



Measuring Scotland's progress towards a circular economy to help combat the climate emergency

Results from a preliminary scoping study reviewing key indicators – Reflections report

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1 Background

In 2016, the Scottish Government published a clear, bold vision for a circular economy in Scotland entitled Making Things Last¹. The landmark strategy sets out the benefits of a circular economy in relation to:

- The environment – cutting the waste and related carbon emissions behind the climate emergency by reducing our unsustainable consumption of scarce resources;
- The economy – improving productivity, opening up new markets and improving resilience;
- Communities – creating more, lower cost options to access the goods we need, including the opportunities this brings for social enterprise.

A key part of delivering these benefits is the development of a framework with which to measure progress on reducing waste and carbon emissions by switching to a more circular economy.

Zero Waste Scotland recognises that we will need better data on how we make, use and dispose of products and resources (material flows), the carbon impacts of these material flows, and the economic and social changes which influence this. Such information will enable us to both understand our progress, and to direct our efforts more effectively to help combat the climate crisis. It will also provide the market intelligence wanted by investors and entrepreneurs looking at opportunities in Scotland to make economic and environmental gains.

2 Aim of the research

Zero Waste Scotland commissioned Ricardo Energy & Environment to undertake a scoping study to:

- Examine the indicators currently used, and their consistency with circular economy aims;
- Consider what new metrics could be used to better monitor progress; and
- What additional actions would be needed to develop a robust monitoring framework.

Ricardo reviewed a wide range of circular economy monitoring metrics and models used internationally. These metrics were assessed on their strengths and weakness with regards to their potential adoption in Scotland, from a perspective of both practicality and usefulness.

3 Key findings

A total of 30 metrics were identified, based on a literature review of relevant selected national and international best practice information, studies and reports on the use of indicators and metrics. The metrics were categorised as either *Tier 1* or *Tier 2* metrics.

Tier 1 metrics are those used at the highest level to monitor the overall performance of the circular economy, such as material productivity or carbon emissions.

¹ <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/>

Changes in these top-level indicators would suggest progress towards a circular economy, though they would not provide detail on the cause of any change.

Tier 2 metrics are more detailed, monitoring direct implications on positive change in resource efficiency, environmental performance, innovation or other aspects associated with a shift to the circular economy; examples include waste production, recycling rates or land use trends.

All indicators were categorised by what they measured, such as material flows, environmental, economic and social factors, and innovation. In addition, the potential use of each metric for Scotland was assessed against several criteria including the ease of measurement, cost, compatibility with other metrics, performance and relevance to Scottish policy.

The report highlighted the following three concerns with the indicators and data currently available in Scotland:

Firstly, metrics which are currently available are not fit to drive the necessary action to achieve a circular economy. This is due to their narrow focus on dealing with materials at their end of life - for example, recycling rates - rather than the flow of materials across the whole supply chain, through extraction, transport, manufacturing and consumption to reuse and finally disposal of materials.

Secondly, while a range of metrics was identified which we could adopt to better incentivise circularity, such as raw material consumption, or carbon footprint, there are several barriers to implementing these. These barriers include the lack of data available, cost to undertake collection, and the difficulty in understanding or using the metric in practice. All these barriers would need to be overcome for any one metric to be useful.

Thirdly, no single metric can be used to monitor progress towards a circular economy. Rather we will likely require a dashboard of metrics – some sitting at the highest level of the economy (Tier 1) to give an overall indicator of progress, complemented by others sitting within more specific areas (Tier 2) covering issues like innovation rates or equalities. A related concern is the need to consider the inter-relationships between different metrics to avoid unintended side effects - for example, a decline in carbon emissions associated with a particular sector would not be a sign of progress were it to be the result of a loss of employment as a result of materials being imported rather than manufactured in Scotland.

