Measuring the Circular Economy

Developing an indicator set for Opportunity Peterborough

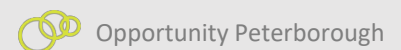Peterborough

Opportunity Peterborough

UCL

CONTENTS

Executive Summary

The purpose of the 'UCL Governance for Urban Sustainability Project' is to provide Opportunity Peterborough and Peterborough City Council with a monitoring framework designed to measure the extent to which Peterborough is becoming a more circular economy.

The report proposes eight indicators, the **Peterborough Circular Economy Indicators**, which report on the environmental (waste and energy), social and economic aspects of the circular economy. A toolkit in excel (Appendix 2) has been prepared to assist the data collection process.

Proposed 'Peterborough Circular Economy Indicators'
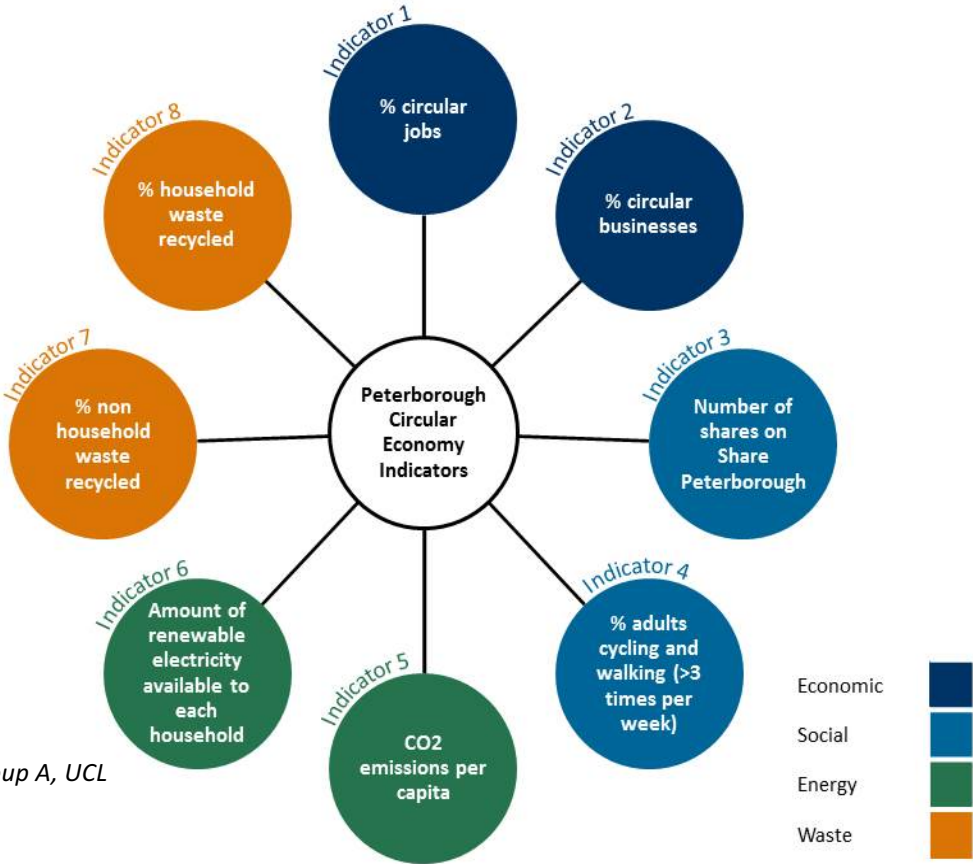
Source: Group A, UCL

The development of the indicator set incorporates learning points on 'best practice indicators' discussed in academic literature (see Appendix 1) and existing indicators currently used in policy making, such as the Human Development Index. The limitations of the proposed indicator set are discussed in detail (Appendix 3) and mainly relate to data availability, incomplete information and differing data collection methods.

The report proposes a set of recommendations to Peterborough City Council and Opportunity Peterborough which focus on how best to **complete the indicator set**, how findings can be **communicated in an effective way**, steps which can be taken to **enhance the indicators** and where **collaboration with stakeholders** can be explored further.

Purpose of the Report

This report is written for Opportunity Peterborough (OP) and Peterborough City Council (PCC) as part of the 'UCL Governance for Urban Sustainability Project'. The purpose of the project is to create an indicator set to measure Peterborough's progress towards the Future Peterborough 'Circular City Vision'[1].

This report presents the proposed 'Peterborough Circular Economy Indicators' and explains the methodology and process behind its development. The overall purpose is to provide OP and PCC with a robust annual monitoring framework, allowing the organisations to measure Peterborough's transition to a circular economy.

What is the Circular Economy?

Defining the concept of the circular economy (CE) is an important starting point. It is an alternative economic model which focuses on waste minimisation and product reuse. It is a direct challenge to the current linear "make, use and dispose" model of consumption (WRAP, 2018). The key components of the circular economy are shown in **Figure 1.1**. It is seen by governments as a way to satisfy society's consumption without placing strain on natural resources (Government of the Netherlands, 2016).

The transition to a more circular economy relies on redesigning business models to, for example, encourage the reprocessing of waste instead of discarding it. Transitioning to a circular economy can improve environmental resilience, provide economic opportunities and enhance social benefits (Ellen MacArthur Foundation [EMF], 2017a).

Circular economy strategies are applied at all scales; globally and locally, for governments and individuals, for large and small enterprises. Circular cities can be characterised by highly centralised capital, population, resources and industries which lead to a minimisation of finite resources (EMF, 2017b).

Figure 1.1: The Flow of Circular Economy
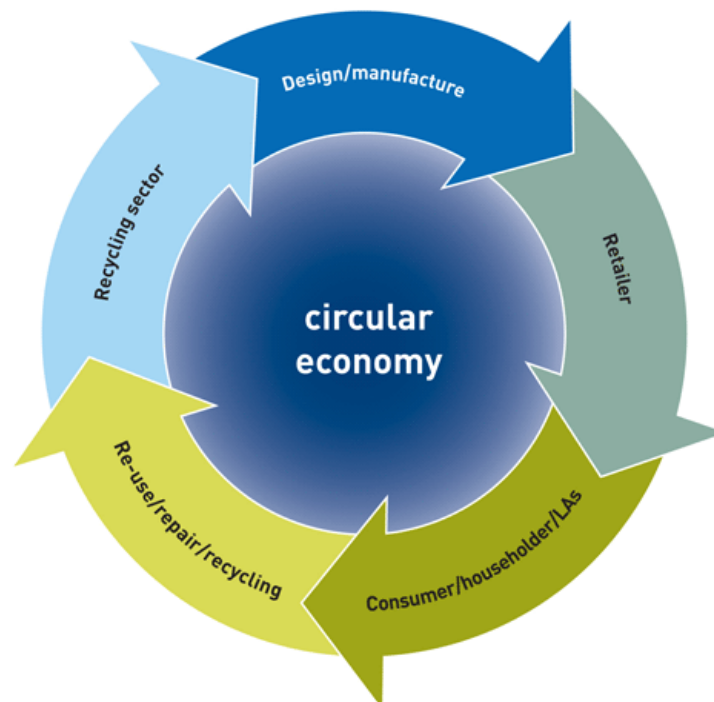
Source: WRAP UK

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[1] 'Future Peterborough' is a programme jointly delivered by Peterborough City Council (local authority) and Opportunity Peterborough (economic development arm of the council). The 'Future Peterborough Programme' includes three projects: circular cities, data and digital, and smart cities.

Circular Economy in Peterborough

The ambition is for Peterborough to be a truly circular city by 2050. The vision is to create a place where the flows of people, materials, resources and capital are managed in a circular way (OP, 2015). The objectives are to circulate materials, use local resources, improve economic resilience, enhance environmental sustainability and develop integrated communities.

OP sees transforming the behaviour of citizens as a central part of delivering the agenda. PCC and OP have adopted the 7 R's (rethink, redesign, repurpose, repair, remanufacture, recycle and recover) to encourage this behaviour change. These principles are illustrated in **Figure 1.2**.

Figure 1.2: 7 R's of Circular Peterborough

Source: Opportunity Peterborough

The principles outlined in the 7 R's will be applied to the five 'high impact areas'. These sectors will be targeted by policy interventions and activities:

1. Buildings
2. Food, drinks and agriculture
3. Manufacturing
4. Mobility and transport
5. Education and communities.

Towards Developing a Monitoring Framework

PCC and OP have been developing circular economy principles as part of the 'Future Peterborough Programme' for the last three years. Until now a systematic monitoring framework has not been required.

An indicator set will be the most effective way of measuring the developmental progress of the circular economy in Peterborough, which is the focus of the UCL project. Indicators can be understood as variables that describe an attribute of a system (Boyko et al., 2012) and are frequently used in the evaluation of a project.

The overall aim of the report has been to develop the 'Peterborough Circular Economy Indicators' by considering current best practice in policy, data availability and longer term objectives for monitoring the circular economy in Peterborough.

