Making Things Last – Consultation on creating a more circular economy in Scotland

RESPONDENT INFORMATION FORM
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1. Name/Organisation
Organisation Name

The James Hutton Institute

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3. Permissions - I am responding as…

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(a) Do you agree to your response being made available to the public (in Scottish Government library and/or on the Scottish Government web site)?

Please tick as appropriate
☐ **Yes** ☐ **No**

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(b)	Where confidentiality is not requested, we will make your responses available to the public on the following basis **Please tick ONE of the following boxes**	Are you content for your **response** to be made available? **Please tick as appropriate** ☑ **Yes** ☐ **No**
	Yes, make my response, name and address all available ☐ **or** Yes, make my response available, but not my name and address ☐ **or** Yes, make my response and name available, but not my address ☐	

(d) We will share your response internally with other Scottish Government policy teams who may be addressing the issues you discuss. They may wish to contact you again in the future, but we require your permission to do so. Are you content for Scottish Government to contact you again in relation to this consultation exercise?

Please tick as appropriate ☑ **Yes** ☐ **No**

Question A – Design

We are looking for feedback on the ideas discussed above on influencing design of products, business models, services, and systems.

- Do you agree with our aspirations on design for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

The plans for design are in line with the circular economy ethos but it is unclear where impact will be made in Scotland. To target design per sé needs some targeted thinking. High volume low cost items are not bought to last long, thus changing this thinking is a long term aspiration and, similar to the plastic bag issue, it can be addressed by charging and changing mind-sets, initially via the consumer's pocket.

There is a need for more evidence that the economic implications of the proposed changes have been considered in sufficient detail. The changes suggested will only be successful if they improve (or at least do not harm) the Scottish economy. Some of the aspirations appear to threaten existing sectors of the workforce (e.g. production, which will be decreased) without addressing the need to improve job opportunities elsewhere. The projected increases in employment are considerable, and we support them but the *status quo "take, make and dispose"* approach also employs people. So, is there an indication of what the net increase in employment might be?

There should be a focus on retraining, and skill enhancement in particular, which would help to unlock new opportunities. Training and education should be closely linked to opportunities in the job marketplace, otherwise skilled people will move overseas for work.

The plans for circular economy design should consider the whole life cycle aspects, with e.g. emphasis on co-location to reduce transportation costs/impacts. The ubiquitous wastes of heat, water and carbon dioxide (and possibly light) are obvious targets: e.g. large manufacturing with vertical farming/glasshouse systems close by to generate high value produce such as herbs, horticultural plants and medicinal crops/plants; waste water treatment plants co-located with anaerobic digestion facilities.

Given Scotland's size there is an opportunity to provide global leadership via generating the IP, processes etc., with production and implementation elsewhere where the scale of the task is greater and therefore a solution can be delivered more economically. This concept applies to all the circular economy sectors identified for comment in the Consultation.

Question B – Reuse

We are looking for feedback on the ideas discussed in this section on extending the life of goods through reuse.

- Do you agree with our aspirations on reuse for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

In general we agree with these aspirations; we feel that reuse is crucial, both on the supply and demand side. As with our response to Question A, a careful consideration of the full lifecycle economics needs to be undertaken to properly understand the feasibility of large-scale reuse. Increasing, the value of reusable materials/items may also increase associated criminality, so there may be an argument to enhance regulation surrounding the reuse of items. However, such a move should be carefully considered so as not to impact negatively on community-led schemes. Investments in R&D and social innovation are needed to optimise impacts.

Question C – Repair

We are looking for feedback on extending the life of goods through stimulating greater levels of repair by businesses, community organisations and individuals.

- Do you agree with our aspirations on repair for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

We broadly agree with enhancing the repair culture in business, but have reservations about the same incidence of repair being replicated amongst the general public. This is primarily because individuals want to own new items, and many dispose of older items before they are broken in order to have the latest version/model. A culture of repair may be seen by many as turning the clock back. This may be engrained as a part of consumer culture and would only significantly change if, so called, ‘big ticket’ items started to cost a significant proportion of the average salary.

One suggestion that would encourage consumers to repair products would be if manufacturers provided long (and free) warranties on their goods. This could lead to improved quality of goods, reducing repair costs during the warranty period. Indeed, targeting new business models towards hiring and leasing products with built in repair and warranties is sensible. Best practise models for this should be sought (both here and in other countries) and tested for compatibility with other sectors.

