



Circular economy in the Oxfordshire Plan 2050 - September 2019



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Date

September 2019



1. Executive Summary

This report was commissioned by Oxfordshire County Council to inform the Oxfordshire Plan 2050 (OP2050) team and the Oxfordshire County Council (OCC) Strategic Planning Team to outline the case for adopting a more circular economy in Oxfordshire. The benefits to Oxfordshire of a more circular economy are:

Circular economy supports good growth

Feedback from public consultations for OP2050 in May 2019 show a tension between the need for new homes and protecting local and global environments. A circular economy, running through all OP2050 themes, could ease those tensions and demonstrate good, clean, inclusive growth. The development of OP2050 creates the opportunity to demonstrate a commitment to circular economy and gives members, officers and stakeholders the opportunity to explore, influence and prioritise circular economy potential throughout the plan period.

Circular economy supports climate change action

Oxfordshire acknowledged a climate emergency in April 2019. Reducing resource consumption is an essential part of reducing the county's climate change impacts. A circular economy achieves this by keeping products, components and materials at their highest use and value. It provides an alternative to the current "linear" economy – in which we make, use and dispose of products, components and materials and recover little value from them.

Circular economy supports jobs and economic development

The Oxfordshire Local Industrial Strategy was published in December 2018 with the aim of delivering inclusive growth across Oxfordshire, drive productivity and innovation, and generate additional growth for the UK. A circular economy brings economic development opportunities that fit squarely in the LIS agenda - new jobs, skills, investment and start up potential. Cities such as London, Paris and Amsterdam and regions around the world are exploring the opportunity circular economy provides.

There is a lot of good work in the area of circular economy in the county happening already, particularly in the areas of energy and mobility and now supported by the climate change emergency action plan. As Oxfordshire transitions to a more circular economy, it will be important to be part of, and contribute to, the international community that is building an evidence base to inform policy and delivery. In this way, Oxfordshire can become a leader in circular economy and add the sector to the list of those that makes the county an important net contributor to UK plc.

Recommendations are summarised here and described in more detail in the document:

- Build circular and sharing economy into OP2050, and Oxfordshire planning policies, as a guiding theme with a high-level statement of support to make sure there is always scope for including circular/sharing requirements in future projects and approaches;
- Review other upcoming strategy and consider the relevance of including circular economy to build strength across the organisation;
- Develop a short/medium term action plan on circular economy to gain momentum and build the local evidence base including plans on sustainable consumption;
- Upskill key staff in circular economy knowledge and experience - including executive team - to ensure opportunities are identified and shared with relevant colleagues;
- Be part of the international community building the circular economy evidence base through networks such as the Circular Economy Club and the Ellen MacArthur Foundation;
- Integrate circular economy into current business support offering by seeking internal and external funding;
- Review carbon targets in the light of consumption figures.

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2. Introduction

This document builds the case for the adoption of a more circular economy in Oxfordshire. It aims to inform the Oxfordshire Plan 2050 (OP2050) team and the Oxfordshire County Council (OCC) Strategic Planning team. We developed the report through interviews and engagement with a variety of stakeholders and hope this will enthuse the work of teams and partners such as OxLEP, the Oxfordshire Environment Partnership, the Innovation Hub and Infrastructure teams.

We would like to thank those who shared their insights and views as part of the project:

Andrew Thomson, Senior Planning Officer, OCC
Vicky Fletcher, Environment and Heritage Manager, OCC
Frank Nigriello, Director Corporate Affairs, Unipart
Llewelyn Morgan, Head of Innovation, OCC
Dan Cooke, Head of Sustainability, Pennon
Richard Byard, Director of Business Development, OxLEP
Rupert Biggins, Senior Project Manager, Grosvenor
Charmian Love, Circular Economy Lab, Saïd Business School

2.1. What is a circular economy?

In a circular economy, every item or material is useful and valuable to another part of the economy. If we consider the natural environment, every single resource is used and reused, normally as a “food” for the next part of the system.

In our modern society we create many products, by-products and wastes. These have no value, cannot be reasonably reused or recycled and create the need for waste treatment and so cause climate impacts. There are two main ways to create a circular economy - firstly, design products for maximum value/life and secondly, set up systems to deal with products in a way which retain maximum value, preventing products from being disposed of or downcycled.

If we can develop systems where products are repaired and reused for much longer - and shared between users – we can radically reduce the amount of resources needed to sustain communities and businesses. For example, Oxford Office Furniture¹, repairs and remanufactures desks and chairs that otherwise may have gone to landfill. If we can also develop systems that minimise wastage of food and recover nutrients from any waste created, then we can help to sustain the agricultural sector, improve the quality of our farmland and create new businesses. For example, The Wonky Food Company², based in Woodstock are working with farmers, suppliers and retailers to collect their imperfect and surplus fruit and vegetables and turn it into relishes.

¹ <https://www.oxfordofficefurniture.co.uk/>

² <https://www.wonkyfoodco.com/>

2.2. Global perspective

Exploring the potential of a circular economy is increasingly important in a world where consumption rates continue to grow, resources are increasingly scarce and climate change is severely impacting on communities around the globe.

In recognition of this many cities and regions, including Oxfordshire, have declared climate emergencies and set their own carbon reduction targets, supporting the Paris agreement target to limit the rise in global average temperature to below 1.5°C above pre-industrial levels.