02 Learning from Best Practice

Academic Literature Review

Our approach

Learning from best practice is an important first stage of developing an indicator set. While there have been some attempts to measure the circular economy[2], the use of monitoring frameworks is more established in urban sustainability. The attributes of a successful indicator are well documented in academic journals and therefore can help to identify what constitutes a 'best practice indicator'.

A template was used to review the academic literature in a targeted way[3]. The questions are outlined in **Box 2.1** below and the complete findings of the literature are included in **Appendix 1**.

> **Box 2.1: Questions used in literature review**
>
> - What is the purpose of the indicator?
> - What makes a good indicator?
> - What type of indicator is being discussed?
> - How are the findings applicable to Peterborough?
> - What lessons can be taken forward?

Findings: What makes a good indicator?

Following the literature review, four themes emerged regarding the attributes of a best practice indicator. It was found that indicators should be relevant, reliable, simple and sensitive. The findings are summarised in **Figure 2.1** and the key themes explored in more detail in **Figure 2.2** overleaf.

Figure 2.1: Summary of Findings from Literature Review

01	RELEVANT	• Resonate with policies • Fit for purpose, e.g. expert-led or citizen-led
02	RELIABLE	• Availability of valid and affordable data • Objective representation of data
03	SIMPLE	• Easy to use • Understandable to target audience
04	SENSITIVE	• Responsive to changes in circumstances • Flexible to allow continued assessment and monitoring
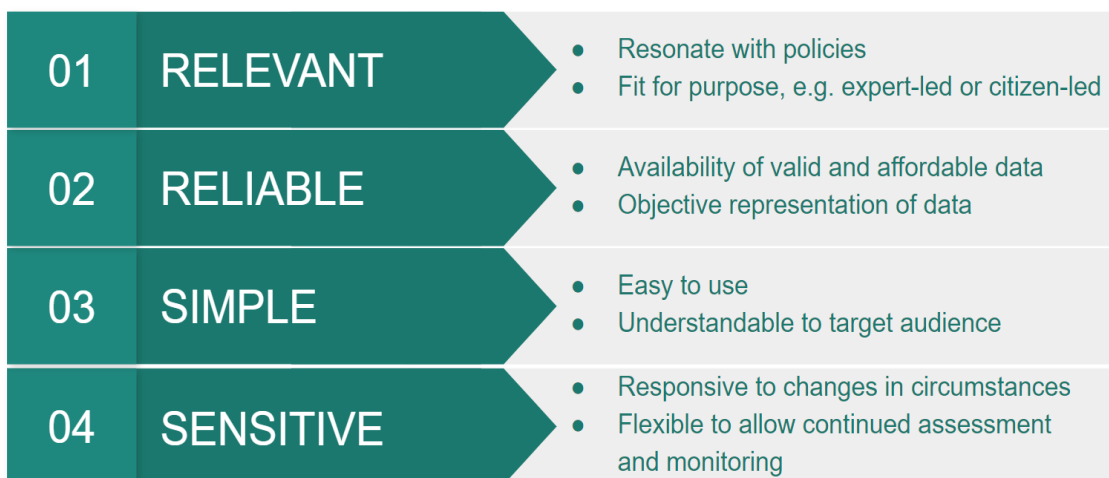
Source: Group A, UCL

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[2] The Ellen MacArthur Foundation undertook a circularity baselining exercise in Denmark which considered resource productivity, circular activities, waste generate and energy and greenhouse gas emissions. See report 'Delivery the Circular Economy: a toolkit for policy makers'.

[3] The academic literature was identified through key search terms on Google scholar, lecture reading lists and direction from Prof. Yvonne Rydin at UCL.

Figure 2.2: Key Themes of the Academic Literature Review

RELEVANT

Designing an indicator which is policy relevant and helpful for decision makers is an important theme identified in the literature.

The Pastille Consortium's (2002) extensive literature review identifies that unless the indicator is linked to critical decision making it is unlikely to motivate action. Similarly, Devuyst and Hens (2000) note that the targets and indicators should be developed closely with local goals and objectives, so that they remain useful to decision makers. An indicator should offer intelligence and insight into specific issues (Feitelson and Chenoweth, 2002).

RELIABLE

Being able to consistently update the indicator with the same data is another important characteristic.

Tanguay et al. (2010) state that data should be easily accessible for indicators to be updated. This theme is evident in Elgert and Kruger's (2012) research which finds that indicators should be "quantifiable, measurable, reportable and verifiable". This calls for the need for a transparent methodology (Morse and Fraser, 2015).

SIMPLE

An indicator which can be easily understood makes it more appealing to the target audience; even complex issues and calculations should eventually yield clearly presentable information that is understandable to all.

Turcu (2017) argues that indicators should not be overly sophisticated as complex tools are resource-intensive and difficult to use. The idea of simplicity is important for the presentation of the indicator. Cartwright (2000) argues that sustainability indicators should be "eye-catching".

SENSITIVE

Indicators should be sensitive to changes in the system. Having an indicator set which does not change is not helpful for measuring progress.

Feitelson and Chenoweth (2002) state that indicators must be correlated or causally related to the complex issues which they portray.

Reviewing other Indicator Sets

Existing indicators on the circular economy have also been reviewed. The EMF (2015) have produced a 'circularity baseline' for Denmark which documents the level of circularity according to four metrics: resource productivity, circular activities, waste generation and energy and greenhouse gas emission. This EMF research provides a building block for this UCL project. The key learning points are outline in **Box 2.2**.

Box 2.2: Learning Points from 'EMF Circularity Baseline'
- An indicator is a powerful way to show the areas in which a country (or region) is more or less advanced compared to its peers.
- The metrics provide high-level direction for policy.
- Existing metrics were used in the 'circularity baseline' to ensure that data was available.
- When designing the set of indicators, there is a need to balance completeness with data availability and comparability over time.

Source: EMF, 2015

The next step was to review indicator sets used in government policy, such as the Human Development Index and UN Habitat Indicators of Sustainable Development[4]. The findings from the review reinforced the four themes identified in the academic literature review.

Box 2.3 summarises key learning points which have been taken forward into the development of the 'Peterborough Circular Economy Indicators'. The main findings relate to the importance of presenting and communicating findings in a clear and simple way.

Box 2.3: Learning Points from other Indicator Sets
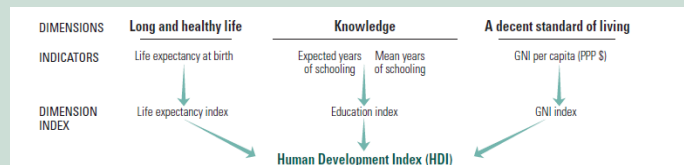
|		
Sustainable Development Indicators, DEFRA	A small table is included at the end of each chapter summarising the long and short term performance of each indicator.	
Human Development Index	Simple illustration methodology. Transparency is an important attribute of an indicator set.	
Indicators of Sustainable Development, UN Habitat	Diagram to show how each indicator is applicable to a particular topic. This allows different stakeholders to select those which are most applicable to their work.	
Healthy Streets Checklist, Greater London Authority	Simple visual presentation of data in a diagram which shows a clear comparison between before and after.	

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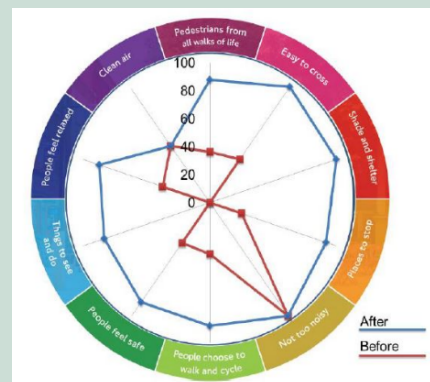
[4] Indicator sets and indexes were identified as a result of the academic literature review.

03 Applying Best Practice to Peterborough

Understanding the requirements

Having established the key features of a 'best practice indicator', tailoring the learning points to the requirements of PCC and OP was an important next step. A meeting with PCC and OP on 10 January 2018 provided insight into the challenges and opportunities the organisations had experienced on their journey towards being a Circular Economy.

While aspects of the Future Peterborough Circular City programme have been a success, PCC has lacked city-wide indicators to measure their progress. Engaging businesses with circular economy models has also been a challenge; it was recognised that a set of suitable indicators could help show businesses how to develop their own key performance indicators.

Developing the indicator set

The development of an initial set of indicators consisted of three stages, which is summarised in **Box 3.1**.

The principles of a circular economy were first identified[5] (Stage 1); these are the attributes to be measured. The 'high impact areas'[6] were then considered and shaped the definition of the proposed indicators (Stage 2) so that the indicators are relevant to the sectors which PCC and OP are targeting. The reliability of availability of data sources was then reviewed (Stage 3). The EMF identifies that using existing metrics is often the only option (EMF, 2015).