Question D – Remanufacture

We are looking for feedback on the ideas discussed in this section to promote remanufacturing in Scotland.

- Do you agree with our aspirations on remanufacture for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

We strongly agree with these aspirations, and recognise that the demand for remanufactured products can be enhanced through incentivisation, e.g. by offering price reductions on a replacement unit for customers who provide the remanufacturing company with a broken unit. This is an approach used commonly in the automotive parts industry.

A significant contribution towards meeting these aspirations is to ascertain the energy required in the remanufacturing of products. Although it is clear that energy used in remanufacturing is usually about a quarter of the energy in manufacturing of new products, it might be naïve to associate this to all products. There is the need to clearly define the Life Cycle of product categories to assist in the development of a better strategy for management.

Question E – Recycling

We are looking for feedback on the proposed approaches to expand recycling among households and businesses and improve the quality of recycled materials.

- Do you agree with our aspirations on recycling for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

The issue of recycling has many putative opportunities to deliver feedstocks to new and existing industries for product development and enhancement or production savings. For example, extending and improving existing recycling operations across Scotland (and including the application of waste recycling to SMEs in 2016) will generate significant feedstocks such as paper/natural fibre waste which could, through the application of existing technology, be converted into simple glucose sources for the vibrant Scottish Industrial Biotechnology sector. The James Hutton Institute will be very happy to expand on the background to this if it will be of assistance.

While we agree with the aspirations, there is a need to apply systems thinking to this issue. It is desirable that the full environmental cost of the product be 'internalized' in the retail price of goods. This would include its packaging, especially if made from different plastics and laminates, and the life cycle (including impacts of resource extraction, transportation etc.), as well as expected reuse or recycling at end-of-life. Currently, some of these costs, and especially of recycling, are externalized onto taxpayers and the environment. Incentivising separation and collection systems that minimise the costs of recycling, and reuse merits further work. A number of countries (such as Germany and Sweden) are well advanced in these areas and may be sources of useful information on their experiences.

With regard to recycling and the generation of refined, reusable feedstocks, it has been noted through discussion with industry that basing new or existing product development on such feedstocks comes with caveats. A key consideration is the issue of continuity of supply of the feedstock: should Scotland achieve targets elsewhere this "new" feedstock could diminish or disappear. The issue of price is another where an initial waste is viewed as low cost but once an end use is established the costs rapidly increase. Thus cost issues link with the issue of recycled material/feedstock quality and the need to establish a basal level of acceptable quality for the "new" feedstock. This issue of quality is probably the most important which needs to be addressed. It will require attention before using industries will change from virgin to recycled feedstock. It will need to be delivered with credibility from the outset if the approach is to gain traction and then progress.

A number of waste streams have potential for use in agriculture/food production via, for example, nutrient recovery. It is important that maximum permissible levels of contamination are set for all potential waste streams using risk based approaches. Feedstocks are depend upon supply chain sustainability and resilience and the lessons learned in the food and drink sector, and in countries such as Germany and Sweden, may be valuable in identifying additional opportunities.

Question F – Producer Responsibility for reuse and recycling

- Do you agree with our aspirations on harnessing producer responsibility approaches for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

Producer responsibility may be assumed as appropriate, but may be a less attractive issue for industrial sectors to deal with. Some innovation is required rather than only direct legislation. Incentivisation could be important for achieving this responsibility to reuse and recycle as an integral part of day to day activities. The establishment of new funding mechanisms to support new re-processors where supply chains are not yet fully developed should help and with recycling. There should be a link to innovation in recycle waste utilisation and the proposed Scottish Circular Economy Network.

Question G – Recovering value from biological resources

We are looking for feedback on the proposed approaches to harnessing greater value from biological resources that would otherwise end up as waste.

- Do you agree with our aspirations on recovering biological resources for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

Applying the circular economy concept to biological resources is overdue. The timing aligns well with the requirements driven by climate change and reducing GHGs, as well as the increased recognition of the importance of greater sustainability.

In the discussion document there is a gap in references to the primary production sector in Scotland, which underpins the food and drink sector and is one of the key growth sectors. This requires better linking of Scottish innovation (academic and industry) with exploitation at the commercial end. This can be achieved at several levels, and for primary production delivered on-farm, with the farm representing the (micro) circular economy within which inputs and resources can be cycled (e.g. natural for synthetic fertilisers, slurries/ wastes crop co-products for AD etc.). Such as approach will require close engagement with NFUS for practical exploration of issues and delivery.

