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circular city action plans

Peter Jones and Daphne Comfort look at the concept of the 'circular city' and at how three cities in the UK – Peterborough, Glasgow and London – are pursuing a vision and action plan for a transition to circular economy approaches

The concept of the circular economy¹ has been attracting increasing attention from policy-makers and business corporations, and there is also growing interest in circular cities.

The Bartlett School of Planning at University College London (UCL) has established a Circular Cities Hub, which describes itself as 'an interdisciplinary, virtual network of scholars working on all aspects of Circular Cities [which] draws on existing academic and practitioner expertise'.² In 2016 the Ellen MacArthur Foundation launched the Circular Cities Network, described as 'a global network of city leaders who are pioneering the application of circular-economy approaches to address today's urban challenges'.³

Circulate, an online site 'for news and insight on the circular economy and related subjects', curated by the Ellen MacArthur Foundation, has suggested that 'planners and policymakers have the chance to rethink the way our current urban systems operate, to learn from previous mistakes', and that 'the characteristics of the circular economy..., along with its systems change approach, has the potential to provide the necessary framework for building resilient and prosperous communities'.⁴

Looking in particular at six cities 'in transition', Prendeville *et al.*⁵ have argued that 'urbanisation and climate change are urging cities to chart novel paths towards sustainability' and suggested that 'many cities are turning to the alluring 'circular economy' concept to guide this redirection'.

At the same time, Williams⁶ has described a number of potentially daunting economic, cultural, political and regulatory challenges facing the transition to the successful functioning of a circular city.

With these thoughts in mind, this article outlines the concept of the 'circular city' and explores how three cities within the UK are currently looking to develop a vision and an action plan for the transition to a circular city.

The circular city

The concept of the circular city has emerged from the notion of the circular economy, which 'holds the promise of prosperity that is restorative and regenerative' and 'aims to decouple growth from finite resource consumption'.⁷ More specifically, the online magazine *Citiesintransition.eu* suggests that 'the circular city is where we manage waste, commodities and energy in smarter and more efficient ways',⁸ while the Ellen MacArthur Foundation argues that 'a circular city embeds the principles of the circular economy across all its functions'.⁷ Bartlett School of Planning's Circular Cities Hub² suggests that in a circular city 'resources can be cycled between urban activities' and 'within city regions' and that 'cities can be designed so that land and infrastructure can be reused/recycled over time'.

There are a number of prescriptions for the circular city. The Ellen MacArthur Foundation's vision for a circular city, for example, includes a number of elements:⁷

- 'a built environment that is designed in a modular and flexible manner';
- 'energy systems that are resilient, renewable, localised, distributed and allow effective energy use';
- 'an urban mobility system that is accessible, affordable and effective';
- 'an urban bioeconomy where nutrients will be returned to the soil in an appropriate manner'; and
- 'production systems that encourage... local production, and increased and more diverse exchanges of value in local economies.'

The Circular Cities Hub² has suggested that 'systems integration, flexibility, intelligence, cooperative behaviour, localisation, recycling and renewable resources are the key concepts underpinning the Circular City'. The AMS Circular City Research Programme⁹ identified three principles –



Peterborough's circular city approach focuses on the '7 Rs' of rethink; redesign; repurpose, re-use and share; repair; remanufacture; recycle; and recover

materials and buildings, nutrients recovery, and energy systems – as fundamental to the vision of a circular city. Prendeville *et al.*⁵ have outlined a 'conceptual framework' which they suggested could provide a lens through which the circular economy could be articulated within a city.

Academic researchers, practitioners and networks of interested organisations will rightly continue to explore the concept of the circular city and the principles underlying it, but it is also important to chart initiatives designed to put circular ideas into practice. Within Europe circular city initiatives have been launched in Amsterdam and Paris, but this article examines the different approaches to the circular city in three different-sized cities within the UK: Peterborough, London and Glasgow. There is a population of 196,000 within the Peterborough unitary authority area, while the corresponding figures for Glasgow City Council and the Greater London Authority are 606,000 and 8.6 million people, respectively.

Circular Peterborough

Peterborough's vision to be the UK's first truly circular city by 2050 was launched in November 2015 by Peterborough DNA in collaboration with Forum for the Future and the Knowledge Transfer Network. Peterborough DNA is a 'smart city' programme delivered by Opportunity Peterborough, the city's economic development organisation, in partnership with Peterborough City Council.