Resource consumption, driven by the products residents and businesses use, cause significant greenhouse gas emissions within cities and regions. These consumption emissions are rarely accounted for in city or county greenhouse gas inventories because these resources are “imported” from external sources. Globally, current trends in resource extraction are due to double from 2015 to 2050.³

Many cities and regions across Europe are exploring a circular economy approach. Cities such as London, Peterborough, Amsterdam and Paris have written and are actioning circular economy plans. The York/North Yorkshire/East Riding LEP has published its first circular economy strategy in late 2019.⁴ At a national level Scotland, Denmark and Finland have published circular economy strategies. Looking globally, Japan has also published a strategy for circular economy.

London has started to embed a circular economy approach in its strategies and plans that guide the development of the city, including its draft London Plan. Appendix 1 collates some key policy examples. In November 2018, C40 published a report that compiles over 40 case studies on cities undertaking circular planning and activity.⁵

A more circular economy can also help to tackle and adapt to global megatrends such as the ageing population (linked with social care and home ownership), personalised health and medicine, privacy and data protection and food security, reduced-meat and plant-based diets.

³ United Nations International Resource Panel

⁴ <https://www.businessinspiredgrowth.com/project/circular-economy/>

⁵ Municipality-led circular economy case studies, C40, 2018

2.3. Local perspective

A study by the C40 organisation showed that the climate impacts of resource consumption of imported goods and services can be as large as direct greenhouse gas emissions in a region (see Figure 1).⁶

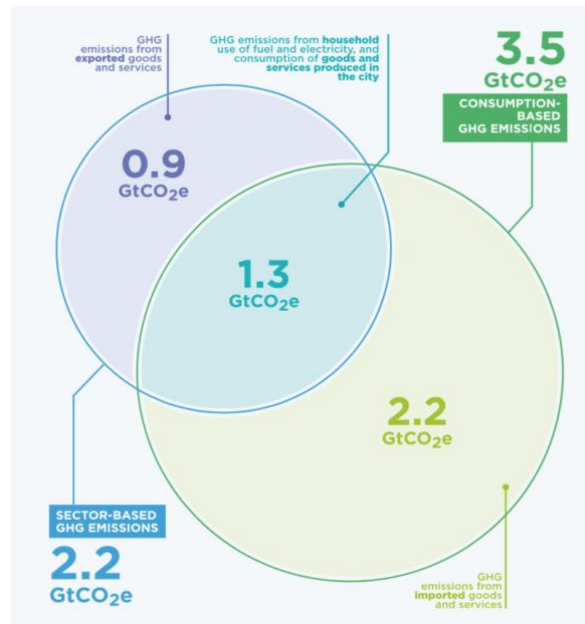


Figure 1: Consumption-based GHG emissions from C40 cities, March 2018

More recently, the Ellen MacArthur Foundation's publication on the climate impacts of adopting a circular economy⁷ indicate that as much as 45% of the greenhouse gas emissions created are caused by the products and materials we use which can be managed within a circular economy.

Oxfordshire's own target, to reduce carbon levels 50% by 2030 from 2008 levels⁸, is based on energy usage in waste, transport, industry and commerce, agriculture, residential and public services sectors respectively, missing approximately half of carbon emissions based on the above studies. Our crude extrapolation of the C40 data for Oxfordshire, based on an in-region carbon impact of 4.5 million tonnes per year,⁹ indicates that imports to the region could be adding 6 to 8 million tonnes of CO₂e to the region's carbon impact.

A circular economy uses materials and resources more efficiently, offering significant opportunities for greenhouse gas reduction. Based on other city studies, we estimate roughly 1 million tonnes of this imported green house gas (GHG) impact could be prevented with circular economy actions in place. However, a circular economy alone cannot provide sustainability – the consumption and use of products and materials must be done at a sustainable level.

As local economies grow the need for good, inclusive growth is equally important. Good growth supports resident and business needs, and respects natural and cultural capital.

⁶ Consumption based GHG emissions of C40 cities, 2018

⁷ Completing the picture, Ellen MacArthur Foundation, September 2019

⁸ Oxfordshire Energy Strategy, OxLEP, 2019

⁹ Aether GHG update for Oxfordshire, 2018

A circular economy contributes to good growth by capturing the value in materials in the area, making an area more resilient, bringing economic growth, jobs and offering opportunities for social inclusion.

Feedback from public consultations for OP2050 in May 2019 show the clear tension between the need for new homes and protecting local and global environments. Equally, there is support for an OP2050 that provides climate change mitigation and liveable, thriving communities. A circular economy, running through all OP2050 themes, could ease those tensions and demonstrate good, clean, inclusive growth.

One example of an Oxfordshire business operating a circular economy model is Oxford Office Furniture. Oxford Office Furniture provides both new and pre-owned furniture. Rehoming and reusing commercial grade office furniture has been a pillar of Oxford Office Furniture since the beginning and forms an integral part of the business. They keep a rolling stock of furniture over two warehouses in Oxfordshire. Within these facilities are a full range of desking, seating and storage from the same manufacturers which supply their new furniture. The result is a huge number of opportunities to buy quality office furniture at about half the price of new.