4 Reflections and next steps

While it is clear from the report findings that circular economy metrics are an essential component of the changes we wish to see, those currently available do not meet our needs at this time. A reasonable conclusion is that new measurements are needed; however, there is a risk that if new indicators are adopted too soon, data gaps may make them unreliable and a poor guide to decision-making. Zero Waste Scotland considers that three areas of work are needed to address key knowledge gaps prior to the introduction of any metric. These are outlined below:

4.1 Further development of data, analysis and aggregation frameworks

Reflecting on the outcomes from this study, we do not intend to propose indicators that should be adopted at present. Instead, we believe it is more important to focus on improving underlying data quality, frequency, and granularity around material consumption and carbon impacts. As that underlying data improves, it will become easier to calculate a range of indicators of circularity, and the accuracy of any indicators adopted will also improve, making them even more useful.

Two datasets will be key to both future national indicators, and also to a host of policy and investment decisions as we work to create a zero-carbon future: a Scottish material flows accounts and Scotland's carbon footprint.

The first of these is a better understanding of material consumption in Scotland: what do we extract, what do we import, and how do we use it? Zero Waste Scotland has undertaken an initial study in this area, and we will publish this in a first Material Flow Account for Scotland in 2020. We appreciate that work in this area is at an early stage, and that the publication will be a first step towards developing a more robust framework for material flow accounting in Scotland.

Secondly, the Scottish Government already publishes Scotland's carbon footprint² which shows, in carbon terms, the impact we have globally - due to the vast amount of goods which we import - and not just the emissions associated with activity within our borders. However, this indicator is not yet updated sufficiently frequently to be useful to inform decision-making. To help translate this high-level indicator, Zero Waste Scotland has developed our own carbon metric³ which shows the carbon footprint of waste produced as a result of consumption in Scotland, regardless of where it is produced.

There may be potential to combine these approaches. Ideally, it would be possible to develop a single tool to help clarify options to reduce Scotland's carbon footprint, and aid delivery of the Scottish Government's aim of ending our nation's contribution to the climate crisis.

4.2 Integrating data sources

As these and other data sources improve, our ability to use them to make smart decisions and develop smart indicators will also improve. A key parallel step, in line with the findings from the study, will be to align these metrics with existing economic indicators, so that we fully understand the interactions between policies and avoid unintended consequences.

² <https://www2.gov.scot/Topics/Statistics/Browse/Environment/TrendCarbonFootprint>

³ <https://www.zerowastescotland.org.uk/content/what-carbon-metric>

For example, we would not want to support a low-carbon solution at home that led to higher carbon impacts elsewhere in our global supply chain. An objective for Zero Waste Scotland is therefore to integrate thinking around circular economy indicators, and economic performance, into an overall strategy to decouple material consumption and carbon emissions from economic success.

4.3 Increasing understanding of the complexities and challenges associated with decoupling

Even when links between different aspects of the circular economy are better understood, challenges will clearly remain in implementing change. This is especially the case where changes in one part of the system can create unexpected, and potentially unwelcome, effects in other areas.

An example is this is the rebound effect - if a group of consumers save money and decrease environmental impacts from leasing a fridge instead of buying one, some of those benefiting may, in the absence of intervention, use the savings generated to purchase something else such as a flight which cancels out the original positive action. There is growing evidence that interactions of this type have limited the overall benefits of increased energy and materials efficiency⁴.

It is therefore necessary to develop a more refined understanding of such potential knock-on effects and ensure these are appropriately considered within the policymaking process and development of circular metrics. Zero Waste Scotland plans to undertake research into what these challenges are and what this means in the context of Scotland.

5. Conclusion

The overriding aim of the Scottish Government's Making Things Last strategy was to build a strong economy which also protects our environment by making best use of our limited resources. This is vital if we are to meet the government's current ambition of ending our contribution to the climate emergency by 2045.

The report shows that we need to develop a growing set of interlinked Tier 1 and Tier 2 indicators to help Scotland adopt the circular economy which is necessary to help combat the climate crisis.

⁴ Examples include: (1) Office for National Statistics (ONS) report on [UK Emissions Decoupling](#); (2) European Environmental Bureau report of [Decoupling Debunked](#)

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