Box 3.1: Considerations for Applying Best Practice to Peterborough

Stage 1: Circular economy principles	Stage 2: High impact areas	Stage 3: Reliable data sources
● Drive greater resource productivity ● Create stronger social ties ● Developing local skills and jobs ● Reduce waste and environmental footprint ● Pursue local opportunities which will arise	● Buildings ● Food, drink and agriculture ● Manufacturing ● Mobility and transport ● Education and communities	● Office of National Statistics ● Share Peterborough ● Department for Business, Energy & Industrial Strategy ● Department for Environment Food & Rural Affairs ● Department for Transport

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[5] The principles of a circular economy were identified by reviewing resources published by Opportunity Peterborough. For example, 'Circular Peterborough - Circular Cities Commitment'.
[6] PCC and OP have identified five sectors within which they want to target their circular economy interventions and engagement.

Key issues considered during development

Availability and effectiveness of datasets

The main challenge encountered while developing the indicator set for OP lies with the ability to find readily available datasets and use them effectively due to:

1. *Geographical scale* - While there are datasets available on the Internet that could possibly be used, the information often encompasses the whole of England or the United Kingdom. This made the data meaningless for Peterborough as it was not specific for measuring progress at the city-level.

2. *Incomplete information* - Although available at the city-level, some data was not recorded at particular years. Gaps in data do not allow a complete year-to-year analysis.

3. *Differing benchmarks* - Some datasets are based on financial years instead of calendar years. This makes the comparison of datasets with different benchmarks more difficult.

Consideration of 'enablers'

During the development of the 'Peterborough Circular Economy Indicators', useful feedback was received from Katie Thomas, Circular Economy Project Officer at OP. It was noted that the proposed indicator set concentrated on the outcomes[7.] It became apparent that it would also be useful to document the 'enablers'[8] of a circular economy in Peterborough. The 'enablers' of the circular economy were not incorporated into the main indicator set as their parameters are too difficult to define and therefore it is too challenging to develop a corresponding indicator. For instance, OP may have successfully engaged an organisation to commit to the circular economy agenda. However, the business may be unwilling to share their business strategies due to fear of competition.

Therefore, the final list of proposed indicators (outlined in Chapter 5) is outcomes-based. Nevertheless, the importance of enablers in the Circular Economy is recognised; Chapter 4 recommends a checklist which can be used to document 'enablers' and record qualitative information which tracks the progress of Peterborough moving towards being a circular economy.

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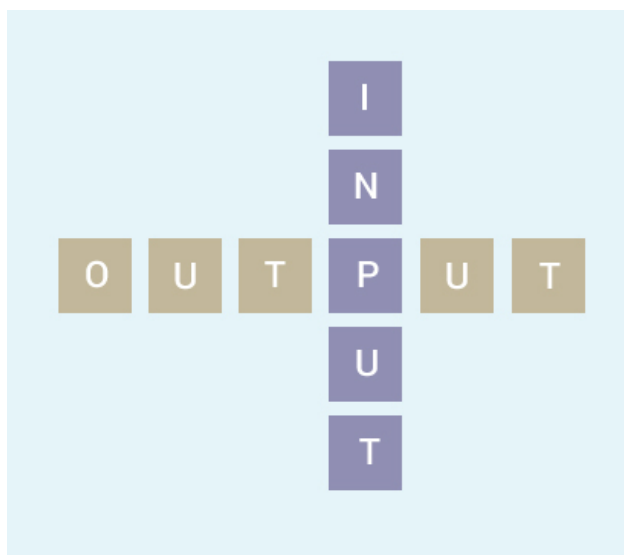
[7] An 'outcome' is the end result of a process. For example, reduction in CO_2 emissions per capita in the industrial, agriculture and transport sectors.

[8] An 'enabler' is understood to be the conditions which encourage the development of a circular economy, such as change in procurement methods and education in schools. These factors can be described as 'inputs' into the system.

04 Checklist of Circular Economy Enablers

To capture the 'enabling conditions' of the Circular Economy, a checklist has been developed. The checklist included in **Table 4.1** draws on the 'building blocks' framework created by the EMF[9] and is adapted for use in Peterborough. The checklist is divided into six 'policy intervention areas' which outline the areas of public policy adapted to further the circular economy agenda. These are then divided into 'intervention examples' which describe specific areas which can encourage the development of a circular economy.

OP and PCC can complete the checklist on an annual basis to audit which enabling conditions exist.

Table 4.1: Checklist of Circular Economy Enablers

Policy Intervention Areas	Intervention examples	Not relevant	To what extent do these conditions exist in Peterborough?			Justification / Evidence
			Not evident	Partly evident	Fully evident	
Education, information & awareness	Integration of circular economy/systems thinking into school curricula					
	Campaigns to change consumer behaviour					
Collaboration platforms	Public-private partnerships with businesses at local authority level					
	Encouragement of voluntary industry collaboration platforms, encouraging value-chain and cross-sectoral initiatives and information sharing				*(e.g. Yes)*	*(e.g. Share Peterborough Platform)*
	R&D programmes in Peterborough in the fields of, for example, material sciences and biosystems					
Business support schemes	Financial support to SME businesses, for example direct subsidies, provision of capital, financial guarantees					
	Technical support, advisory, training and demonstration of best practices to business			*(e.g. Yes)*		*(e.g. workshops run by Share Peterborough)*
	Investment in technical skills within a business, for example design skills required for product design					

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[9] 'Delivering the Circular Economy: A toolkit for policy makers' was published by the Ellen MacArthur Foundation. Page 45 details six policy intervention areas which provide an indication of the existing policy landscape.

Public procurement & infrastructure	Whether reuse and reduce principles are part of public procurement decisions					
	Public investment in infrastructure					
Regulatory frameworks	National or local government (sector) strategy and associated targets on resource productivity and circular economy					
	Product regulations, including design, extended warranties and product passports					
	Waste regulations, including collection and treatment standards and targets, the definition of waste, extended producer responsibility and take-back systems (local authority waste plan)					
	Industry, consumer, competition and trade regulations, for example on food safety					
	Accounting, reporting and financial regulations including accounting for natural capital and resources, and the fiduciary duty of investors and managers					
	Integrate circular economy principles into land use planning (e.g. bringing vacant buildings back into use)					
Fiscal frameworks	VAT or excise duty reductions for circular products and services					
	Tax shift from labour to resources					

Source: Ellen MacArthur Foundation; Group A UCL

05 Circular Economy Indicators

Introducing the 'Peterborough Circular Economy Indicators'

The 'Peterborough Circular Economy Indicators' are designed to allow individuals and organisations, such as OP, to measure whether the city of Peterborough is becoming a more circular economy. The circular economy is a "complex system"[10] influenced by a complex web of interactions; the indicator set is designed to capture specific characteristics of this changing system.

The 'Peterborough Circular Economy Indicators' are designed to be updated on an annual basis and will allow the user to answer the following question:

"To what extent is Peterborough a circular economy?"

The purpose of the indicator set is not to directly evaluate the performance of OP as an organisation, but to measure more broadly how the city is performing against the Circular Economy objectives.

Figure 5.1 sets out the eight indicators which have been developed. The figure shows that each indicator is designed to reflect different aspects of the circular economy: economy, social and energy and waste. The next section of this chapter will outline the rationale for choosing each indicator and the respective limitations.

A more detailed explanation is included in **Appendix 3** of how each indicator is likely to change, the underlying rationale and potential limitations.

Figure 5.1: Proposed 'Peterborough Circular Economic Indicators'
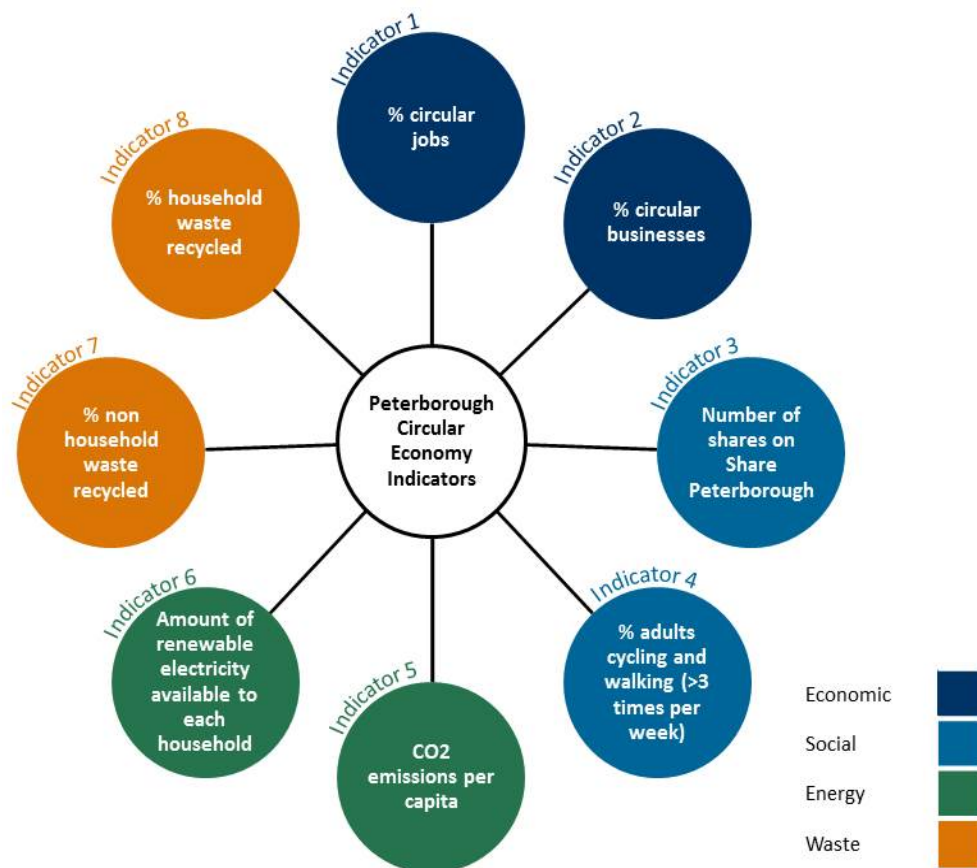
Source: Group A, UCL

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[10] The Ellen MacArthur Foundation (2017) explores 'complex systems' in more detail. The report identifies that a complex system is more than a sum of its parts; a complex system is a product of many interconnections and the system's structure influences its behaviour.