The Circular Peterborough programme seeks 'to apply circular economy principles at the city level' and 'is about making the most of the resources we have locally, supporting economic resiliences, developing strong communities and increasing environmental sustainability'.¹⁰ The programme may well evolve over time, but initially four 'development mechanisms' were identified:

- namely, an approach focused on the '7 Rs' (rethink; redesign; repurpose, re-use and share; repair; remanufacture; recycle; and recover);
- the circular city 'Maturity Model';
- 'Share Peterborough', which aims to facilitate circularity within the city's business community'; and
- and a more general focus on partnership and collaboration.¹⁰

At the same time the 'Circular Peterborough Commitment' has been co-created with a number of stakeholders within the city to enable individuals, communities and businesses to pledge their support to the programme. Future Peterborough believes that 'by working collaboratively we will change the way that we do things in Peterborough: maximising the full potential of the city's resources, reconnecting people, places, businesses, organisations and communities'.¹⁰

The focus on the 7Rs very much reflects the wider circular economy mantra of 'reduce, re-use, recycle' and suggests that a – arguably the –

dominant theme in Peterborough's circular city programme is to maximise the potential of all the city's resources. In addressing 're-use', the accent is on people donating their goods, time and knowledge and buying and selling goods in the second-hand market.

Peterborough Reuse, for example, takes hessian and jute sacks first used to ship coffee beans from around the world to Masteroast, a local roasting and packing company, and turns them into shopping bags. The initiative has given local women the opportunity to learn new skills and has created fresh home-working opportunities. In 2016, FoodCycle Peterborough in partnership with Cross Key Homes established a project to collect food from local supermarkets and provide meals once a week in a local church.

The 'redesign' theme might be seen to be about constructing buildings that last longer, and here flexibility in design, to facilitate changes in the internal configuration and use of buildings over time, may become increasingly important. There is also seen to be greater scope for 'repair' within the circular urban economy, as increasingly reflected in the growth in repair cafés and bicycle repair workshops. In addressing 'remanufacture', the city has the longstanding example of Perkins Engines, founded in 1932 and acquired by Caterpillar in 1998, which both makes and remanufactures diesel engines and transmissions for a range of military and commercial vehicles.

Future Peterborough is developing a circular city Maturity Model to measure progress towards becoming a circular city. A two-stage approach is being adopted. First, Future Peterborough is working with local businesses to jointly create a model that can measure business progress in becoming more circular, and then this model will be scaled up to embrace community and social elements in order to measure circularity at the city level.

Share Peterborough aims to facilitate circular thinking and activities among the business community, to provide an easy way to harness local resources and to generate economic, social and environmental benefits for the city's businesses. Here the focus is on waste reduction and re-use, which is seen to contribute to the local economy and to improve the city's environment. On the social side Share Peterborough looks to bring businesses together and to share discussions which may, in turn, lead to better relationships, increased knowledge and new opportunities. More generally, the accent is on widespread collaboration, and the Circular City Champions Scheme, for example, involves a number of companies and organisations, including Skanska, Serco, Highways England, Anglia Water, Perkins, Viridor, Cross Key Homes, HM Prison Peterborough, and Railworld Wildlife Haven.

A vision and action plan for circular Glasgow

In the introduction to *Circular Glasgow*¹¹ – a vision and action plan for the city of Glasgow, produced by Glasgow Chamber of Commerce in partnership with Circle Economy (of the Netherlands) and supported by Zero Waste Scotland and Glasgow City Council – Kevin Rush, Head of Economic Development at Glasgow City Council, emphasised that 'Glasgow is committed to growing a circular economy as part of our transformation into a more sustainable, smart and resilient city'. Much more optimistically, *Circular Glasgow* argued that:

'the circular economy means 'enough for everyone forever', a direct challenge to the 'take, make, waste' mentality of the linear economy. The benefits of a circular economy for companies are endless: reducing dependency on scarce natural resources; increasing their competitive advantage; and realising significant financial savings.'

The vision and action plan document identified four stages in the circular city transition. First, despite the optimism cited above, it recognised that 'creating a circular city is a complex journey involving many organisations, companies, technologies and resources' and posed the question 'which areas within the city are ripe and relevant to begin the transition towards a circular economy?' Furthermore, it emphasised that 'in order to become a circular economy, it is vital to identify and initiate change in areas where there is strong economic and political support'. Three sectors were initially identified: healthcare, education, and manufacturing.

Secondly, material flow maps were created to track the major resources – namely energy, water, biomass, metals, chemicals and minerals used in process and production across the three sectors – and to identify their environmental impacts.

The analysis of material flows and environmental impacts revealed that the food and beverage industry, an important element in the city's manufacturing base, was one of the largest consumers of resources and one of the largest sources of waste. As such, the food and beverage sector was selected for the development of practical and realistic strategies to spark the transition towards a circular economy.