Oxford Office Furniture can also refurbish existing furniture - repainting, reupholstering and replacing parts as necessary, keeping furniture in use for longer. Their team will also take away any unwanted furniture items, which will then be either rehomed, or as a last resort, recycled. They work with charities, and regularly donate furniture to them. Oxford Office Furniture also have a range of electric vehicles to deliver furniture to their clients.¹⁰

3. The case for circular economy in Oxfordshire

Oxfordshire is one of the strongest economies in the UK, one of three net contributors to the exchequer.¹¹ The Oxfordshire Local Industrial Strategy (LIS) sets out the ambition to double the Oxfordshire economy by 2040 to be worth £46bn GVA. The LIS also makes a commitment to 'manage this growth with a light footprint on the environment, harnessing natural resources and demonstrating the benefits of a resilient, ultra-low carbon society.'¹² The UK industrial strategy states a commitment to moving towards a more circular economy.¹³

This section identifies the economic and social benefits a circular economy could bring to Oxfordshire.

The Ellen MacArthur Foundation's Growth Within report aims to add up the economic value of all the resource savings that circular economy can bring to Europe, along with the consequential positive value that can happen as a result. It states that a circular economy across Europe would generate benefits of as much as €0.6 trillion per year by 2030 to Europe's economies through reduced need for virgin "primary resources" in construction, industrial manufacturing and agriculture. In addition, circular economy would generate €1.2 trillion in "non-resource and

¹⁰ <https://www.oxfordofficefurniture.co.uk/>

¹¹ Oxfordshire: a trailblazer for the UK economy, OxLEP, 2018

¹² Oxfordshire Local Industrial Strategy, OxLEP, 2019

¹³ Industrial Strategy: building a Britain fit for the future, BEIS, 2017

externality benefits” such as less pollution, better health, less time lost in traffic congestion, etc, bringing the annual total benefits to around €1.8 trillion versus today.¹⁴

Cities and countries have quantified the benefits that a circular economy can bring to a more local level.

- London’s research estimated a £7 billion net benefit per annum by 2036 through the adoption of a more circular economy, focussing on the areas of built environment, food, textiles, electricals and plastics.¹⁵
- Netherlands and Amsterdam estimated €7 billion for the Dutch economy, 25% less imports of primary raw materials, 20% water saving in the industry, more than 50,000 jobs.¹⁶
- Scotland’s evidence suggests that adopting the circular economy could be worth up to £1.5bn to Scotland’s economy and save around 11 million tonnes of greenhouse gases per year by 2050.¹⁷

Based on these studies and our own extrapolations using population data, we estimate the economic benefit to Oxfordshire would ultimately be in the range of £400m to £1.5bn per year. The range is wide due to the imprecise nature of the source studies used (lower values only consider the business economy, whereas higher figures incorporate the value of wider societal benefits). We believe that local business economic benefits would be in the order of £400-500m and wider societal benefits from circular economy could roughly add a further £1bn. The data sheet behind these extrapolations can be found at appendix 2.

We must emphasise that our estimate is based on a crude comparison of Oxfordshire’s population with other regions. Oxfordshire’s economic and research firepower is greater than that of many other regions, so it’s possible that benefits could be even greater. We recommend a detailed assessment to derive a figure to robustly inform policy decisions.

3.1. Jobs potential

Moving towards a circular economy requires innovation and stimulates development of new jobs and skills. Jobs and skills will be created in re-use, remanufacturing, services and digital sectors.

The EU estimated that the circular economy could add 0.5 per cent to Europe’s GDP and create a net increase of 700,000 jobs by shifting labour away from current resource extraction activities and into more labour-intensive recycling plants and repair services.¹⁸

‘Employment and the circular economy - job creation through resource efficiency in London’ a report by the London Sustainable Development Commission, Greater London Authority and the London Waste And Recycling Board concluded that a ‘transformative’ circular economy scenario, could offer more than 40,000 new circular economy jobs (gross), reducing net unemployment in London by around 12,000 jobs (or 0.26 percentage points), by 2030.¹⁹ The study notes that many of the jobs created are in the mid skills range which were much needed in the London area where there are

¹⁴ Growth Within, Ellen MacArthur Foundation, 2015

¹⁵ London Circular Economy route map, London Waste and Recycling Board, 2017

¹⁶ Opportunities for a circular economy in the Netherlands, TNO, 2013

¹⁷ Scotland and the circular economy, Ellen MacArthur Foundation, circa 2013

¹⁸ Impact of Circular Economy Policies on Labour Markets, Cambridge Econometrics, Trinomics, and ICF, 2018

¹⁹ Employment and the circular economy - job creation through resource efficiency in London, London Sustainable Development Commission, 2017

many high and many low skilled jobs, but little in between. A rough translation of this figure to Oxfordshire gives us an estimate of 6,000-7,000 jobs but this will vary depending on a comparison of sectors in London and Oxford.

3.2. Investment

Investment in the circular economy already comes from a number of sources. A study by the Smart Specialisation Hub in 2019, states that the UK government started its research and development investments in circular economy projects through Innovate UK as early as 2009, with a significant increase in support for circular economy research and development activities taking place over the last five years. The combined public investments of the UK Government and European Commission to UK-wide circular economy initiatives increased by more than £360 million between 2014 to 2018.²⁰

WRAP, based in Banbury, has been involved in leading edge circular economy change and implementation since 2001 and also often administers relevant funds from the Government. It led pioneering work on circular business models between 2012 and 2016 through an EU-funded project called REBus.²¹ QSA Partners LLP led the technical and commercial delivery on the UK work in this project.