How to use the indicators in practice

Completing the 'Indicator Toolkit'

Ensuring that an indicator set is simple and easy to use is one of the key attributes identified in the literature. To collate the data we recommend using the 'indicator toolkit' which we have developed as part of this project. This is an excel spreadsheet designed to guide the user through the data collection process for a given year.

The 'Indicator Toolkit' is included in **Appendix 2** of the report. The spreadsheet is divided into the following sections:

Guidance Note	Instructions on how the toolkit should be completed
Glossary	Definitions of the terms used in the indicator set
Checklist of Enablers	Checklist, as outlined in Chapter 4, included for completeness
Template for data collection	To be completed for the given year of monitoring

Undertaking more detailed analysis

Following the completion of the 'Indicator Toolkit', more detailed analysis can be undertaken to understand the specific characteristics of Peterborough's circular economy.

For example, **Figure 5.2** compares the circular economy job profile between Peterborough and England ('Indicator 1: % of Circular Jobs'). It is evident that Peterborough has a higher proportion of 'rental and leasing activities'[11] employee jobs (42%) compared to the national average (29%).

Figure 5.2: Breakdown of 'Indicator 1: % circular jobs' across Peterborough and England
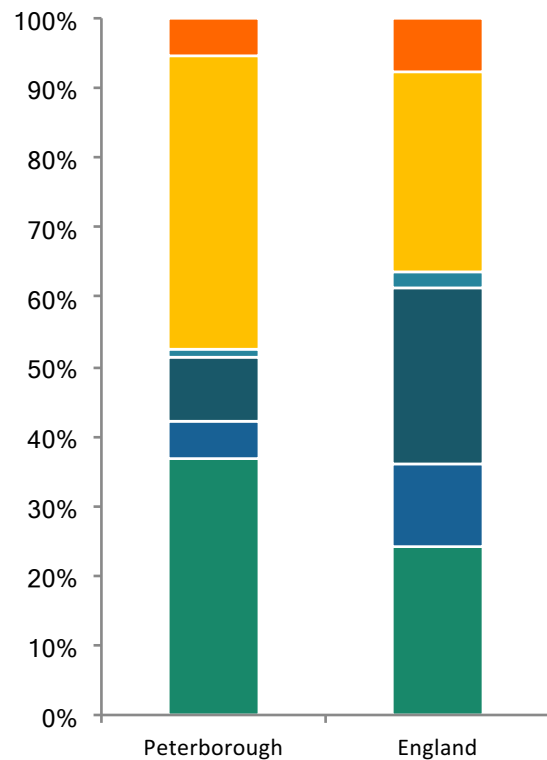
- Retail of second-hand goods in stores
- Rental and leasing activities
- Wholesale of waste and scrap
- Waste collectionactivities
- Repair of computers and household goods
- Repair and installation of machinery

Source: Business Register and Employment Survey, 2016

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[11] This includes the rental of and leasing of personal and household goods, machinery, equipment and tangible goods and intellectual property and similar products, except copyrighted works (defined as Standard Industrial Classification 77).

'Indicator 5: CO2 emission per capita' is another indicator for which more detailed analysis can be undertaken. **Figure 5.3** shows the breakdown of CO2 emissions across industry and commercial, domestic and transport for Peterborough and England.

The latest data from the Department for Business, Energy and Industrial Strategy (2015) shows that CO2 emissions from transport in Peterborough accounts for 42% of total emissions which is above the national average (32%). Industry and commercial account for a smaller proportion of emissions in Peterborough (31%) compared to across England (41%).
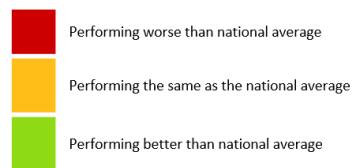
Figure 5.3: Breakdown of emissions by sector

Peterborough

England

- Industry and Commercial
- Domestic
- Transport
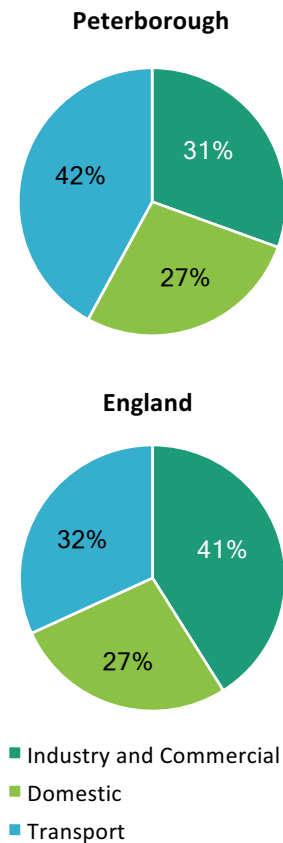
Source: Department for Business, Energy & Industrial Strategy (2015)

Communicating overall findings

Clear visual communication is an important attribute of a well-designed indicator set. In order to communicate findings effectively and efficiently to key stakeholders, such as businesses and councillors, we recommend using a traffic light system to show how Peterborough is performing against the national average (see **Figure 5.4** below).

Figure 5.4: Summary of Indicator Set

Circular Economy Indicators (2017)		Peterborough		England
1	% 'circular jobs' out of total employment	1.6%		1.6%
2	% 'circular businesses' out of total number of businesses	1.9%		1.9%
3	Number of shares on 'Share Peterborough' online portal	270		n/a
4	% adults cycling and walking >3 times per week	43%		46%
5	CO2 emissions per capita (tonnes)	5.3		5.9
6	Amount of renewable electricity available to each household (MWh)	1.6		2.0
7	% non household waste recycled (of total waste)	33%		36%
8	% household waste recycled (of total waste)	42%		44%

- ■ Performing worse than national average
- ■ Performing the same as the national average
- ■ Performing better than national average

Source: Group A, UCL

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[11] This includes the rental of and leasing of personal and household goods, machinery, equipment and tangible goods and intellectual property and similar products, except copyrighted works (defined as Standard Industrial Classification 77).

How do the indicators reflect best practice?

Being reflective about the methodology and strengths of the proposed indicator set is an important part of the development process. **Figure 5.5** assesses the eight proposed indicators against the definition of a 'best practice indicator' as outlined in Chapter 3.

The table shows that all eight proposed indicators can be considered to be 'relevant', 'reliable' and 'simple'. However, for 'Indicator 4: % adults walking and cycling more than 3 times per week', it is not clear how sensitive it will be to change.

Figure 5.5: Assessment of Indicators against the criteria of a 'Best Practice Indicator'

	Relevant (i.e. policy relevant, useful for decision making)	**Reliable** (i.e. data easily accessible and updated regularly)	**Simple** (i.e. easy to use, understandable to target audience)	**Sensitive** (i.e. responsive to changes in the system)
Indicator 1: % 'circular' jobs of total employment (per annum)	✓	✓	✓	✓
Indicator 2: % 'circular' businesses of total employment (per annum)	✓	✓	✓	✓
Indicator 3: Number of shares on 'Share Peterborough' online portal (per annum)	✓	✓	✓	✓
Indicator 4: % adults walking and cycling more than 3 times per week	✓	✓	✓	❓
Indicator 5: Carbon dioxide emissions per capita (tonnes)	✓	✓	✓	✓
Indicator 6: Amount of renewable electricity available to each household (per annum)	✓	✓	✓	✓
Indicator 7: % non-household waste recycled (per annum)	✓	✓	✓	✓
Indicator 8: % household waste recycled (per annum)	✓	✓	✓	✓

Legend

✓ Yes

❓ To be determined

Source: Group A, UCL

Gaps in the Indicator Set

It is important to recognise that many of the aspects of the circular economy extend beyond the geography of PCC or the control of OP as an organisation.