Thirdly, nine strategies were selected for further investigation, and the circular city's project team also reviewed a number of case studies within the food and beverage sector in Germany, the Netherlands, Norway, the US, Belgium and Ireland, as well as the UK. Fourthly, further detailed analysis of these case studies led to the designation of four pilot projects for Glasgow, focused upon 'heat recovery', 'aquaponics', 'bread to beer' and 'beer to bread'.

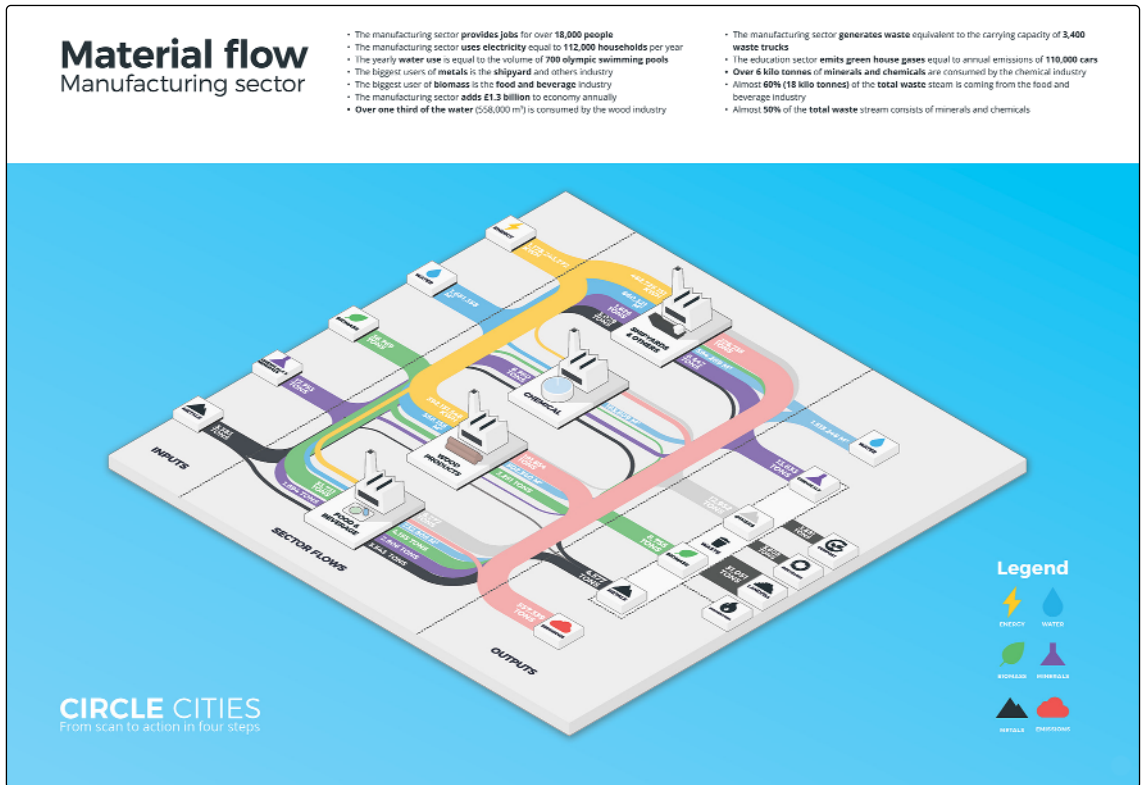
The aquaponics pilot project, for example, is to include a small-scale (15 square metre) system

managed by a local restaurant. The restaurant would benefit from the production of locally grown and sustainable fish, vegetable and herbs, and the wider aim is that the project will serve as an inspiration for fish farms in and around Glasgow. The likely financial benefits to the restaurant are estimated at between £3,600 and £9,000 per annum against a capital investment of £10,000 and annual operating costs of £3,000. Bread to beer is seen as an innovative technology which uses bread waste in the brewing process. *Circular Glasgow* suggested that when piloted successfully 500 kilogrammes of unsold bread could be used to produce 4,000 litres of beer. In 2016, the microbrewery Jaw Brook announced a partnership with Auld's bakery to brew Hardtack, a blonde, low-alcohol (2.2% ABV) beer.

momentum and to demonstrate the business benefits of the city's growing circular economy and the positive effects it could have for the people of Glasgow. *Circular Glasgow* suggested that ultimately 'Glasgow seeks to become a European and global showcase and a civic champion for the successful adoption of the circular economy'.