Private sector investment is increasing - organisations such as Circularity Capital²² have recognised that the traditional banking sector is often still risk averse to circular opportunities and more targeted investment is required that understands the relevant business models in more detail. The London Waste and Recycling Board invested in the Greater London Investment Fund²³ in 2019. The investment is ring fenced for circular economy small and medium enterprises that already have some market traction, and need Series A and Series B capital to start scaling. Crowd funding is also an option for circular economy start-ups such as Sustainable Ventures and Riversimple.²⁴

3.3. Social benefits - building strong and healthy communities

Building strong and healthy communities starts in the design of new, and the redesign of existing areas, as discussed in both the housing and mobility sections of this report. Beyond these crucial areas, the way in which circular economy operates can bring people together into supportive networks and create inclusive opportunities. A great example of this is the library of things called Share Oxford.²⁵

3.4. Sharing economy

Families and friends have always shared and lent things to each other. The sharing economy, enabled by technology, has increased the opportunity to link wider communities to share a range of goods as diverse as food, tools, cars and houses. The social benefits tend to be in the local peer-to-peer sharing platforms rather than the commercial platforms

²⁰ Mapping Circular Economy Activity in the UK, Smart Specialisation Hub, 2019

²¹ <http://www.rebus.eu.com/>

²² <https://circularitycapital.com/>

²³ <https://www.ukbaa.org.uk/news/mayors-new-100m-greater-london-investment-fund-unveils-board/>

²⁴ <https://www.edie.net/news/8/Crowdfunding-success-for-sustainability-start-up-fund/>

²⁵ <https://shareoxford.org/>

such as Uber and AirBnB. By 2025, PwC projects total transactions in the UK sharing economy could reach £140 billion, up from an estimated £7 billion in 2015 and £13 billion in 2016.²⁶ Other examples include Olio²⁷, Globechain²⁸ and Car and Away.²⁹

3.5. Inclusive economy

Circular economy business models offer the opportunity, in a business or organisation with the right values, to offer inclusive opportunities for all involved - volunteers, staff and users. The re-use, repair and remanufacturing circular business models have the greatest potential in this area and may be undertaken by commercial businesses or not for profit organisations. Examples include the Windrush Bike Project (Witney)³⁰ and Greenstream.³¹ A particularly effective reuse and recycling organisation is the RAW Workshop in Blackbird Leys.³²

Benefits from the sharing and inclusive economies can be difficult to quantify but include economic savings from accessing cheap or free products, improvement in wellbeing, health and social inclusion. Zero Waste Scotland carried out a review of the social benefits of their circular economy programme which gives a useful summary of the types of social benefits that a circular economy can bring.³³

3.6. Links to other sectors in Oxfordshire

There are other sectors closely related to circular economy - low carbon, smart, green tech and One Planet Living. Circular economy is complementary to all of them, speaking to resource efficiency, resilience and good growth. A short review of circular economy synergies with each theme can be found at appendix 3.

4. What a vision for a circular economy in Oxfordshire could look like

A circular Oxfordshire would be a more resilient, more efficient, more sustainable county - a continued net contributor to UK plc, respected internationally as a leader in low carbon circular economy innovation. Examples of good outcomes OCC might like to target ahead of 2050 are:

- Strong partnerships are in place to support the development of a circular economy, helping to link up the public sector, businesses and communities
- Space, facilities and investment for circular businesses are available to enable start-ups to grow and scale up across the county
- Circular suppliers and services are selected based on their better whole-life business case and the wider benefits they bring to Oxfordshire
- Oxfordshire is a “net exporter” of circular services to other regions of the UK and the world

²⁶ <https://www.pwc.co.uk/who-we-are/regional-sites/northern-ireland/press-releases/P2P.html>

²⁷ <https://olioex.com/>

²⁸ <https://www.globechain.com/>

²⁹ <https://www.carandaway.com/>

³⁰ <http://windrushbikeproject.uk/>

³¹ <https://www.findcarpettiles.co.uk/>

³² <https://raw-workshop.co.uk/>

³³ Zero Waste Scotland, Let's be social: how can circular economy interventions improve lives?

- Oxfordshire is seen as a global leader in circular economy, particularly in facilitating Living Labs for new circular economy approaches
- Products and materials would be managed across the county bringing greater value and opportunities for communities to come together and grow social links
- The amount of waste Oxfordshire produces per head continues to fall

5. The role of local authorities in delivering a circular economy

Whilst circular economy is mostly seen as a business opportunity, local authorities have a key role in creating the right conditions for circular economy to flourish, maximising local wider societal benefits. This can be achieved through policy, communication, collaboration, procurement, demonstration, business support and finance amongst other activities. This role is being embraced by many cities, regions and counties already, as discussed in section 2.2.

A heat map of these enablers mapped against the relevant themes of the Oxfordshire Plan 2050 can be found at appendix 4. The role of the heat map is to identify areas of current good practice that can be built on, as well as to include new policy options and activities that would accelerate the adoption of circular economy in Oxfordshire. It would be useful to develop the heat map further with appropriate stakeholders from across the county.

6. Oxfordshire Plan 2050

The time is right as the planning team go into a process of developing new policies for OP2050 to include circular economy at the highest level, using the evidence in this study as a starting point. This demonstrates a commitment to the principles, and gives members and officers the opportunity to explore, influence and prioritise circular economy potential throughout the plan period.