Figure 5.6 summarises the complexities which exist when considering the circular economy at the scale of a local authority. Each indicator is influenced by a different set of governance arrangements and is subject to changes at different geographical scales.

For example, the indicators on household and non-household waste recycled would be reliant on accurate data on waste collected by the local authority, which would require the commitment of individual households and commercial sectors to dispose their wastes properly.

In addition, the Circular Peterborough programme is also partly influenced by actions of regional and international bodies. For instance, Peterborough is in the Circular Cities Network of the EMF, and the United Kingdom is currently still part of the European Union (EU). Hence, Peterborough's initiatives would have to be aligned to the overall vision and objectives of the EMF and EU.

Figure 5.6: The Governance Arrangements affecting each Indicator
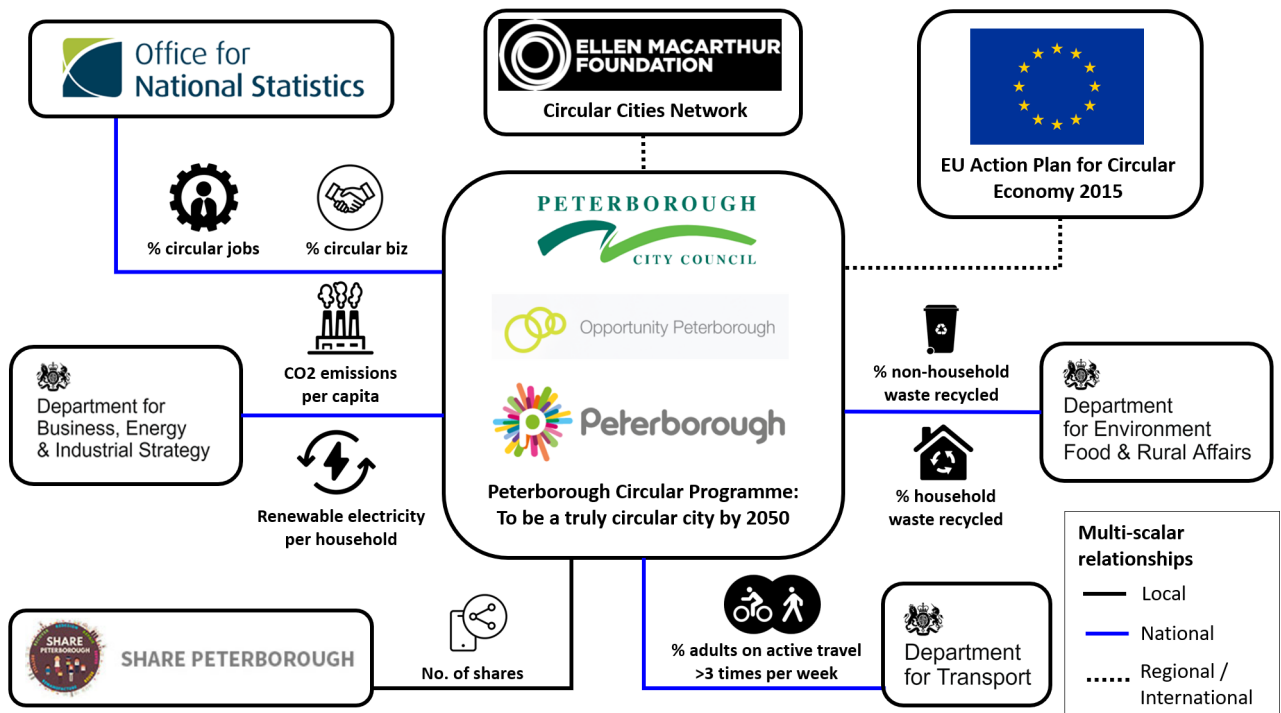
Source: Group A, UCL

Another limitation is that indicator set cannot always convey the exact attributes of a complex system. Each proposed indicator is tested against the key elements of the circular economy as outlined by the EMF and WRAP.

Figure 5.7 shows that the 'Peterborough Circular Economy Indicators' will best demonstrate 'greater recycling of products' (covered by five indicators), but may be less robust in evidencing 'reduction in waste' (covered by two indicators).

Figure 5.7: Aspects of the Circular Economy covered by the Indicator Set

	Design out waste	Transition to renewable energy	Greater reuse and repair	Greater recycling of products	Reduction in waste	Greater resource productivity
Indicator 1: Circular Jobs	■		■	■		■
Indicator 2: Circular businesses	■		■	■		■
Indicator 3: Number of shares			■	■		■
Indicator 4:% adults walking and cycling (>3 times per week)					■	
Indicator 5: CO2 emissions per capita		■			■	
Indicator 6: Amount of renewable electricity available to each household		■				
Indicator 7: % non-household waste recycled	■			■		
Indicator 8: % household waste recycled	■			■		
Total	4	2	3	5	2	3

Source: Ellen MacArthur Foundation, WRAP UK

06 Long-term Objectives

Future data collection

This report draws on existing metrics and data collection by government departments and local authorities. Therefore, completeness and standardisation of data cannot be ensured for all indicators. For instance, as noted by PCC, the number of 'shares' on the Share Peterborough online portal is not a true representation of the current situation because not all the 'shares' are recorded on the Share Peterborough website.

Despite all the collected datasets being updated annually, some of them are renewed by calendar year while others are renewed by fiscal year. To ensure the consistency of the CE database, the recommendation would be to explore whether additional data can be collected from the 'Share Peterborough' website.

Resources and capacity

The toolkit provided in **Appendix 2** should be completed once a year by Share Peterborough. Despite following the specific guidance regarding data sources included in the data template, PCC staff are expected to improve the usability and accuracy of the toolkit by exploring and applying more comprehensive datasets. Apart from filling in the toolkit, PCC staff and

local business owners should be trained on how to interpret the datasets and how to represent indicators through effective visualisation tools.

Business reports

Targeted at reporting the progress in Peterborough's CE agenda per annum, an annual report is encouraged to be published, indicating current year's data as well as a comparison with previous years. This report should also include datasets at both the local authority level and the national level to specifically figure out where Peterborough is in developing a circular economy.

To be more accurate, local businesses in Peterborough could propose annual business reports presenting their particular data in line with the 'Peterborough Circular Economy Indicators'. This would help PCC obtain more detailed statistics on indicators such as circular job opportunities, renewable energy and non-household recycling waste.

07 Key Recommendations

Our key recommendations focus on the practicalities of completing an indicator set, communicating the findings and thinking about the use of the indicator set over the longer term.

Figure 5.7: Key Recommendations for OP and PCC

Completing the Indicator Set	Communicating Findings
Use the 'Indicator Toolkit' to collate data in a consistent format (see **Appendix 2**)	Present indicators in a simple way through using the recommended traffic light system (outlined in Chapter 5)
Ensure adequate resources and time are dedicated to updating the indicator toolkit annually and undertaking more detailed analysis (see Chapter 5 for examples of detailed analysis)	Encourage staff who are more familiar with 'Peterborough Circular Economy Indicators' to present findings through infographics or more 'attractive' rose diagrams depending on target audience
Incorporate the completion of the 'Indicator Toolkit' into current reporting activities (for example, financial reporting cycle)	
Enhancing the Indicator	**Collaborating with Stakeholders**
Explore collecting additional primary data from businesses or the public about the circular economy (see Chapter 6)	Engage school leaders on the use of indicator sets and collection of primary data
Going forward remain reflective about the 'Peterborough Circular Economy indicators' as the objectives of Opportunity Peterborough change	Establish closer ties with businesses to improve enabling conditions for circular economy (see UCL Group B report)