London – the circular economy capital

In December 2015 the London Waste and Recycling Board, with support from the Mayor of London, published *Towards a Circular Economy – Context and Opportunities*,¹² and at the same time WRAP, the London Sustainable Development Commission, the Greater London Authority and the London Waste and Recycling Board published a research report



Material flow in Glasgow's manufacturing sector

Source: *Circular Glasgow*¹¹

In reviewing initial achievements, the *Circular Glasgow* document argued that the action plan provides a clear direction for the implementation of circular business models and a valuable illustration of how companies within Glasgow can embrace the pilot projects – and the innovative thinking behind them – to lower resource costs and identify and develop new market opportunities.

Looking to the future, once all the pilots have been implemented, the focus will be on increasing the scale of the projects to build widespread

entitled *Employment and the Circular Economy: Job Creation through Resource Efficiency in London*.¹³ In June 2017 the London Waste and Recycling Board¹⁴ published *London's Circular Economy Route Map*,¹⁴ designed to accelerate London's transition to become a circular city. These three documents provide the context and a framework for the vision for a circular economy in London.

In arguing that the potential scope of the circular economy could be very large within London, *Towards a Circular Economy* identified five sectors

for the initial focus of circular economy development – the built environment, food, textiles, electrical and electronic equipment, and plastics. These sectors are large elements within Greater London's economy and the London Waste and Recycling Board estimated that in total the circular economy opportunities will be in excess of £7 billion by 2036. Within the textile sector, for example, circular economy activities could include increasing the lifetime of clothes through design and innovative technologies, while the renting, leasing and sharing of a range of products could become a more common business model within the electrical and electronic sector.

Furthermore, *Towards a Circular Economy* argued that the capital's strong digital, financial and media sectors and its prestigious academic institutions could become great enablers for the circular economy. As a hub for a number of leading global digital companies, for example, London is seen to be particularly well placed to drive the links between continually evolving smart technologies and the circular economy – and to offer the opportunity to track and trace products, to facilitate reverse logistics, and to provide online platforms for collaboration and the sharing economy. While financing the transition to a circular economy is recognised as a major challenge, the ability to use the strength and versatility of the city's financial sector is seen to be a vital asset in accelerating change. Here, crowdfunding and providing insurance cover for new business models could have an important role to play.

In addressing the potential scale of job creation within London's developing circular economy, WRAP *et al's Employment and the Circular Economy* report reviewed three scenarios. The first assumed some advancement in circular economy activities, particularly in the recycling, repair and re-use sectors, rather than any new major circular economy initiatives. The second assumed a continuation of current trends in circular economy developments and moderate progress in remanufacturing and 'servitisation' (the strategy of creating value by adding services to products or even replacing a product with a service). The third assumed a much more intensive development of the circular economy, with substantial advancement in remanufacturing and servitisation.

Estimates for the first scenario suggested that by 2030 there would be an increase of 3,000 jobs (gross), while the corresponding figures for the second and third scenarios were 16,000 (gross) and 40,000 (gross), respectively.

The more recently published *Circular Economy Route Map* recommended actions for a wide range of stakeholders. In the foreword, Marcus Gover, the Chief Executive of WRAP, ambitiously claimed that 'the route map is a dynamic tool to unite London's unique blend of creativity, innovation and entrepreneurship and shift the circular economy

from debate to delivery'. Essentially, the route map consists of a number of cross-cutting themes designed to help to create the conditions to accelerate the circular economy, plus a series of recommendations to support these themes and put them into practice in London.

The eight cross-cutting themes are:

- communications;
- collaboration;
- policy;
- procurement and market development;
- finance;
- business support;
- innovation; and
- demonstration.

While all these themes will surely be vitally important if there is to be a transition to a circular economy, demonstration may be a crucial theme, in that demonstration projects and new pilot business models are a powerful way to show companies how the circular economy can work in practice.

There are also a large number of recommendations for a range of organisations, including the Mayor of London and the Greater London Authority; the digital community; the finance community; social enterprises and communities; local authorities; and, perhaps crucially, the private sector, trade bodies and business support organisations. On the one hand, it is recommended that the Mayor of London sets out a vision for London to be the global leader in supporting a circular economy approach. On the other, there is a recommendation that the private sector needs to analyse the opportunities that the circular economy can bring to businesses and leverage its collective buying power to achieve good-value outcomes from circular economy goods and services.

Concluding reflections

During the last four years, a commitment to move towards a circular economy has been launched in Peterborough, Glasgow and London. The three cities have different population sizes and contrasting economic structures, but each has a specific action plan and proposed development programme to guide the transition towards circularity. While common elements can be identified within these action plans and development programmes, with a focus on recycling and waste management being the most obvious, they also seek to reflect each city's economic structure and its political aspirations. That said, a number of more general issues merit reflection and discussion.