At the larger scale, investigation into life cycle aspects of centralisation versus localisation need to be explored more fully. Centralised facilities provide economies of scale, but also have the potential for wider impacts from system failure, e.g. the case of microplastics in digestates.

The major co-products derived from primary production hold significant promise for value enhancement and valorisation, research into which will be delivered as part of the Scottish Government RESAS Strategic Research Programme (2016 to 2021). Early gains which deliver to Scotland's aims to be "clean and green" include cereal milling and harvest "wastes" (husks, straw etc.). These have significant potential as sources of feedstock for the food and drink industries, with the biorefining of these prospectively delivering high value oils, proteins, prebiotics, thickeners, waxes, natural antioxidants etc. The adoption and exploitation of regional biorefining centres will benefit Scotland's current agrifood systems, for which there is a requirement of such an approach in fishing, shellfish, crop horticulture and livestock production systems.

As stated, there is the potential for high societal and economic gains to be had via the circular economy/biorefining approach which, if extended to the forestry sector, becomes even more convincing. There is an opportunity for Scotland to forge many partnerships and alliances in taking this approach to both de-risk activities (practically and economically) and maximise impact by linking with other initiatives. Such a partnership is the Bio-based industries consortium (http://biconsortium.eu/), an EU – supported, Brussels-based non-profit international association, established in 2012 to represent the private sector in the Bio-based sector. This initiative aims to optimise land use and food security through a sustainable, resource-efficient and largely waste-free utilisation of Europe's renewable raw materials for industrial processing into a wide range of bio-based products such as advanced transportation fuels, chemicals, materials, food ingredients and feed, and energy.

Scotland can maximise its innovation in this area more realistically by supporting efforts delivered as part of wider initiatives.

Question H – Energy recovery

- Do you agree with our aspirations on energy recovery in a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

Energy recovery is at the hub of closed loop economies and should be made a central focus in the proposed system design. We support the proposed actions and believe that further consultations with appropriate stakeholders will help determine solutions. Energy recovery and energy efficiency are symbiotic, and it is important that all solutions are evaluated in terms of their whole life cycle. In many situations, localised smaller-scale approaches may be more energy efficient compared to large centralised facilities. The circular economy approach tends to promote a move towards localisation across the full spectrum of sectors.

In addition to the approaches summarised in the discussion document, energy can also be recovered by using waste streams to fertilise energy crops that can then be put to anaerobic digestion. This approach has several advantages: (i) it can make use of derelict land no longer fit for primary production (i.e. it would not make economic or circular economy sense to grow energy crops on land suitable for food production); (ii) plant-derived feedstocks are more efficient in energy production than many waste products; (iii) irrigation of energy crops with waste water in wetland systems treats the water whilst producing useful biomass.

There is much uncertainty remaining regarding the safe use of waste streams and further risk-based and epidemiologic evaluation should be undertaken. Thermal technologies, such as incineration, need to be approached in a sensitive way given public perceptions of health risks associated with these technologies. In particular, concerns associated with levels of PCDD/Fs (dioxins) from incineration have caused significant challenges to this industry. Anaerobic digestion produces digestate that may be used as a fertiliser in agriculture/horticulture, but in-depth risk assessments need to be undertaken given the diversity of potential feedstocks (especially from food waste where a significant proportion is derived from jurisdictions outwith Scottish regulations), and the need to set standards for different end-uses. Specific waste streams have specific issues that remain to be addressed, yet these waste streams are being used for anaerobic digestion, for example in poultry litter and risk of transfer of botulism to cattle; and, risk of transfer of anti-microbial resistance up the food chain. A number of these risks are starting to be explored as part of the Scottish Government RESAS Strategic Research Programme scheduled for 2016 to 2021.

Question I – Landfill

- Do you agree with our aspirations on landfill as we move towards a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

A reduction in landfill is an implicit part of moving towards a circular economy, and as such we support these aspirations. Landfill gas can be a useful source of energy in itself and more consideration should be given to expanding these approaches where technologically and economically feasible. Landfill can be seen as a resource that is plentiful (>90% of Scotland's population live within 2 km of a landfill) and consideration should be given to the mining of raw materials from old landfill sites, where technologically and economically feasible. Old landfill sites can also be exploited for some land uses depending on biophysical and socio-economic factors.