The draft London Plan³⁴ includes a high level policy hook as follows which can be used as a starting point: “To help London become a more efficient and resilient city, those involved in planning and development must: seek to improve energy efficiency and support the move towards a low carbon circular economy, contributing towards London becoming a zero carbon city by 2050.”

The following sections of the study looks at the implications of a circular economy on the relevant sections of OP2050. The focus in the mobility and energy sections is, in the main, on circular service provision making them pertinent to the management of resources and materials. Circular services have spatial needs that must be accommodated within OP2050.

6.1. Economic growth

The Oxfordshire Local Industrial Strategy (LIS) sets out the ambition to double the Oxfordshire economy by 2040. Whilst economic growth has been an accepted measure of global, national and regional success for decades, a plethora of terms such as good growth, inclusive growth and sustainable growth being used by our politicians and policy makers suggest that pure economic growth is not enough to create thriving and equitable communities. This idea has been developed by Kate Raworth into the concept of ‘doughnut economics’ which focuses on meeting the needs of all, within planetary boundaries.³⁵

Whilst this concept is not currently considered mainstream, it is prudent to ensure that the county’s growth agenda is balanced with sectors that meet Oxfordshire’s need to not only grow, but create sustainable and inclusive communities.

Low carbon circular economy

For example, the low carbon business sector is already highly developed in Oxfordshire, contributing approximately 7% of the Oxfordshire economy, with sales of approximately £1.2bn per year, and employing approximately 9,000 people.³⁶

Expanding the scope of low carbon to include circular economy would add further value, estimated by this study to be in the range of £400m to £1.5bn. The added benefit of supporting the circular economy, is that it creates mid skilled jobs in the repair, re-use and remanufacturing sectors that will be accessible to a larger proportion of the population as compared to the hi tech jobs created by many of the sectors identified in the Oxfordshire Local Industrial Strategy.

Circular economy jobs in repair and remanufacture could help address the mismatch in jobs created by high tech sectors and the current skills set within the local labour market that is acknowledged within the LIS. Other sectors such as hospitality are explored in the LIS, looking to create more accessible, permanent jobs for the wider community. This is something circular economy jobs could achieve. The Oxfordshire Skills Strategy acknowledges the importance of the green economy and

³⁴ <https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan>

³⁵ <https://www.kateraworth.com/doughnut/>

³⁶ Materials for Oxfordshire GreenTech, 2018, Dr Doug Crawford-Brown

agriculture in the county and states that ‘ In order to support growth, our skills eco-system must better understand the projected skills requirements of these sectors and ensure the necessary provision is in place.’ It would be advantageous to understand the outcomes of this skills requirement piece as further work is developed around circular economy in the county.

It is important to note that the circular economy is not just a sector but has the potential to be a cross cutting theme, applicable to any business. There are businesses that are inherently circular and offer circular goods and services, as there are those that offer low carbon goods and services. However, any business that currently sells products could investigate a circular business model and start procuring circular goods and services.

It is recommended that future versions of the LIS, associated action plans and the investment portfolio should include circular economy alongside the low carbon sector to ensure benefits are secured for Oxfordshire.

Agriculture

The circular economy section in the UK Industrial Strategy mostly focuses on food and agriculture, specifically on regenerating natural capital, resource productivity, food waste reduction and the bioeconomy and efficiencies through precision agriculture.

With 74% of Oxfordshire’s land being farmed (of which 56% is under cereals farming and 30% under livestock grazing)³⁷ and 2.7% GVA contribution to the county³⁸ this could be another sector to receive greater focus. The Oxfordshire 2018 Economic Review: Baseline states that most industries in the county are more efficient than their peers in the UK apart from construction, with the difference particularly pronounced for agriculture.³⁹

About one-third of all food produced in Europe for human consumption is lost or wasted before people consume it.⁴⁰ In Oxfordshire there are already commitments in place around recovering nutrients in food waste, sewage and waste water in the Minerals and Waste Core Strategy and the Oxfordshire Joint Municipal Waste Management Strategy. However, there are many areas to explore including more resource efficient agricultural practices, regenerative agricultural practices and closing loops of nutrients and other materials that are being explored around the globe. It could be useful to engage with the FAI farm in Wytham to develop some of these strands of work.

Oxfordshire has an opportunity to lead the world, using its strong technology skills, in analysing and improving nutrient quality in agricultural soils - and demonstrating how its own circular nutrient recovery is effective in maintaining healthy soils.

Oxfordshire and local planning policy should cater for commercial food waste aggregation infrastructure to facilitate nutrient recovery through existing composting and anaerobic digestion facilities. Within urban areas, redistribution of food fit for human use should be considered within planning development (minimising the wastage of premium food).

³⁷ <https://www.wildoxfordshire.org.uk/education/>

³⁸ OxLEP, Oxfordshire 2018 Economic Review: Baseline

³⁹ OxLEP, Oxfordshire 2018 Economic Review: Baseline

⁴⁰ Ellen MacArthur Foundation, Growth Within, 2015

6.2. Housing

Early design of housing developments, energy infrastructure and transport connections have long term impacts on the viability of communities. Early planning should also consider how materials, products and nutrients can be captured and kept in use in communities. We're already planning the infrastructure needed to enable electric vehicles such as charging points. Beyond our current waste management systems, what would an innovative infrastructure look like for household and commercial materials and products in communities?

