIF. The project will present a blueprint for an advanced plastic recycling facility, which other countries may wish to adopt and learn from. Project Beacon might therefore attract visitors from around the world to Scotland.

Zero Waste Scotland works closely with the Association of Cities and regions for sustainable Resource management (ACR+) and in 2018, Iain Gulland, became President of the Board of Directors. This is a Europe-wide network focused on developing the expertise and skills of public authorities in effective waste-product-resource policies. Zero Waste Scotland provides ‘light touch’ support, contributing expertise and experience to help ACR+ design its programme of work. Zero Waste Scotland also represents Scotland on various EU forums (e.g. Sustainable Public Procurement for Circular Procurement) and has contributed to EU papers
Zero Waste Scotland has provided expert contributions to the EU Platform on Food Losses and Food Waste, our invitation to participate reflecting Scotland’s leading role in setting ambitious reduction targets, delivering meaningful interventions and developing measurement strategies. Zero Waste Scotland currently sits on the main platform as well as on the sub-group on food waste measurement and the sub-group on action and implementation. Participation represents a chance to both influence thinking on how food waste prevention will be tackled and assessed at the EU level, and to transfer knowledge between countries and platform members.

### 3.10.3 Engaging with the general public

In addition to supporting and funding organisations to understand and implement the circular economy, Zero Waste Scotland has also undertaken a number of communications activities to engage with the general public. To embed a successful circular economy, every individual must also play her or his part in increasing the demand for sustainable products and in supporting re-use, remanufacturing and recycling. The term ‘circular economy’ has not been widely used with individuals, however, as the meaning is difficult to express and it encompasses a range of different behaviours. Instead, we have undertaken smaller, individual campaigns and activities to get across specific messages around waste prevention and material re-use and recycling. We believe that this piecemeal approach is easier for individuals to understand and act upon, but also recognise that engagement activities must be committed to strategic long-term messaging to have a real impact on people’s behaviours. Examples of successful and ongoing long-term engagement campaigns include Recycle for Scotland, which aims to improve recycling, and Love Food Hate Waste, which focuses on preventing food waste in the home. While neither campaign falls within the scope of this review, their successful approaches could be adopted by parts of the circular economy engagement campaign.

The first official circular economy activity not focused solely on business and industry was the #Makethingslast campaign in 2015, which was delivered through social media and a limited amount of press activity. The campaign, which ran shortly before the Scottish Government released its Making Things Last strategy, is estimated to have reached 3 million people. To inform the writing of the Scottish Government strategy, an ‘ideas jam’ was held in partnership with Young Scot to explore how young people view the circular economy. Twenty individuals took part in the various workshops held over the course of one full weekend. It took the whole of the first day for attendees to grasp the concept of the circular economy, highlighting the complexity of engaging with new and inexperienced individuals (and organisations) on this topic.

Prior to this, Education Scotland and Zero Waste Scotland had supported EMF from 2013 to 2015 by funding a member of the charity’s staff to increase engagement with schools and learning related to the circular economy. Activities undertaken included asking young people to consider the circular economy in a business context, conducting trials to embed the circular economy across the curriculum, training teachers on the topic, and working with careers guidance professionals.

Pass it on Week, an annual re-use campaign, has been running since March 2015, and is the only national re-use week in the world. Each year, the campaign takes a different focus, for example, clothes or electrical goods. Celebrity involvement has helped to raise the profile of the various annual campaigns, which have proved popular and been picked up by more than 200 organisations, with an estimated £15,000-worth of clothes donated in Pass it on Week 2016 alone.

### Other engagement activities have included:

**Design Doctor campaign:** This 2015 furniture upcycling campaign achieved good online traction and media coverage.

**Love Your Clothes campaigns:** These have involved PR activity, social media, cascade training to partner organisations, and events in John Lewis and Ocean Terminal.

**A circular economy board game:** Produced via a Kickstarter campaign sponsored by Zero Waste Scotland, the game invites players to make products from available resources and waste products and is often used to engage with the public on the circular economy.

A number of grant-funded projects have also involved engaging with the general public around re-use. Building on a pre-existing volunteer programme, the Volunteer and Community Advocate Programme was delivered from 2013 to 2017. This supported 15 organisations to employ a volunteer coordinator who then recruited volunteers to stage community activities, and community advocates to help reach new audiences. Activities included recycling, food waste reduction, clothes swaps, repair cafés, upcycling workshops, maintenance classes, and other re-use, repair and sharing activities, all of which have helped to increase circular behaviours in the community.
The Zero Waste Town projects in Bute and Dunbar fast-tracked awareness of the circular economy at a local level from 2014 to 2017. The projects covered a whole range of topics, including recycling, re-use and waste prevention.