Question J – Communications

We would welcome views on the approaches to communication discussed in this section.

- Do you agree with our aspirations on communication for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

Marketing and communications are crucial for transition to a circular economy. Business and consumers are the key decision-makers. Upstream and downstream decisions in the value chain need to be better communicated, providing coherent incentives between producers, investors, distributors, consumers and recyclers, and ensuring a fair distribution of costs and benefits. Market mechanisms need to be employed to ensure the most efficient allocation and use of resources, and social innovation, entrepreneurship and new production and consumption models promoted. Where the markets fail, efficient allocation and use of resources must be addressed through information and communication campaigns and other policy/governance instruments.

Zero Waste Scotland (ZWS) is a potentially very influential player in achieving the aspirations behind this consultation. The current landscape is relatively complex and it is not always clear to the general public the differences in roles of other government agencies/individuals in related areas. We recommend that the role of ZWS is made significantly stronger as part of circular economy development, or that their responsibilities are devolved to another organisation (e.g. SEPA) to avoid overlap and confusion.

Is the expression ‘Circular Economy’ itself a potential barrier to progress? To the public it may be interpreted as jargon, and is an expression open to different interpretations of meaning. It is an expression which has been used for some time but it is the translation into meaningful actions, such as carrier bag pricing, that will resonate with the majority. Efforts should be made to increase the accessibility of the concept to the wider public.

Question K – Skills

- Do you agree with our aspirations on skills for a more circular economy?
- What other opportunities are there for transformational change?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

The plans for capacity building for the Circular Economy are generally appropriate but omit certain aspects. Key to sustainable delivery is the need for good quality life cycle analysis across the multiple sectors to be targeted. Currently, this skill base is not common in Scotland (or the UK) and needs attention in the academic and institutional skill bases and teaching prospectus. One suggestion would be to develop a Scottish Centre for Life Cycle Analysis - possibly engaging all Life Cycle experts in Scotland under one umbrella. Such a Centre could be a focus for projects, training, etc. especially since much of the circular economy approach depends on life cycle product design.

The targeting of SG funding into specific research calls e.g. RCUK, EU, etc. to promote capacity building in specific areas of relevance to circular economy is another approach that can also be used for building skills in life cycle analysis.

More fundamental to the training above (LCA) is the need to change mindsets in some industrial sectors. The approach to generating opportunities and exploitation is weaker in Scotland than in other parts of the European Union. To deliver on the aspirations towards a circular economy and sustained economic growth will require greater entrepreneurship. Scottish Enterprise and Highland and Islands Enterprise have significant roles to play in this regard and, linked with the appropriate Scottish business schools or translation of research at organisations such as the James Hutton Institute could help to fill the skills gap.

Question L – Measuring Progress

We are looking for feedback on the proposed approaches discussed in this section.

- Do you agree with our aspirations on measuring progress towards a more circular economy?
- Do you agree with the proposed actions for further exploration?
- What other actions would help unlock opportunities?

We broadly agree with these aspirations. Businesses could provide more detailed information on how much is being spent on the different modes of operation (e.g. purchase new, repair, reuse or lease).

Question M – Equality

- Do you have any comments on the proposals in terms of how they may impact on any particular equalities group i.e. in respect of age, gender, race, religion, disability or sexuality?

No. We believe it is to the benefit of all.

Question N – Business and Regulatory Impact Assessment

- Do you have any comments on the draft partial Business and Regulatory Impact Assessment?

While impact assessments tend to be high level, this example suffers from very limited quantification which does not engender economic confidence in circular economy thinking. In particular, the 'Business as Usual' scenario needs some level of quantification similar to that provided for the Making Things Last scenario. Without this, it is difficult to make a real comparison and the argument for a circular economy is less convincing. This issue is replicated in the consultation document. It is important to apply the same level of scrutiny to the negative impacts on our current economy due to moving towards a circular economy as well as to the positive impacts of the new economy.