First, each of the three organisations looking to pursue their development programmes and action plans recognised that the concept of the circular city is firmly based in the wider concept of the circular economy. However, in a world where

economies, and the raw material and finished goods flows that underpin and drive those economies, are increasingly global, it remains to be seen how individual cities can significantly increase the scale of their circularity when the vast majority of the major corporate organisations which dominate the national and global economy have not currently adopted a circular economic model.

Secondly, a commitment to the development of a more circular economy within cities might increasingly be seen as a challenge to the current social value which consumers ascribe to many of the products and services that they buy. This may, in turn, make it difficult for large numbers of consumers to buy into second-hand or re-usable patterns of consumption. More generally, it thus remains to be seen how enthusiastically consumers will embrace the realities of the circular economy, not least because it might be seen by many as 'a reversal of progress towards a better life' that involves 'a sacrifice of our current, tangible needs and desires, in the name of a better but uncertain future'.¹⁵

Thirdly, there are questions about the extent to which circular economy approaches within cities can transform local economies as part of a wider transition to a more sustainable future. Some of the initial ventures in Peterborough, for example, have been on a very small scale, and the pilot projects in Glasgow will, at best estimate, produce small economic benefits. In London, the most ambitious estimate of job creation, namely 40,000 by 2030, is small compared with the estimated 5.7 million jobs within the capital. At best, a wholesale move towards a circular economy seems likely to be a slow, rather than a rapid, process, while less optimistic forecasts might suggest that the circular economy could become a small element within cities and that it might be focused on waste management and recycling rather than a defining characteristic of cities.

Fourthly, although planning has received little or no attention date in circular city action plans and programmes to date, planners will want to keep a watching brief on the circular city development plans. Indeed, in those cities where circular city action plans and programmes have been launched, some planning professionals and consultants may already be actively involved in development initiatives and projects. On the one hand, the planning community may look to embrace the concept of the circular economy enthusiastically and to look positively on its increasing introduction within the urban economy, in that such developments will contribute to a more sustainable future. On the other hand, the development of a more circular economy may bring challenges for local authority planners increasingly under pressure as cuts in local government planning budgets continue to bite.

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Notes

- 1 P Jones and D Comfort: 'Planning and the circular economy'. *Town & Country Planning*, 2017, Vol. 86, Dec., 533-39
- 2 See UCL Bartlett School of Planning's 'UCL Circular Cities Research Hub' webpage, at www.ucl.ac.uk/bartlett/planning/research/ucl-circular-cities-research-hub. See also the Circular Cities Hub website, at <http://circularcitieshub.com/>
- 3 'The Ellen MacArthur Foundation launches Circular City Network'. News release. Ellen MacArthur Foundation, 6 Oct. 2016. www.ellenmacarthurfoundation.org/news/circular-cities-network
- 4 'When the city meets the circular economy'. News release. Circulate, 21 Apr. 2016. <http://circulateneews.org/2016/04/when-the-city-meets-the-circular-economy/>
- 5 S Prendeville, E Cherim and N Bocken: 'Circular cities: mapping six cities in transition'. *Environmental Innovation & Societal Transitions*, 2018, Vol. 26, 171-94. <https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/24890>
- 6 J Williams: *Circular Cities: Strategies, Challenges and Knowledge Gaps*. Expert workshop summary report. Circular Cities Hub, Jun. 2017. <http://circularcitieshub.com/wp-content/uploads/2017/06/Circular-Cities-Strategies-Challenges-and-Knowledge-Gaps-Page.pdf>
- 7 *Cities in the Circular Economy: An Initial Exploration*. Ellen MacArthur Foundation, 2017. www.ellenmacarthurfoundation.org/assets/downloads/publications/Cities-in-the-CE_An-Initial-Exploration.pdf
- 8 'The circular city'. Webpages. [Citiesintransition.eu](https://citiesintransition.eu/transition/circular-city). <https://citiesintransition.eu/transition/circular-city>
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- 13 *Employment and the Circular Economy: Job Creation through Resource Efficiency in London*. WRAP, Dec. 2015. www.londonsdc.org.uk/documents/LondonCircularEconomyJobsReport2015OnlineVersionFinal.pdf
- 14 *London's Circular Economy Route Map*. London Waste and Recycling Board, Jun. 2017. www.lwarb.gov.uk/wp-content/uploads/2015/04/LWARB-London%E2%80%99s-CE-route-map_16.6.17a_singlepages_sml.pdf
- 15 *Policies to Encourage Sustainable Consumption*. Technical Report 2012-061. BIO Intelligence Service, for European Commission, Aug. 2012. http://ec.europa.eu/environment/eussd/pdf/report_22082012.pdf