Examples of circular elements of the projects include:

A “Zero Waste Shed” was established on the local HWRC which was used to communicate Zero Waste messages and made it easier for residents to divert waste away from landfill for re-use and remanufacturing.

A textiles collection and re-use project, The Big Pick, was established in Dunbar.

New Life to Old Things: a re-use project that linked with ‘hard to let’ properties on Bute and a Kerbside textile collection service on Bute to enable re-use.

Construction on Bute: Local builders changed their practices and made salvaged materials available for re-use as a result of Bute becoming a Zero Waste Island.

Bute Food 360: A composting centre has been introduced, which supplies a community garden with compost. The garden sells vegetables to locals, who in turn send their food waste to the composting centre. This demonstration of the circular economy in action can be seen and appreciated on a local level, based as it is on a simple technology that is easy to grasp.

Zero Waste Scotland is keen to understand attitudes and behaviours regarding the circular economy to identify barriers and solutions. A piece of research carried out in 2016, looking specifically at re-use, included gap analysis, an evidence review and a survey, revealing insights into what types of message increase engagement. The impact of different messages and signage employed at HWRCs as part of the Re-use Infrastructure Grant project has demonstrated how the volume of donations can be affected. Further market research into re-use behaviour took place in 2018 and three more Zero Waste Town projects, covering parts of Perth, Leith and Edinburgh, are in development.

3.10.4 Scotland as a circular economy leader

BS 8001, the first standard in the world for implementing a circular economy framework for business, was developed with input from Zero Waste Scotland, including responding to consultation and providing expert advice. The standard was published in 2017 and it is now intended that Zero Waste Scotland will use this framework and guidance to support companies within CEBSS.

Much of the activity described in this report contributed to Scotland winning the Award for Circular Economy Governments, Cities and Regions at the World Economic Forum’s Circular Economy Awards in January 2017. Scotland is now seen around the world as a leader for the circular economy. Several governments have visited to seek out more information about Zero Waste Scotland activities, and Scotland was selected to host the Circular Economy Hotspot event in 2018.

Commenting on The Circular Awards, Roseanna Cunningham MSP, Cabinet Secretary for Environment, Climate Change and Land Reform, said:

“The Award for Circular Economy Governments, Cities and Regions reflects our clear direction and priorities set out in our circular economy strategy ‘Making Things Last’, and the rich programme of investment and innovation we are pursuing in partnership with Zero Waste Scotland, SEPA, Scottish Enterprise, the third sector and business across Scotland.”
4 Lessons learned and future considerations

As the Circular Economy Programme has developed, our experience has taught us important lessons. These have informed the direction and nature of the programme’s delivery and will continue to do so as the programme progresses. Some of the issues raised have not yet been resolved, but are key considerations whenever a new project or programme of activities is embarked upon. We believe that many of the insights that we highlight here can be considered applicable to other support programmes across Scotland and beyond.

Quite often, similar experiences occurred within each of the separate work streams, making for transferable insights that we describe in the subsections below. First, though, we set out some of the lessons we’ve learned that are specific to certain activity areas. For example, re-use, remanufacturing and sustainable procurement are circular economy activities that span all sectors and industries. To make substantial progress in these areas, it is necessary to influence the market at scale and integrate the theories and opportunities across all industries.

Procurement opportunities

With regards to procurement, NHSScotland offers significant opportunities to make an impact, as demonstrated through the Glasgow hospitals’ decommissioning project and the Zero Waste Scotland procurement programme. Scotland Excel is another key public sector organisation that we can target to influence public sector procurement. We are currently engaging with these two organisations around re-use and procurement support and they will continue to be a key focus.

Procurement has proved to be a complex area in which to promote circular economy thinking. Procurement processes take time, and are often for long-term projects, so it can be difficult to understand the final impacts. How the contract is managed – for example, which key performance indicators are selected for reporting performance – can significantly affect the extent to which benefits identified in the procurement phase are, in fact, realised. We believe ongoing support to mentored projects is key to ensuring potential benefits are realised, and lessons learned are captured in order to improve future support provision.

In addition, circular procurement is only one of the great many drivers of procurement policy, even in the sustainability sphere. Impacts may be greater where circular solutions are specified (e.g. tendering for a lease) rather than simply being one of many scoring criteria (i.e. where influence on awarding the actual contract may be more marginal). Nonetheless, even in the latter case, circular procurement criteria are likely to shape the bids received.