Question O – Strategic and Environmental Assessment

1. To what extent does the Environmental Report set out an accurate description of the current baseline and the business as usual scenario? (Please give details of additional relevant sources)

Generally, we agree with the current baseline and business as usual scenario. There are some good examples provided of where circular economy practices are already flourishing. The examples provided is not an exhaustive list, but they cover the full range of sectors currently involved in circular activities. While some circular economy activities are 'old' and well established (such as automotive parts remanufacture), focus has been placed on more recent initiatives in personal technology and retail. However, there are a number of instances where the language used in the report over-emphasises circular economy success stories, with, initiatives are described as ensuring or guaranteeing, when in reality these initiatives are based on incentivisation to encourage consumer behaviour with varying degrees of success.

There is little consideration of the full lifecycle aspects of the circular initiatives. Not all will make environmental or economic 'sense', and some will be more beneficial than others. Some circular economy initiatives have knock-on negative impacts in other areas of the economy. The SEA sees 'environment' as primarily 'climate change', which is a limited viewpoint of both impacts and benefits of circular initiatives. There is limited discussion about the wider impacts that relatively undefined terms such as 'remanufacture' might have on business, including dynamics of supply and demand; but this is primarily from an economic standpoint. A wider, systems, approach (linked environmental: economic) is needed for assessing both the baseline and the scenarios. The SEA should acknowledge this, and ideally make recommendations on how systems approaches may be used to develop, apply and promote circular economy initiatives in the future.

The use of Denmark as an example of public procurement might be misleading given the high taxation rates in Denmark. This may provide the (possibly unwanted) suggestion that Scotland will also adopt similar tax and spend policies in the future. It may be more prudent to select a model for public procurement based on countries with similar fiscal policies to Scotland.

The use of the carbon metric and CO_{2e} are welcomed as life cycle approaches. However, true LCA looks at a much wider range of impacts and a focus on carbon alone may skew economic activity towards processes and products that minimise GHG emissions but might have significant impacts elsewhere (e.g. elevated chemical contamination of natural resources). Paragraph 5.2.4 explicitly links carbon to environmental impacts, whereas this linkage is rather too narrow or overly simplified.

Later, the SEA only considers GHG emissions as an environmental impact. Circular economy activities often reduce overall lifecycle GHG emissions, but they can increase other environmental impacts. Due to their nature, circular processes often exploit waste streams where contamination (chemical, biological, physical) is a significant issue. Contamination should not be ignored simply to reduce GHG emissions. Again, a more systems viewpoint is required.

2. Do you agree with the predicted environmental effects as set out in the Environmental Report?

See above. While we broadly agree with the predicted effects on carbon footprint resulting from adopting circular approaches, we feel that the almost exclusive focus on climate change is potentially disadvantageous and may skew economic activities towards reducing carbon footprint with limited consideration of other environmental impacts. We found it surprising that Section 6 focussed on remanufacturing and reductions in GHG emissions and repeat information provided in the preceding Sections. This reinforced the impression of a narrow view of environment. We recommend that people and communities (and their health and well-being) are considered as an integral part of the environment. While we recognise that this was not included within the scope of the SEA, we believe that it should be identified as an area worthy of more specific assessment in the future as part of developing circular initiatives.

3. Do you agree with the recommendations and proposals for mitigation and enhancement of the environmental effects set out in the Environmental Report?

Although limited, the James Hutton Institute broadly agrees with the recommendations; especially those expressed in Paragraph 8.1.2. We concur that monitoring (both environmental and economic) is key to successful delivery of a circular economy. Again, we reiterate that any monitoring scheme needs to take a systems perspective and not be based entirely on carbon accounting.

4. Are you aware of any further information that will help to inform the findings of the assessment? (Please give details of additional relevant sources)

Outputs form the current (2011-2016) and future (2016-2021) RESAS-funded Strategic Research Programme should inform this assessment. There have been a number of explorations into circular economy activities using systems approaches, including the explicit coupling of environmental and economic methodologies. There are some excellent research examples (including demonstration sites) within this work and we would encourage those tasked with developing the circular economy mandate to engage with the RESAS Programme and Main Research Providers (James Hutton Institute, SRUC, Rowett Institute for Nutrition and Health, Moredun Research Institute and Biomathematics and Statistics Scotland.

5. Are you aware of other ‘reasonable alternatives’ to the proposed policies that should be considered as part of the Strategic Environmental Assessment (SEA) process conducted for the Consultation Document?

We think the primary focus on Scottish and EU policies to be appropriate to this SEA.