Source: Group A, UCL

Appendix 1: Systematic Review of Literature

Authors	Paper title	Location / General policy area	Name of indicator	What is the purpose of the indicator?	What makes a good indicator? *e.g. examples of best practice*	Type of indicator	Applicable to Peterborough? *Lessons / good practice to take forward in the project*	
Boyko, C. et al. (2012)	Benchmarking sustainability in cities: The role of indicators and future scenarios	Global	Urban Futures (UF) Toolkit	The tool kit assesses the performance of individual indictors in different scenarios	- Indicators can be both quantitative (e.g. distance) and qualitative (e.g. subjective perception - Results of indicators are incorporated into decision-making - Indicators can be changed or adapted as programmes / interventions change	Matric of 120 indicators and associated benchmarks, spread across 8 topic areas	Yes	The tool is set out as follows: **indicator** (e.g. dwelling density) => **question** (e.g. What is the average density of new housing?) => **metric** (e.g. dwellings per hectare). This could be a helpful way of setting up the tool for PCC.
Cayzer, S. et al. (2017)	Design of indicators for measuring product performance in the circular economy	N.A.	Circular Economy Indicators Prototype (CEIP)	Extension of the Kingfisher Circularity Calculator (KCC) which separates questions more clearly to show the relationship of a product with its lifecycle stages	- Ease of use is a critical requirement; however the user should have reasonable knowledge on the CE model, the product that is being assessed and MS Excel - Provides a more precise range of answer options by allowing tester the possibility to input percentages (see p.293)	Product performance indicator Multi-metric indicator prototype covering different CE dimensions (material, energy or waste) that separates impacts into lifecycle stages	Yes	Helpful in the thought process behind design of indicator(s) for PCC
Devuyst, D & Hens, L. (2000)	Introducing and measuring sustainable development initiatives by local authorities in Canada and Flanders (Belgium)	Canada	Sustainable Community Indicators Program (SCIP)	A software package to help communtiy select, create and use indicators for monitoring and reporting on local sustainahility.	- a sustainability indicator should go beyond just reporting on the state of the environment, other social and economic factors should also be considered - The development of policies, goals, objectives, targets and indicators are closely linked to each other	Sustainability indicator	Yes	The indicators used in Canada were selection based on the data which was being collected already and because they were meaningful to the people involved
Devuyst, D & Hens, L. (2000)	Introducing and measuring sustainable development initiatives by local authorities in Canada and Flanders (Belgium)	Belgium	No name yet	Monitoring sustainability acitvities	- consultation with the community on selection of indicators, interaction with the public is encouraged - the policy should be set up first before the indicators	Sustainability indicator	Yes	Set up policy and goals before establishing the monitoring mechanisms
Elgert, L. & Krueger, R. (2012)	Modernising sustainable development? Standardisation, evidence and experts in local indicators	Global	Sustainable Development Goals (only as an example)	Monitoring sustainable development, as a follow-up from the Millennium Development Goals	- should be based on scientific evidence and expertise - should be quantifiable, measurable, reportable and verifiable - Evidence-based policy decisions are expected to lead to better policy outcomes, and reduce the cost of doing so		No	
Feitelson, E. & Chenoweth, J (2002)	Water poverty: towards a meaningful indicator	Global	Water Poverty Index	Create an indicator which includes the social, economic and environmental aspects of water poverty. The outcome of this measure is to quantify water poverty in monetary terms.	- Indicators can reduce the confusion caused by large amounts of environmental and economic data - Indicators should be useful to decision-makers by offering intelligence / insight into a specific problem - Indicators should enable trends to be identified over time and provide a basif for international comparisons - Indicators must be high correlated or causally related to the complex issues they portray (i.e. they have to change as a result of an intervention) - Consider the range of interpretations e.g. affordability can be defined in a number of ways - One issue to consider are discrete geographical boundaries - does this reflect the boundaries of the issue?	Composite index	Yes	Less applicable, as this article considers the monetary implications of water poverty. But there are some good lessons about what makes a good indicator
Hezri, A. A. & Dovers, S.R. (2006)	Sustainability indicators, policy and governance: Issues for ecological economics	Global, but very limited discussion	Various, e.g. Human Development Index (HDI)	See next cell	Sustainability indicators should resonate with policies, in terms of content and legitimacy. Authors outlined these main purposes of a good indicator: i. to discriminate among competing hypotheses (for scientific exploration); ii. to structure understanding of issues and conceptualise solutions; iii. to track performance as determined by results-based management; iv. to discriminate among alternative policies either for specific decisions or general policy directions; and v. to inform general users (public, stakeholders, community).	To measure: 1. Managerial efficiency – ratio of outputs to inputs – cost per unit of output 2. Economic efficiency – function of microeconomic reforms 3. Community sustainability indictors – part of local Agenda 21 processes	Partly	Reminder about indicators showing strong links to programmatic and financial planning of budgets To be aware of the cost of using indicators* and marketability of indicators *Sum of the costs of using indicators=the costs of obtaining indicators+the costs of consumption+the costs of value conflict +the costs of action–the costs of inaction

Authors	Paper title	Location / General policy area	Name of indicator	What is the purpose of the indicator?	What makes a good indicator? *e.g. examples of best practice*	Type of indicator	Applicable to Peterborough? *Lessons / good practice to take forward in the project*	
Holland, L (1997)	The role of the expert working parties in the successful design and implementation of sustainability indicators	Leicester	Local Agenda 21 sustainability indicators	Monitor progress towards sustainable development	- Weak sustainbility indicators will generally have an element of 'cost' or 'monetary value' as their basis is in economic thought - Is there a bias in your indicators towards the economy? Or anthropocenic outcomes? - Need cooperation with interest parties e.g. business group	Sustainability indicator	Yes	Need to consider what are the biases in the data e.g. are these indicators designed for the business community?
Huysman, S. et al. (2017)	Performance indicators for a circular economy: A case study on post-industrial plastic waste	Case study based on anonymous companies based in Belgium and England	Circular Economy Performance Indicator (CPI)	Shows the ratio of the actual obtained environmental benefit (i.e. of the currently applied waste treatment option) over the ideal environmental benefit according to quality. $CPI = \frac{actual\ benefit}{ideal\ benefit\ according\ to\ quality}$	- considerations of different waste treatment options, e.g. closed loop, semi-closed loop, open loop, incineration (see p.48)	Circular economy performance indicator, based on Life Cycle Assessment (LCA) approach on natural resources (instead of the traditional impacts related to emissions) and using the CEENE (Cumulative Exergy Extraction from the Natural Environment) method, quantifying resource consumption Case study on post-industrial plastic waste treatment (instead of more commonly studied post-consumer waste)	Yes	However, to check relevance and application to specific industry sectors. Highly technical mechanics behind the indicators though.
Morse, S. & Fraser, E. (2015)	Making 'dirty' nations look clean? The nation state and the problem of selecting and weighting indices as tools for measuring progress towards sustainability	Global	Environmental Sustainability Index (ESI)	Measures sustainability by ranking nations by league tables based on extensive databases of environmental indicators	- Draw on a range of 'voices' when creating an indicator including local stakeholders and international experts - Being aware of how data is presented e.g. league ranking tables create the illustion of absolute categories - Transparent methodology and acknowledge methodology bias	Composite index which agreegate a total of 68 datasets covering 142 countries unto a singal numerical value of each country	Yes	Create a method note to accompany the indicators to ensure transparency
OECD (2009)	Good practice guideline for indicator development and reporting	New Zealand	Various examples of different indicators	Various	Good practice steps which should be taken: - Establishing the purpose of the indicators - Designing the conceptual framework - Selecting and designing the indicators - Interpreting and reporting the indicators - Maintaining and reviewing the indicators	Various	Yes	Guidance on the overall steps which should be taken when developing a set of indicators
The Pastille Consortium (2002)	A Practitioners Guide for improving the use of Sustainability Indicators at the local level	European	General discussion on indicators	-understanding sustainability -supporting decisions -solving conflict -direction -involving stakeholders	Indicator-based tools for effective decision-making, such as: 1. Assessment or appraisal - explores potential impact from a specific single course of action on sustainability 2. Monitoring - management tool which tracks progress and operates mostly on the project level 3. Comparison - systematic and unbiased weighting of all impacts, benefits and drawbacks of each alternative 4. Benchmarking - tool for the relative comparison of sustainability performance of different organisations, a town for instance or solutions to a problem Indicator set - collection of indicators over the same time and related to the same place (also see notes on main folder)	- state indicators - target or goal indicators - pressure indicators - driving force indicators - rate indicators - impact indicators - response indicators - steering indicators - process indicators > quantitative indicators > qualitative indicators > objective indicator	Yes	Very helpful. Can use their framework to test out potential indicators.

Authors	Paper title	Location / General policy area	Name of indicator	What is the purpose of the indicator?	What makes a good indicator? _e.g. examples of best practice_	Type of indicator	Applicable to Peterborough? _Lessons / good practice to take forward in the project_	
The Pastille Consortium (2002)	Local Sustainability Indicator Sets in Their Context	European			- Objective setting - Technical and managerial - Public communication and partnership A process of indicator development incorporating = intended purpose, desired audience, appropriate design and relevant consultation/participation			
		Vienna (Austria)	The Climate Protection Programme (KliP)	To reduce CO2 emissions	Takes into account three action areas: 1) Energy 2) Mobility 3) Procurement/waste	Distance to target		
		Lyon (France)	Environment Observatory (EO) Urban Travel Plan Observatory (UTPO)	To measure and improve air quality		Classical indicators		
		Winterthur (Switzerland)	Sustainability Barometer Key Indicator Set	To conceptualise policy making process		Classical indicators & indices		
		London Borough of Southwark (UK)	Elephant & Castle SRB Project Appraisal Masterplan Evaluation Business Environment Indicators Project (BEIP)	To deliver Single Regeneration Budget with higher regard to quality of life issues		Criteria		
Turcu (2013)	Re-thinking sustainability indicators: local perspectives of urban sustainability	Not stated	Turcu's own integrated indicator	To report on sustainability	- Be clear about the characteristics that you are measuring - SIs should be largely objective, 'measurable', easy to understand, 'eye-catching' and reflect local circumstances (Cartwright 2000). - They do not need to be purely objective - SIs can either be _expert-led_ or _citizen-led_ (this gap can often be difficult to bridge) - Indicators which are not 'embedded in' and 'reflective of' the target context will prove difficult to implement and yield effective results	Sustainability indicator	Partly	Possible integration of citizen's views in indicators Although this may be a longer term ambition for PCC.
Turcu (2017)	Chapter 10 - Sustainability indicators and certification schemes for the built environment	European	10 European Common Indicators (ECIs) European Green City Index Sustainable Development Goal (SDG) Urban Audit Indicators Global City Indicators Programme China Urban Sustainability Index European Metabolism Framework BREEAM ARUP's SPeAR	To report on sustainability	- Any indicator or measurement should start with a definition of what is being measured (e.g. sustainability in this case) - A good indicator should try and consider what's important at a local level and not just what can easily be measured - Good indicators should remain reflexible to changing circumstances in the urban environment (not just set in stone) - Consider the role of bottom up indicators (e.g. level of community satisfaction), but be aware of the criticisms. - Should not be overly sophisticated, policy makers should be able to use indicators easily. Overly complex tools are resource-instensive and difficult to use.	Various - mainly indexes	Yes	Involve PCC in the process to avoid 'top down' implemetation. And then encourage them to test ideas with local businesses or stakeholders?