One solution, especially for new developments, would be to dedicate space for community hubs. These hubs would be used as centres for re-use, repair and sharing. Oxfordshire already hosts some successful projects in this space, such as Share Oxford and Repair Cafes which could be replicated across the county. As noted previously, there are social benefits to be gained from these types of activities that can help build community links, especially in new developments. Community hubs could also act as a delivery site for residents and local businesses, using a service such as Pedal and Post⁴² for last mile deliveries. There could also be a link here to community mobility hubs for shared electric vehicles - see section 6.4. Community hubs can also service other agendas such as public health and culture. Dedicating space for these shared community facilities could be mandated within District local plans and wider Oxfordshire planning policy. .

The materials our homes are made from could also be more efficiently managed. New housing developments should be considering circular economy building principles as well as energy efficiency and renewable energy. A good summary of the principles can be found in David Cheshire's book "Building Revolutions - Applying the Circular Economy to the Built Environment".⁴³ These principles have been included in the draft London Plan.

The draft London Plan also includes a policy on developing circular economy statements as part of referable planning applications. The plan is due to be published in spring 2020 but a primer to help developers adopt circular economy principles has already been published by the Mayor of London.⁴⁴ These circular economy statements would be in a similar to the energy statements required in the draft Oxford Local Plan.⁴⁵ The wording of the circular economy statement policy and a summary of all references to circular economy in the draft London Plan can be found at appendix 5. Adoption of such a policy within OP2050 would signal a strong intent to support a circular economy and is recommended.

Modular housing incorporates some circular economy principles and is frequently discussed as a potential answer to the UK's housing crisis and an area of interest for the OCC innovation and planning teams. The new building technique is increasingly accepted as a cheaper, quicker, lower carbon alternative to traditional build housing. More detail on modular housing can be found in appendix 6. However, we would urge caution to ensure that components within modules can be readily removed, repaired and replaced.

Circular business models such as, product as a service, also offer opportunities to manage products within the home. IKEA is currently testing leasing offers to support customers to acquire, care for

⁴² <http://www.pedalandpost.co.uk/>

⁴³ Building Revolutions, David Cheshire, RIBA, 2016

⁴⁴ Design for a circular economy, Mayor of London, 2019

⁴⁵ Oxford Local Plan 2036 - Proposed Submission Draft Policy RE1: Sustainable design and construction

and pass on IKEA products in more sustainable ways.⁴⁶ Developers already offer choices to new homeowners in how their home is fitted out, for example kitchens and flooring. What if those offers were made on a service basis so they could be updated when the owner wants something new but the original product can be remanufactured and used elsewhere? This model could be applied to white goods, heating (especially heat pumps) and PV panels for example. It has the added advantage of being able to offer the home owner energy efficient options.

6.3. Energy provision

The energy sector has been gradually transforming for a number of years, from fossil fuel to renewable based energy. The energy sector is under increased scrutiny since the adoption of national and local net zero carbon targets by 2050. Much energy provision is outside the scope of Oxfordshire as it is at a national level. However much can be delivered at a local level with the Oxford Energy Strategy⁴⁷ focusing on opportunities including maximising a clean energy grid, reducing demand and zero carbon energy as well as leveraging strong partnerships and growing decentralised power sources.

These changes will see a larger focus on managing the grid locally with battery storage, load balancing from various local renewable energy sources (particularly photovoltaic sources in Oxfordshire) and a huge growth in energy efficiency across homes and businesses. The growth of local renewable energy source creates challenges for the spatial plan but with policies and appropriate targets these can be built into framework plans and developments.

In a circular world, energy service companies will provide grid services as a service-based business model. They would naturally want to maximise the asset life of the product it owned, but also upgrade and capture the value of any used asset in order to deliver improved performance and services. For example, this could work with boilers. For a guaranteed revenue return over a number of years, such as in power purchase agreements, equipment would be supplied to the business or homeowner whether for efficiency or as an energy service.

A circular 'service' model allows for energy's rapid technological change and efficiency as these are often high value products that can be designed for repair, reuse and remanufacturer providing high quality local companies and jobs. Such examples are the emerging flow battery technology which offers much more reusability than lithium batteries. The business model allows for rapid uptake and ongoing revenue and with Oxfordshire's strong research and development skills focus, products and supply chain have the potential to be developed and be UK, if not world leading.

It is recommended that Oxfordshire explores the potential for service type development within existing projects and developments:

- Project Leo's local energy grids linked to photovoltaics installation and battery management
- Energy super hub's large-scale battery, electric vehicle / Vehicle 2 Grid charging and heat pump load balancing
- Low Carbon hub Cosy Home energy efficiency project
- OxFutures 2 energy service company
- Enysham Garden Village aspiration with building design, services provision and living lab opportunity

⁴⁶ https://www.ikea.com/us/en/about_ikea/newsitem/040319-IKEA-will-test-furniture-leasing-2020

⁴⁷ Oxfordshire Energy Strategy, OxLEP, 2019

6.4. Connectivity and movement

The transport sector is undergoing a revolution in electrification, data and infrastructure connectivity, the growth of on-demand services, mobility as a service and the need to decarbonise the sector. Importantly this is recognised at governmental level. This change has large implications for spatial planning, though could create division between city and rural populations.