Conventional ways of thinking about procurement can remain a barrier. Considering whole-life costs, rather than upfront costs only, can count against circular procurement solutions. Changing this requires engagement not only with procurement professionals but also with other decision makers. Realising the full potential of circular procurement requires a cultural shift in how the public sector makes purchases, not simply a technical change in the procurement process.

To date, Zero Waste Scotland has focused on buyers, but international practice in countries like the Netherlands has sought to engage more directly with framework suppliers as well, to really drive circular economy thinking. This is an opportunity that could be further explored in Scotland. The current focus on public...
Some insights and solutions may be transferable between the public and private sectors.

The bioeconomy

Successful bioeconomy activity is key to a circular economy. Activities to date have seen innovative technologies and processes emerging thanks to Scotland’s strong academic expertise and excellent research facilities and support agency network, which is backed by national strategies such as Making Things Last. The bioeconomy strongly links to key industries for Scotland such as food and drink manufacturing to date, support has been spread across all sectors, but a sector-specific focus may enable greater traction. Other lessons learned from delivering support on the bioeconomy include:

- Early-stage and research development projects require more capital funding support.
- It is necessary to connect the biotechnologies, biosystems and bioproducts in development with the market and increase manufacturers’ confidence in these new tools and materials.
- Waste producers need to be linked up with waste users and the end market.
- National data should be reviewed to understand which feedstocks could be sourced within Scotland from biological sources, rather than from international chemical sources.
- Increasing understanding of the scale of the opportunity – considering financial, social and environmental aspects – can help to inform investment and prioritisation.

4.1 What works (and doesn’t work) for directly supported businesses?

By supporting a range of organisations, Zero Waste Scotland has learned about various support types and how they are received, barriers to implementing circular economy opportunities, and how to support small businesses and start-ups. The ability of a business to implement a circular economy opportunity is largely determined by its:

- ability to embrace innovation
- available staff, time and funds
- existing skills base within the organisation.

Success often comes down to the presence within the business of an individual who has the necessary drive, skills and time to develop and exploit an opportunity. Unfortunately, this success factor can be difficult to assess and influence, but it nevertheless requires consideration at the outset of any project or partnership. A benchmarking, competency or readiness framework may be used to score the business and its project and determine how likely the project is to succeed.

4.1.1 Innovation

Readiness for innovation: Any organisation receiving support should understand how the opportunity fits within its wider business objectives. While a new business model may disrupt a traditional business model, the circular economy objectives must make business sense. Many businesses are unclear on the type of support they need or even what is available, and so the support agency must determine the business drivers and put together an appropriate support package. Innovative projects require bespoke knowledge and skills and support cannot be generalised. A competency framework can determine how ready a business is for innovation as well as the bespoke support package that the project will require. It is also necessary to gauge the commitment of the business and thus the likelihood of project success. Projects have been found to be more successful where there is buy-in at a high level and longer-term strategic planning.

Range of support: The early Market Development Innovation Grants demonstrate that innovative projects require a range of support from the initial research stage, through development and piloting, to operationalisation and marketing. This support includes capital funding, technical expertise and business advice, and there should be continuity to the support based on a clear customer journey. We need to understand, however, at what point our support can actually make a difference. For example, well-developed ideas tend to benefit more from the support available, so the maturity of a concept requires consideration before support can be offered.

Intellectual property: The support agency also needs to consider the implications of intellectual property (IP) and the likelihood of an innovative business wanting to protect its own IP. This could be achieved by developing standard templates for memorandums of understanding or non-disclosure agreements and creating stronger links with IP experts. Publishing case studies and key examples can support the delivery of the programme, however, IP issues and data sensitivity will restrict this opportunity.

Partnership approach: Smaller businesses find it more difficult to employ innovative business models, but may find it easier to do so if they work together. For example, small businesses could join forces to more cost-effectively import innovative resources currently unavailable in Scotland, or a small enterprise could benefit from the infrastructure and security provided by working with a larger brand to support an otherwise risky investment.
4.1.2 Resource

Time commitment: The resource and time commitment required to implement change is often underestimated, especially by small businesses that find it a stretch just to operate a business as usual model. This should be considered at the time the support offering is agreed, with the expected requirements written into the contract or support agreement at the outset. As previously mentioned, individuals are key to driving the project forward and achieving success.

Communications support: Once an innovative intervention has taken place, or a theory that disrupts normal behaviours has been put into practice, communications are required to ensure the project’s continued success. Examples include the marketing of the Re-use Line to generate ongoing demand, and signage at HWRCs to help people make use of the new opportunities presented to them.