Appendix 2: Guide to Completing Indicator Toolkit

This is from the Excel toolkit which will be emailed to Opportunity Peterborough.

Circular Economy Monitoring Toolkit

Purpose of the Toolkit
The purpose is to answer *'to what extent is Peterborough becoming more circular?'* . This indicator set is not designed to evaluate the activities of Opportunity Peterborough, but instead provides a broader understanding of the circular characteristics of the economy in Peterborough.

How the Toolkit should be completed
This toolkit should be completed once a year by Share Peterborough. Specific guidance notes regarding data sources are included with the data template for each year.

The following steps should be undertaken when completing the template
  (1) Download the raw data using information from 'Datasets tab'
  (2) Complete the datasets for the relevant monitoring year

Toolkit Key For Completion
The template is formatted to show where data needs to be entered. The key below shows which action follows each field.

Key:

       Cells where data should be entered
[text]   Instruction for completing template

Guidance Note | Glossary | Checklist of Enablers | Datasets (2017) | Detailed analysis

Glossary

This glossary provides an explanation of the terms used in the toolkit.

Term	Definition
Active Travel	Refers to walking or cycling as an alternative to motorised transport (notably cars, motorbikes/mopeds etc.) for the purpose of making everyday journeys
Carbon Dioxide emissions	CO_2 is the main greenhouse gas, accounting for about 81 per cent of the UK greenhouse gas emissions in 2015. The data show emissions allocated on an "end-user" basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related). Except for the energy industry, emissions from the production of goods are assigned to where the production takes place. Therefore, emissions from the production of goods which are exported will be included, and emissions from the production of goods which are imported are excluded.
Circular economy' employment	Definition of a 'circular job' taken from 'Opportuniities to tackle Britiain's labour market challenges through growth in the circular economy' (p.26, WRAP, 2015). This includes: - 'SIC 33: Repair and installation of machinery and equipment' - 'SIC 38: Waste collection, treatment and disposal activities' - 'SIC 95: Repair of computers and personal and household goods' - 'SIC 4677 : Wholesale of waste and scrap' - 'SIC 4779 : Retail sale of second-hand goods in stores'
Household Recycling	Contains materials sent for recycling, composting or reuse by local authorities as well as those collected from household sources by 'private/ voluntary' organisations
Landfill Gas	The methane-rich biogas formed from the decomposition of organic material in landfill
Non Household Recycling	Includes municipally collected materials for recycling from commercial sources. It excludes material which was collected for recycling from non-household sources but actually rejected at collection or at the gate of a recycling reprocessor
Photovoltaics	The direct conversion of solar radiation into electricity by the interaction of light with the electrons in a semiconductor device or cell
Renewable Electricity	Refers to electricity generated from renewable sources, such as photovoltaics, onshore wind and landfill gas
Renewable Energy Sources	Renewable energy includes solar power, wind, wave and tide, and hydroelectricity. Solid renewable energy sources consist of wood, straw, short rotation coppice, other biomass and the biodegradable fraction of wastes. Gaseous renewables consist of landfill gas and sewage gas. Non-biodegradable wastes are not counted as a renewable source.
Standard Industrial Classification (SIC)	SIC codes are used to classfy business establishments and other statistical units by the type of economic activity in which they are engaged

Guidance Note | **Glossary** | Checklist of Enablers | Datasets (2017) | Detailed analysis

Checklist of Circular Economy Enablers

This checklist provides an indication of the 'enablers' of the Circular Economy. It can be used to determine whether the conditions exist to encourage the development of the circular economy. This checklist can be used as an audit of the inputs into the Circular Economy.

| Themes | Type of intervention | Not relevant to Peterborough ✓ | To what extent do these conditions exist in Peterborough? | | | Justification / Evidence |
			Not evident ✓	Partly evident ✓	Fully evident ✓	
Education, information & awareness	Integration of circular economy/systems thinking into school curricula					
	Public communication and information campaigns to change consumer behaviour					
Collaboration platforms	Public-private partnerships with businesses at local authority level					
	Encouragement of voluntary industry collaboration platforms, encouraging value-chain and cross-sectoral initiatives and information sharing					
	R&D programmes in Peterborough in the fields of, for example, material sciences and biosystems					
Business support schemes	Financial support to SME businesses, for example direct subsidies, provision of capital, financial guarantees					
	Technical support, advisory, training and demonstration of best practices to business					
	Investment in technical skills within a business, for example design skills required for product design					
Public procurement & infrastructure	Whether reuse and reduce principles are part of public procurement decisions					
	Public investment in infrastructure					
Regulatory frameworks	National or local government (sector) strategy and associated targets on resource productivity and circular economy					
	Product regulations, including design, extended warranties and product passports					
	Waste regulations, including collection and treatment standards and targets, the definition of waste, extended producer responsibility and take-back systems (local authority waste plan)					
	Industry, consumer, competition and trade regulations, for example on food safety					
	Accounting, reporting and financial regulations including accounting for natural capital and resources, and the fiduciary duty of investors and managers					
	Integrate circular economy principles into land use planning (e.g. bringing vacant buildings back into use)					
Fiscal frameworks	VAT or excise duty reductions for circular products and services					
	Tax shift from labour to resources					

Guidance Note | Glossary | **Checklist of Enablers** | Datasets (2017) | Detailed analysis | +

Data Collection Template

This template can be used to collect the raw data for a year in which monitoring activities are taking place

Data collected by	Amber Morley
Data toolkit completed	10-03-17

Indicator	Indicator Description	Source	Data Set Name	Information	Raw data and calculations	Latest year for available data	Peterborough City Council	England / GB
Indicator 1	% 'circular' jobs of total employment	Office of National Statistics (ONS)	Business Register and Employment Survey (BRES)	Data taken from the 'Business Register and Employment Survey'. Data on employment can be downloaded according 'Standard Industrial Classification Codes' (SIC Codes). Those applicable to the 'circular economy' are included.	Number of employee jobs in 'SIC 33: Repair and installation of machinery and equipment'	2016	700	108,000
					Number of employee jobs in 'SIC 38: Waste collection, treatment and disposal activities'	2016	175	113,000
					Number of employee jobs in 'SIC 77: Rental and leasing activities'	2016	800	130,000
					Number of employee jobs in 'SIC 95: Repair of computers and personal and household goods'	2016	100	55,000
					Number of employee jobs in 'SIC 4677 : Wholesale of waste and scrap	2016	20	10,000
					Number of employee jobs in 'SIC 4779 : Retail sale of second-hand goods in stores	2016	100	34,000
					Total 'circular jobs'	2016	1895	450,000
					Total employees jobs	2016	113000	25,530,000
					% Circular Jobs	2016	1.7%	1.8%

Guidance Note | Glossary | Checklist of Enablers | **Datasets (2017)** | Detailed analysis