Circular economy can serve the transport revolution well: a future where shared services, e-bikes, electric vehicles (EV's) and autonomous vehicles (AV's) are standard. The circularity can be taken one step further, to offer interconnected place based mobility hubs that offer the shared vehicles mentioned above, as well as other services, benefiting mobility access and social inclusion at a community scale.

Circular business models are even more compelling with the growth of higher value technological services. Assets such as EV charging points, EV cars and AV shuttles are provided as a service, allowing for more adaptable service provision. Higher value assets can be reused at end of first life at one hub and therefore lifetime value of the asset and the infrastructure can be maximised. This approach can be extended to many other emerging areas such as energy and transport, especially as they become more interlinked, i.e. battery storage, LED lighting, buses, hydrogen charging provision etc.

Oxfordshire planning policy should ensure that there is adequate provision not only for the transition to residential EV charging needs – but beyond this to localised e-bike, EV and AV car pools. It should also ensure that there is adequate allowance for the potential switch to hydrogen fuel cell technology, which has benefits over electric battery power in longer journeys and also avoids the need for some changes in the electric power distribution network.

Much of the traffic passing through Oxfordshire on major transport routes may require hydrogen refuelling. Localised hydrogen generation (powered by renewable energy) minimises the need for fuel transport.

This approach fits both Oxfordshire's key connectivity aspirations, but also aims to reduce car travel and target of zero carbon transport by 2050, by not only reducing emissions but also reducing the carbon used in making the assets. Oxfordshire with its high knowledge economy and with producers such as BMW e-mini and EV charge points producers, provides an opportunity for increased productivity and growth. As items are not just sold, but provided as a service, this will create jobs in service support, repairing and remanufacturing.

Oxfordshire has potential areas where these solutions could be deployed, such as its data and Mobility Living Labs sites in Didcot Garden Town, Culham Smart Village and others, that already aim to create connected mobility across multi-modal transport services, reducing reliance on private cars. Also, the emerging cluster at Harwell with the Faraday Institution, academia and BMW provides real opportunities.

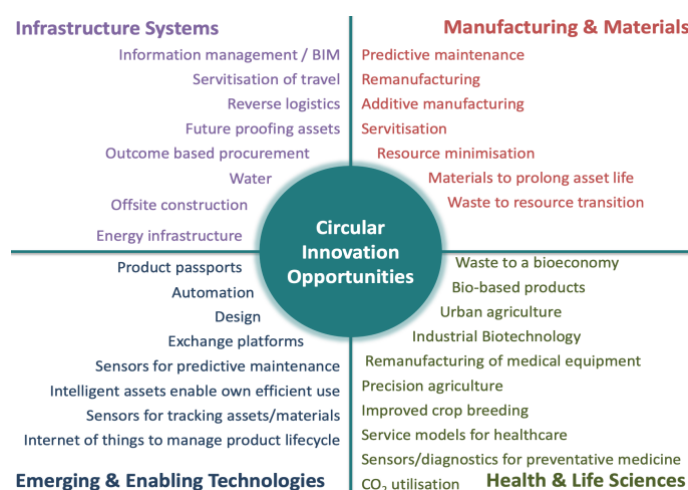
6.5. Innovation

Innovation is vital to the acceleration of a circular economy. Innovation is not a key theme within OP2050 but is included here as a key theme of the Oxfordshire Local Industrial Strategy (LIS). The LIS vision is to position Oxfordshire as a top three global innovation ecosystem by 2040.⁴⁸

Oxfordshire already has a very strong innovation ecosystem due to the presence of its universities, science, technology and business parks. The fact that OCC supports a growing, in house innovation team also demonstrates commitment in this area.

The breakthrough sectors identified in the LIS are life sciences, quantum computing, space-led data applications, cryogenics and motorsport alongside robotics and autonomous systems, energy and creative and digital which have obvious links to a circular economy.

Circular economy offers a lens through which to view challenges that the county is facing which will deliver good growth solutions. The diagram below outlines a number of areas where innovation is required to support an acceleration of a circular economy but it's by no means exclusive.



Ref: Innovate UK: The role of innovation in delivering a circular economy ⁴⁹

Innovation is required in business model design as well as product design to achieve a higher degree of circularity. Why design and produce a great new product just to put it into a linear business model? Accenture categorised circular business models into five areas⁵⁰ detailed below, each with an illustrative example:

Circular Supplies: Provide renewable energy, bio based- or fully recyclable input material to replace single-lifecycle inputs *for example Vegware* (<https://www.vegware.com/>)

Resource Recovery: Recover useful resources/energy out of disposed products or by-products *for example the Wonky Food Company* (<https://www.wonkyfoodco.com/home>)

Product Life Extension: Extend working lifecycle of products and components by repairing, upgrading and reselling *for example Oxford Office Furniture* (<https://www.oxfordofficefurniture.co.uk/>)

⁴⁸ Oxfordshire Local Industrial Strategy, OxLEP, 2019

⁴⁹ www.insidegovernment.co.uk/uploads/2016/09/catherine-joce.pdf

⁵⁰ Circular Advantage, Accenture, 2014

Sharing Platforms: Enable increased utilization rate of products by making possible shared use/access/ownership *for example Share Oxford* (<https://shareoxford.org/>)

Product as a Service: Offer product access and retain ownership to internalise benefits of circular resource productivity *for example Girl Meets Dress*

(<https://www.girlmeetsdress.com/blog/celebrity-dresses/dress-hire-in-oxford/>)

Circular economy business support schemes and accelerators

Both Zero Waste Scotland (ZWS)⁵¹ and the London Waste and Recycling Board (LWARB) through their Advance London⁵² project offer tailored circular economy business support services for SME's. LWARB also runs a Circular London accelerator programme in partnership with the Carbon Trust. These projects offer opportunities to create and support new businesses in the circular economy space. Circular economy can also be encouraged as an area of focus in traditional accelerators and incubators.