Financial considerations: Innovative or disruptive projects can carry financial risks, both to the business and to the support agency’s investment. Innovation is inherently risky and a considerable amount of time and money may need to be invested before a return is seen – and there is no guarantee that there even will be a return. Businesses should aim to spread their financial risk, by exploring circular economy opportunities alongside the current business model. Tapping into a range of funding options could also help to de-risk the investment. Support agencies may wish to develop guidance on circular economy support and funding to help businesses navigate such issues.

Sustainable support: The legacy of a support offering also requires consideration at the outset of a project. Temporary funding should support a business model that is sustainable over the long term, and this model should be considered at the time the funding is allocated.

4.1.3 Skills

A range of skills is required to deliver a successful circular economy project, and individual businesses will possess – and lack – expertise in different areas. For example, start-ups typically require business support to define, understand and use key business terms, to implement good financial management and to commercialise a concept. Innovative organisations tend not to need support with technical development, but often require input on business issues such as market research, marketing and building a business case. Other skills required for a successful project include data skills and the ability to model flows, general circular economy and resource efficiency awareness, and funding and grant support application skills. Support should build expertise within the business, through training and the use of guidance documents. Useful tools may include process flow models, financial models and carbon calculators, as well as procurement approaches including a mentoring programme for specific sectors.

4.2 What wider market factors can help or hinder circular economy ideas?

A range of external challenges and factors will affect the ability of a business to successfully implement a new circular economy approach. Many of these factors will be beyond the control of both the business and the support agency, but it is nevertheless useful to take early steps to identify and try to mitigate any potential risks and challenges.

Regulatory requirements: Small businesses are resource- and time-poor and so must prioritise regulatory requirements, such as health and safety, before developing and applying circular economy opportunities.

Regulatory restrictions: New products and business models may challenge current waste classifications and the regulations surrounding some waste materials. Any such issues must be resolved before the opportunity can be developed or receive investment.
**Access to finance:** Many young businesses are unable to apply for bank loans and new business models often don’t suit traditional loans. When requesting match funding from the support recipient, it is important to consider what finance, if any, the business is able to access.

**Market opportunity and demand:** Significant work is required to bring a new product or service to market – and then there must be a demand for it. Consideration must be given to how to generate this demand if the product has a higher cost or requires a change in customer behaviour. Alternatively, organisations such as Zero Waste Scotland could potentially generate demand for a circular product or service, de-risking investment in new business models that can meet this existing demand.

**Procurement opportunities:** As mentioned earlier, procurement offers huge opportunities to encourage a circular economy – it is an area in which interventions can very effectively trigger demand for circular economy products and services. It can be a complex area for intervention, however, as the range of procurement opportunities is vast, yet procurement activity is often long term and difficult to influence.

**4.3 How can support agencies be most effective?**

**4.3.1 Delivery mechanisms**
The support provided to recipients needs to be flexible and agile, with the possibility of revisiting and adapting the initial project scope agreed at the outset. To improve support delivery, it is necessary for agencies to first fully comprehend the nature of the businesses to be supported.

**Expectations and timescales**

**Management of expectations:** To avoid damaging important relationships and organisational reputation, all support agency staff and partners should be able to accurately communicate what support is, and is not, available to businesses. It is also important not to have unrealistic expectations of stakeholders’ ability to collect monitoring data from SMEs or refer businesses to the programme.

**Long mobilisation times:** Our experience of many of the support streams – and, in particular, SIR – has highlighted the significant amount of time and resources required to mobilise a support programme. Project pipelines should be built during the mobilisation stage and if a network does not already exist, this will take time, effort and resource to establish. Working with strategic partners can accelerate this stage, but when trying to build a presence and reputation in a particular market, sector or industry, plans should include sufficient time for development. Incorporating longer lead times can result in more successful and wider-reaching projects.

**Long support timescales:** Even after mobilising its support programme, SIR found that it took eight months on average for an initial enquiry to become an engagement activity. Timescales were longer for larger or more bureaucratic organisations and shorter for highly motivated businesses already on their way to becoming more circular. As such, extended programmes of support are recommended to ensure the greatest impact on the circular economy.

**Return on investment:** Several years can pass between the receipt of the initial support and savings being realised. The early Resource Management Innovation Grants in 2012 are a good example of this, with some recipients of 2012 grants not expected to see actual savings until 2018. Innovation is risky and, while it may take time to prove the value of an investment, it is necessary to accept that there will also be some failures. As the real impact of most circular economy interventions will be felt some time after support has been delivered, post-funding evaluation and monitoring should continue for a sufficiently long period following the end of the support. In reality, some businesses find it difficult to meet ongoing monitoring requirements and, if the funding has been received, it can be difficult to hold the organisation to subsequent monitoring requirements.