	B	C	D	E	F	G	H	I	J
20						Number of businesses in 'SIC 33: Repair and installation of machinery and equipment'	2017	45	11,735
21						Number of businesses in 'SIC 38: Waste collection, treatment and disposal activities'	2017	10	4,645
22						Number of businesses in 'SIC 77: Rental and leasing activities'	2017	40	14,875
23						Number of businesses in 'SIC 95: Repair of computers and personal and household goods'	2017	20	7,760
24	Indicator 2	% 'circular' businesses of total employment	Office of National Statistics (ONS)	UK Business Counts	Data taken from the 'UK Business Counts'. Data on businesses can be downloaded according 'Standard Industrial Classification Codes' (SIC Codes). Those applicable to the 'circular economy' are included.	Number of businesses in 'SIC 4677 : Wholesale of waste and scrap	2017	5	1,440
25						Number of businesses in 'SIC 4779 : Retail sale of second-hand goods in stores	2017	10	3,555
26						Total 'circular businesses'	2017	130	44,010
27						Total number of businesses	2017	6900	2,320,885
28						**% Circular Businesses**	**2016**	**1.9%**	**1.9%**
29	Indicator 3	Number of 'transactions' (or 'shares') on PCC sharing portal	Share Peterborough Website	n/a	Data taken from 'Share Peterborough' website. The data simply reflects the number of 'success stories' over an annual period.	**Number of 'shares'**	**2016**	**270**	**Not applicable**
30	Indicator 4	% adults cycling and walking > 3 times per week)	Department for Transport	Active People Survey	This dataset is published by Sport England on an annual basis	**% adults cycling and walking > 3 times per week)**	**2015-2016**	**43.4%**	**45.7%**
31					This data set is downloaded in 5 year periods. The dataset combines data from the UK's Greenhouse Gas Inventory with data from a number of other sources, including local energy consumption statistics, to produce a nationally consistent set of carbon dioxide emissions estimates at local authority level.	Industry and Commercial Total	2015	317	162,366
32				UK local authority and regional carbon dioxide emission national statistics		Domestic Total	2015	285	107,338
33	Indicator 5	CO2 emissions per capita (tonnes)	Department for Business, Energy & Industrial Strategy (BEIS)			Transport Total	2015	437	125,820
34						Total	2015	1048	386,528
35						**Per capita emissions (tonnes)**	**2015**	**5.3**	**5.9**
36		Amount of renewable	Department for		Dataset on UK renewable electricity generation, capacity and site numbers, disaggregated by local	Number of households	2,016	76,131	22,449,098

						H	I	J
Indicator 6	Amount of renewable electricity available to each household (MWh)	Department for Business, Energy & Industrial Strategy (BEIS)	Renewable electricity by local authority	Dataset on UK renewable electricity generation, capacity and site numbers, disaggregated by local authority. Annual data published nine months in arrears. For this data set, 'renewable electricity generation (MWh)' is used.	Number of households	2,016	76,131	22,449,098
					Amount of renewable electricity generation (per annum)	2,016	126,023	45,638,063
					Amount of renewable electricity available to each household (MWh)	**2016**	**1.7**	**2.0**
Indicator 7	% Non-household waste which is recycled	Department for Environment, Food & Rural Affairs	Local authority collected waste statistics - Local authority data	Data collected from WasteDataFlow which is a web-based system for quarterly reporting on Local Authority collected waste data. Data is taken from Table 1.	Amount of non-household recycling (per annum)	2016-2017	1,653	923
					Amount of non-household waste total (per annum)	2016-2017	5,009	2,557
					% non-household waste recycled	**2016-2017**	**33%**	**36%**
Indicator 8	% Household waste which is recycled	Department for Environment, Food & Rural Affairs	Local authority collected waste statistics - Local authority data	Data collected from WasteDataFlow which is a web-based system for quarterly reporting on Local Authority collected waste data. Data is taken from Table 1.	Household waste sent to recycling	2016-2017	35,018	10,329
					Amount of household waste	2016-2017	83,658	23,653
					% household waste recycled	**2016-2017**	**42%**	**44%**

Guidance Note | Glossary | Checklist of Enablers | **Datasets (2017)** | Detailed analysis

More detailed analysis [example]

Indicator 1: % Circular jobs

	Peterborough	England
Repair and installation of machinery and equipment	700	108000
Waste collection, treatment and disposal activities	175	113000
Rental and leasing activities	800	130000
Repair of computers and personal and household goods	100	55000
Wholesale of waste and scrap	20	10000
Retail sale of second-hand goods in stores	100	34000
Total 'circular jobs'	1895	450000
Total employees jobs	113000	25530000
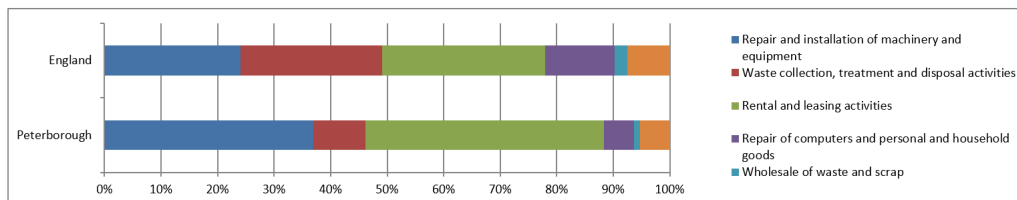
	Peterborough	England
Industry and Commercial Total	317	162366
Domestic Total	285	107338
Transport Total	437	125820
Total	1048	386528
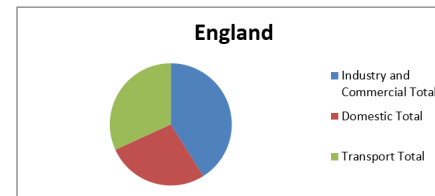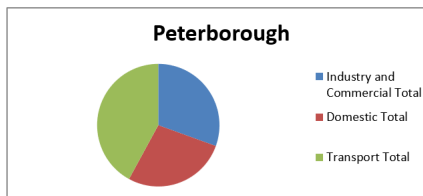
Appendix 3: Detailed Explanation of Indicators

Indicator 1	% Circular Jobs (per annum)	**What will the indicator show?**	As the circular economy grows the number of 'circular' jobs will increase in proportion.
		Rationale	This measure provides an indication of the share of employment which can be defined as 'circular economy'. The definition of circular is matched with employment sectors as defined by ONS (see WRAP's 2015 report for definition). The strengths of indicator are that it is based on time-series data and data is publicly available.
		Limitations	This is not an exact definition of the circular economy, and therefore is only an estimation of the size of the sector. Unknown how sensitive / responsive the indicator is to change.

Indicator 2	% Circular Businesses (per annum)	**What will the indicator show?**	As the circular economy grows the number of 'circular' businesses will increase in proportion.
		Rationale	This measure provides an indication of the share of business which can be defined as 'circular economy'. This indicator is included after the presentation to Opportunity Peterborough on 19 March 2018.
		Limitations	This is not an exact definition of the circular economy, and therefore is only an estimation of the size of the sector. Unable to calculate the GVA / economic output which they generated. Unknown how sensitive / responsive the indicator is to change.

Indicator 3	Number of 'transactions' on Share Peterborough Portal (per annum)	**What will the indicator show?**	The number of transactions will increase as the circular economy develops.
		Rationale	Incorporates primary data which is already being collected by PCC into the indicator set. Important to include some primary data collection. Strengths: policy relevant, sensitive and responsive
		Limitations	As noted by PCC, not all the 'transactions' are recorded on the Share Peterborough website. This is not available at a national level for comparison.

Indicator 4	% adults cycling and walking more than 3 times per week	**What will the indicator show?**	⬆ Increase in active travel as fewer people use their cars for local trips
		Rationale	PCC sets 'active travel' as an important goal in circular economy strategy by improving well-being of Peterborough residents. It incorporates data which has already been collected by PCC into indicator set.
		Limitations	This indicator is incomprehensive to measure Peterborough's level of cycling and walking.

Indicator 5	CO2 Emissions per capita (tonnes) (per annum)	**What will the indicator show?**	⬇ Emissions per capita will decrease over time.
		Rationale	The purpose of this indicator is to monitor the amount of carbon dioxide emissions (one of the major greenhouse gases) for the industrial, agriculture and transport sectors which is emitted per population. Strengths: Information is publicly available and relatively up-to-date
		Limitations	Further breakdown into manufacturing, food & drink, and modes of transport is not available.

Indicator 6	Amount of renewable electricity available to each household (per annum)	**What will the indicator show?**	⬆ There will be an increase in renewable electricity availability as the circular economy develops.
		Rationale	Harnessing energy from waste streams and more efficient buildings is one of the aims of PCC's circular economy agenda. Strengths: Data is publicly available and easy to interpret, e.g. breakdown on renewable energy sources.
		Limitations	Lack breakdown according to business sectors to provide indication on effectiveness of measures specific to sectors.

Indicator 7	% non-household recycling (per annum) (of all recycling)	What will the indicator show?		There will be an increase in recycling rate as the circular economy develops.
		Rationale		Managing waste streams is a key concern for the circular economy. The purpose of this indicator is to draw out the amount of local authority collected waste from non-household sources and those sent for recycling. Strengths: Policy relevant, data is publicly available.
		Limitations		Data on Peterborough is aggregated under the 'Eastern' region of England. Data on recycling of specific waste material is not available for Peterborough.

Indicator 8	% household recycling (per annum) (of all recycling)	What will the indicator show?		There will be an increase in recycling rate as the circular economy develops.
		Rationale		Managing waste streams is a key concern for the circular economy. The purpose of this indicator is to draw out the amount of local authority collected waste from household sources and those sent for recycling. Strengths: Policy relevant, data is publicly available.
		Limitations		Data on Peterborough is aggregated under the 'Eastern' region of England. Data on recycling of specific waste material is not available for Peterborough.

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