**Support route**

**Capital vs expertise:** Capital is sometimes required to purchase equipment that will allow circular economy activities to take place. In many cases, expert support is required alongside this investment, to ensure that the equipment purchased is used to maximum effect and that circular economy thinking is embedded in the business. Expert support and/or the provision of personnel can be delivered in a number of ways: via a grant that pays for a member of staff or expert consultant; by employing an intern on behalf of the business; or by seconding a support agency staff member to the business for a limited time.

**Grant vs procurement:** Support has traditionally been provided through either a grant or a procurement exercise. There are benefits and drawbacks to both support routes, and it is worth investing some time to determine which is most appropriate before embarking on a project. Whichever route is selected, all contracts must include a requirement for the recipient to monitor impacts and report savings.
Strategy and intervention: Providing a single intervention is generally not enough to increase circular economy activity. Supported businesses need to have an overarching strategy that encompasses sustainability and circular economy thinking to ensure that these are embedded across the entire organisation. If such a strategy is not already in place, the support agency should work with the recipient to develop one.

Pilots and trials: Running pilots and funding trials allows for various theories to be tested before a major investment is made in a particular method. The Re-use and Repair Hub Grants programme is an example of how three different delivery methods can be tested through a grant programme. To reap maximum benefit from such trials, it is necessary to detail the objectives at the outset and agree the monitoring and evaluation requirements with the recipient at the contract negotiation stage. Ongoing monitoring throughout a project and subsequent follow-ups to reflect on outcomes are paramount to securing the most useful insights from the project.

Opportunity-driven support: Grant programmes are set up with eligibility requirements and scoring criteria that applicants must meet to access the funding. Whilst this ensures that finance is invested in a fair and democratic way, it results in some projects being altered to fit the criteria or losing out on funding. Innovation can be stifled and progress limited as a result. On the other hand, open calls for funding or opportunity-driven support often result in applications of variable quality and challenges when it comes to comparing the relative value of projects.

4.3.2 Strategic opportunities
Clear support landscape: While Scotland is considered a world leader on the circular economy, the support landscape for businesses is complicated by the variety of help available from several support agencies. One benefit of this is wider-reaching engagement and communications on the subject, but it can also lead to confusion over the various support routes available. In some industries, there may even be a greater supply of support than current demand from eligible businesses. In addition, it is harder to promote the varied circular economy support opportunities through a single marketing campaign. Possible solutions may be to produce a guidance summary of support opportunities, embed support into existing business support systems and/or introduce a more streamlined, connected landscape.

Start-ups: Working with start-ups brings both opportunities as well as difficulties, as they tend to be more receptive to circular economy thinking but can be a riskier investment. Generally, grant support from Zero Waste Scotland is contingent on a business providing evidence of three years of trading to offer some security before public money is invested – new businesses are deemed a riskier investment. This needs to be addressed, however, if young organisations are also to receive support. Start-ups require a whole range of support, some of which is outside of Zero Waste Scotland’s expertise, and so partnerships with other support agencies may result in more successful circular business models. In addition, smaller businesses require responsive support that is ready when they are, which is often incompatible with large grant programmes.

Bespoke solutions: Circular economy interventions tend to be bespoke and are not generally replicable. A lack of standardised measures makes it difficult to develop best practice guides that apply to a range of businesses, meaning that one-to-one support is more appropriate.

Legacy: Support programmes should consider not only the future sustainability of the projects they fund, but also the legacy the programme itself will leave once
funding is no longer available. Suitable legacies could include leaving a sector with increased competency and skills or self-help tools, or developing a self-sustaining support delivery business model.

**Skills and knowledge development**

**Specialist knowledge:** The range of solutions and measures that can be implemented and the various types of support that a business may need calls for support agencies to have specialist knowledge. This could be a constraint for support agencies and an appropriate team may need to be built up over time.

**Actionable research:** Research needs to be actionable, with a clear sense of scope and objectives. Possible objectives may be to present evidence, to scope opportunities or to determine recommendations. Published research reports have proved successful in demonstrating expertise and engaging with technical sectors as well as in stimulating ideas and attracting businesses to support agencies.

**Reflection and review:** It’s important to find time to reflect on past activities to understand why some innovative projects do not succeed to avoid the same issues occurring in future initiatives. Conversely, understanding why some projects work better than others can sometimes enable further success. The phased approach to the delivery of the CEBMs programme, and then CEBSS, has allowed lessons learned from each phase to be applied to subsequent phases. Time is often at a premium in busy support programmes, however, so it may be valuable to formalise opportunities to reflect and provide feedback.

**Upskilling and training:** As well as developing a support agency’s own skills and knowledge, it is crucial to help the engaged organisations to embed circular economy skills and understanding. For example, the delivery of the Glasgow Chamber of Commerce project means that Chamber staff are now able to identify and support circular economy opportunities within their business networks. A greater awareness and understanding of circular economy and sustainability principles could also be achieved by introducing the topic within higher and further education, and by upskilling the resource management, recycling and re-use workforce.

**Networking, partnerships and collaborative projects**

**Informal relationships:** Whilst collating the learnings from across all programme activities, we have recognised the importance and value of the informal relationships that exist between support agency delivery team staff and external organisations and sectors. In some cases, where staff originate from a particular industry, they have brought those relationships with them to Zero Waste Scotland; in other cases, the relationships have grown over time as a programme has developed. A real challenge for support agencies is how to maintain such contacts when staff on either side of the relationship move on.

**Working with delivery partners:** Several programmes delivered by Zero Waste Scotland have been delivered in partnership with other support agencies, including Glasgow Chamber of Commerce and IBioIC. Such partnerships provide incredible opportunities to access new sectors and markets, add a new perspective to the support offering and provide additional expertise to the programmes.

**Funding collaborative projects:** A number of projects we have funded have adopted a collaborative approach, for example, the Re-use Infrastructure for Household Waste Recycling Centres and the Re-use and Repair Hub grants. Again, significant benefits and greater gains can result from working in collaboration, but challenges can also be encountered. A project will usually have a lead applicant, who is contracted to Zero Waste Scotland and directly receives the funding or support, with other recipients named in the project proposal. Collaborative projects tend to require much more involved project management to ensure their delivery, and the time required for this should be taken into account at the outset of such projects.

**Network building:** Building new networks takes time, from making the initial engagement to nurturing relationships to ensure that those involved have confidence and trust in one another. Network building can be resource-intensive during the establishment phase and project plans should include both time and resource for this activity.

**Internal and external communications and engagement**

As highlighted by all of the circular economy activity areas covered in this report, the importance of communications and engagement cannot be underestimated – they can determine the success of an activity. Activities include communicating support opportunities both internally and externally, promoting success stories and disseminating research findings.

**Awareness of the concept:** There needs to be a better understanding generally of the concept of the circular economy and greater awareness of how everyone can be involved. Increasing awareness among customers and supply chains can stimulate demand and support for new initiatives, while a more widespread awareness
across businesses and other organisations could drive innovation and progress.

**Generating demand for support:** We have found in several cases that the demand for circular economy support is not necessarily present in Scottish businesses. As such, it has been crucial to engage both with partners and directly with companies to generate projects. More widespread communication of the concept of the circular economy, the opportunities it brings and the available support could increase the demand from businesses. There is also the potential to increase awareness of circular economy opportunities among other business support agencies. Zero Waste Scotland continues to work with other support agencies via the Scottish Business Sustainability Partnership to improve inter-agency referrals and the delivery of coordinated support from Zero Waste Scotland, Scottish Enterprise, Highlands and Islands Enterprise, SEPA, Business Gateway and Energy Saving Trust.

**Learning from others:** Creating and sharing best practice examples and good news stories provides opportunities to highlight programme successes, educate others on circular economy principles, encourage peer-to-peer learning and attract new businesses to consider the support offering. Timely access to such communications supports engagement with new sectors and businesses and can build momentum and inspire wider participation.

**Recipient confidentiality:** While sharing best practice and good news stories can be an ideal mechanism for inspiring others, many support recipients may not wish to be showcased. This may relate to concerns about commercial confidentiality, IP restrictions and/or a preference not to share their secrets with competitors. In addition, activities like remanufacturing and re-use are sometimes misunderstood by customers, so businesses active in certain sectors may wish to avoid highlighting such aspects of their business model. Any such concerns should be resolved, however, as the support programme begins to influence attitudes towards circular economy activities.

**Method of engagement:** We recognise that different communication media will engage different types of businesses and result in different outcomes. While specific project examples are useful in engaging small businesses to replicate previous activities, research reports have proved more successful in inspiring innovation among technical industries. For example, sharing relevant research reports with energy industry businesses has stimulated engagement and innovation, and encouraged businesses to request support to pursue circular economy opportunities.

**Networking:** Workshops, matchmaking events and networking sessions are recognised as excellent ways to engage with businesses, create partnerships and stimulate ideas. Encouraging small, time-poor businesses to attend such workshops can be difficult, but working with business engagement partners (e.g. Chambers of Commerce or trade associations) has been shown to increase interest and improve attendance.
5 Our current support offering

Zero Waste Scotland’s support for a circular economy has developed rapidly. This report has focused on work delivered prior to 2017, what we learnt from it and how it has informed and developed into more recent work, particularly ERDF funded direct support to small businesses. Some activities described in this report continued beyond 2016 and into 2017. These include the:

- Scottish Biofuel Programme
- mapping and data model developed with key partners to inform the future of biorefining in Scotland, known as Biorefining for Scotland
- procurement support activities – which have continued into 2018
- ongoing support to CRNS
- continued engagement with NHSScotland to increase re-use
- last of the Re-use and Repair Hub Grants
- final stages of SIR – which has continued to provide support into 2018
- second phase of the Glasgow City Project – which runs from 2017
- continued engagement with Orkney, working with OIC and HIE to identify circular economy opportunities within the islands.

As already discussed, Zero Waste Scotland is not alone in supporting circular economy developments. The initial three-year phase of Zero Waste Scotland funding for SIR came to an end in the second quarter of 2018, although SIR is continuing to operate currently under SFC funding until end April 2019. SIR, in discussion with SFC and Zero Waste Scotland, is now considering its next phase, including how it can integrate with the new National Manufacturing Institute for Scotland.

Since 2016, two streams of Zero Waste Scotland support have been in place to build the circular economy in Scotland. The first focuses on providing direct support to SMEs and is jointly funded by the Scottish Government and the ERDF Resource Efficient Circular Economy Accelerator Programme. The second stream, funded solely by the Scottish Government, focuses on strategic engagement with sectors, industry and the general public, research, and opportunity scoping. Both streams of support have been informed by the activities described in this report and many of the lessons learned detailed above have been incorporated into our current support offering. Both ERDF and non-ERDF work contributes to Scotland’s overarching ambition to build a circular economy – and also helps to revitalise Scotland’s manufacturing tradition.

Key ERDF projects include:

**Circular Economy Business Support Service (CEBSS):** This provides bespoke one-to-one support to help businesses develop their ideas for circular economy products and services. Lessons learned from the CEBMs programme in particular have been key to informing the design of this service.

**Circular Economy Development Grant:** This fund can provide a small capital investment to recipients of CEBSS to develop a promising project idea to the point where the business can apply to CEIF for more comprehensive funding. It acts as a bridge between CEBSS and CEIF.

**Circular Economy Investment Fund (CEIF):** This fund provides capital investment to support the implementation of business models, some of which may have been developed via CEBSS. Key areas of interest are plastics, the bioeconomy, re-use and flat glass recycling solutions, but this is by no means an exhaustive list.

**Employment of sector managers:** Dedicated Zero Waste Scotland sector managers are able to support engagement with SMEs operating in crucial sectors and industries, including energy, manufacturing, food and drink and construction.

**Cities and regions projects:** Further projects that build on the Glasgow experience are being rolled out across Scotland, targeting businesses on a geographical, rather than sectoral basis.

**Masterclasses and networking events:** More events are planned to build on the success of the Textiles Masterclasses Series and the networking events held as part of the Glasgow Chamber of Commerce and Orkney projects.

**Circular Economy Hotspot event host:** Scotland was selected to host the Circular Economy Hotspot event in 2018, highlighting our nation as a leader for the circular economy. The event also enabled Zero Waste Scotland to secure national and international profile opportunities and allowed Scottish businesses to generate international leads for circular economy opportunities.

**Zero Waste Towns:** Funding is in place for three further projects, which include trials of innovative community-based responses to the circular economy. These projects offer the opportunity to engage with communities about the circular economy and showcase solutions nationally and internationally.
While the ERDF funding enables Zero Waste Scotland to support more businesses more widely, it also introduces restrictions around the types of projects that can receive support. For example, SMEs must benefit from the provision of the support and feasibility studies cannot be funded through the ERDF programme. The non-ERDF work stream picks up where the ERDF programme is unable to provide support – that is, for projects led by large businesses or public sector organisations.

Circular economy procurement opportunities have continued to be supported through engagement, mentoring, workshops, training and input into procurement exercises delivered throughout 2017 and into 2018. We also provided significant input to inform the wording of policy guidance to support the public sector on how to consider the inclusion of circular economy outcomes when using the Scottish Government’s Sustainability Test tool.

Stakeholder engagement continues to be a priority for our Circular Economy Programme, as it is recognised that one of the main barriers to realising a circular economy is lack of demand – both for the support that is available and for the products and services that contribute to a circular economy. We need to engage and communicate with all sectors and the general public to raise awareness and demand, drive innovation and ensure long-lasting success of projects we support.

**Future priorities**
Priorities highlighted in the Making Things Last strategy that will be a key focus for Zero Waste Scotland include:

**Reducing food waste** – from farm to fork, by engaging with the public sector and large businesses, supporting SMEs and influencing members of the public.

**Reducing construction waste** – including in design, construction processes and deconstruction. Working to influence large businesses and the public sector and supporting SMEs to create less waste and increase re-use and recycling.

**Increasing recycling by householders** – through improved or rationalised collection services and public engagement.

**Improvements to the recycling process** – innovative approaches that improve the quality of recyclates and retain the value of resources within Scotland will be funded through CEIF.

**Consideration of deposit return schemes and extended producer responsibility** – to increase recyclate capture and recyclate content and reduce waste.

**Bioeconomy** – particularly through partnership working with iBioIC.

**Communications and engagement** – it is recognised that awareness of the circular economy and its benefits must be raised to drive demand and sustain a transitioning economy.

Currently, the ERDF programme is due to come to an end in December 2019, at which point we can consider other ways to deliver support and advance the circular economy. It is recognised that significant impacts could be achieved by providing direct support to larger companies and the public sector as well as delivering pilots and feasibility studies to support new, innovative technologies. A potential extension of the ERDF programme could focus on identifying large-scale strategic projects to support, and a review of existing support approaches would help us to understand both their effectiveness and current market demands.

In order to further accelerate development and implementation of circular economy business models and approaches by Scottish businesses, we are working to develop a new, engaging section of our website called “The Circular Economy Acceleration Centre” (CEAC), which will be home to all of our circular economy content and will aim to:

- Educate visitors about the circular economy
- Inform businesses what the circular economy means for them and how they can capitalise
- Inspire visitors to implement circular economy best practice into their business processes
- Provide tools that empower businesses to independently explore circular economy opportunities
- Showcase best practice ‘case study’ examples within Scotland, to inspire, educate and motivate others
The CEAC may include tools such as interactive case studies and maps, video content, infographics, webinars, online discussion and networking tools and free-to-download materials which will provide a lasting legacy in the event that we are no longer able to provide direct support.

There is likely to remain a focus on cities and regions, which will see us work closely with partners and ‘city region deals’ to maximise circular economy opportunities. We will also continue to focus on manufacturing and remanufacturing, as we seek to influence the work of Scotland’s Manufacturing Action Plan and the National Manufacturing Institute for Scotland in regard to circular economy opportunities.

We will begin to consider some key problem products, raise awareness of extended producer responsibility and identify solutions for these products to reduce waste to landfill. The products we will focus on are still to be determined, but may include tyres or mattresses, for example.

The Revolve certification programme will continue to expand, shifting its focus towards increasing awareness of the brand, in part by signing up high street charity chains to increase its reach. A monitoring programme will also be introduced to ensure that stores that are already certified continue to meet the required quality standards.

Circular procurement offers significant opportunities and we will focus on providing support along supply chains - influencing large companies and public sector organisations in their purchasing decisions. Activities will concentrate on working with public sector organisations to improve their procurement practices and at the same time supporting SMEs to meet the sustainability requirements of progressive public sector organisations.

Engaging the construction sector to become a part of the circular economy will be a priority. Programme plans include showcasing circular economy procurement, construction and living benefits at residential sites, and contributing to Scotland’s Manufacturing Action Plan by highlighting circular economy-focused manufacturing construction and operations.

In Making Things Last, the Scottish Government outlined the need to “embed the development of new skills and thinking in the next generation of designers, business leaders and innovators. We want to make sure Scotland’s workforce has the right skills to take advantage of opportunities from a more circular economy.” The strategy recognises the need for specific knowledge and skills, in addition to new attitudes, behaviours and business models, to grow the circular economy which will be developed through a “skills hub”. This initiative, led by Zero Waste Scotland and Skills Development Scotland, is designed to be developed in partnership with a broad range of stakeholders, employers, industry leadership groups and skills partnerships. It will take the form of a collaborative network of stakeholders, with a central coordinating ‘hub’ to provide leadership, strategic direction and guidance.

Our current plans will not be the end of the journey. New opportunities are certain to emerge, knowledge of what works will continue to improve, and circular economy solutions will have to adapt and respond to changing market conditions like any other kind of business. There is no single version of a circular economy, it’s a way of thinking and doing things so that we use fewer resources, reduce our impact on the environment, and realise new economic opportunities as we do so. True success will be when these approaches become embedded across our economy.