Making space for circular businesses

New and growing circular businesses need a variety of different spaces to succeed. Digital sharing platforms based companies need very little space whereas a company such as Chips Board⁵³ making plastic alternatives from potato waste needs development and testing space. The LIS states 'Oxfordshire has a wealth of innovation potential in technologies and industries with growing global markets. However, many of our businesses struggle to grow to scale and commercialise and export these technologies. To unlock our growth potential in this area we need to improve access to finance, business support and appropriate business space.'⁵⁴

Oxfordshire and local policy should make allowance for small business flexible working space and facilities where they can grow and develop their circular propositions, products, services and technologies.

Planning requirements for shared asset facilities could be adopted within Oxfordshire and local planning policy. For example, a community of large and small businesses could access shared plant and equipment to reduce their total resource needs (and buying duplicate equipment.)

⁵¹ <https://www.zerowastescotland.org.uk/circular-economy/business-support-service>

⁵² <https://www.advancelondon.org/>

⁵³ <https://www.chipsboard.com/>

⁵⁴ Oxfordshire Local Industrial Strategy, OxLEP, 2019

7. Challenges and opportunities

A summary of the challenges and opportunities that have become evident through the course of writing this report are detailed below. More detail on the challenges and opportunities can be found at appendix 7.

Challenge	Opportunity
Oxfordshire County Council's suite of strategies lack commitments to circular economy, meaning it may be overlooked in implementation plans	Include circular economy as a high level statement in the Oxfordshire Plan 2050 (OP2050) and wider Oxfordshire planning policy, and adopt a circular economy statement approach as developed in the draft London Plan
	Include circular economy in future iterations of the LIS, it's associated action plans and the investment portfolio alongside the low carbon sector
	Include circular economy in other strategies as they are updated including the Local Transport Plan (review due in 2020) and the review of OCC procurement policy
	Develop a short/medium term action plan on circular economy to gain momentum and build the local evidence base
Maintaining Oxfordshire's leadership position as a net contributor to the UK economy	Develop Oxfordshire as a circular leader (in policy and with examples of existing good practice and innovation)
	Create, or build on an existing cross sector network, to build knowledge and experience around circular economy in the county
Shortage of space for circular community activity and businesses (for example, "Library of Things" operations within residential and business communities)	Include planning policy to ring fence space for circular economy activities (including community hubs) and businesses. (some will be commercial business, some community-led, some in social-purpose business area)
National Planning Policy Framework (NPPF) constrains how much OCC can support/require ambitious energy, mobility, service based and circular low carbon opportunities in new developments	Innovation within the planning system led by innovation team at OCC. Build on work on mobility in partnership with Homes England to look at circular economy opportunities. Build the demonstration case for how circular economy contributes to NPPF objectives while

	delivering carbon benefits in parallel. Potential to look how circular service/remanufacturing business model could drive local economic development
Focus of the Local Industrial Strategy is purely on hi tech sectors	Extend cornerstone and breakthrough sectors in the Oxfordshire Local Industrial Strategy to create more balance - include circular economy and low carbon sectors Broaden OCC definition of what falls within "hi tech" scope - e.g. a circular economy business model with a hi tech back-end.
	Explore the opportunities within the agricultural and food sectors to embed circular economy principles in the county
Lots of good projects and businesses in Oxfordshire that are not acknowledged as part of the circular economy scene that gives access to funding, investment and prestige	Develop a directory of Oxfordshire businesses that have circular economy elements in their offer
There are many interesting individual and test circular economy projects that are developing within the county and wider that need to be scaled up to have maximum impact.	Oxfordshire as host of circular economy Living Lab for the UK
	Include circular economy projects in Local Industrial Strategy investment prospectus.
Oxfordshire's current carbon targets don't reflect consumption impacts of government, businesses and residents the county	Develop the evidence base on consumption to inform carbon targets. Review targets and associated action plans.
Funding - very often, circular economy projects need some catalyst funding to get them going. Whilst investment is very possible, it takes time and effort. The future of the UK's access to European funding post Brexit is in the balance at the time of writing.	Committing to circular economy within OP2050 and many of the other opportunities here will signal to the wider community that Oxfordshire is the place to do circular economy business. This will support funding applications and investment potential.
Oxfordshire businesses not aware of circular economy and its benefits	Create a new circular economy business support service within existing business innovation and support systems. Share experience through existing accelerators and incubators.

8. Recommendations

- 8.1. Build circular and sharing economy into OP2050, and wider Oxfordshire planning policy, as a guiding theme with high level statement of support to make sure there is always scope for including circular/sharing requirements in future projects and approaches;
- 8.2. Review other upcoming strategy reviews and consider the relevance of including circular economy to build strength across the organisation;
- 8.3. Develop a short/medium term action plan on circular economy to gain momentum and build the local evidence base including plans on sustainable consumption;
- 8.4. Upskill key staff in circular economy knowledge and experience - including executive team - to ensure opportunities are identified and shared with relevant colleagues;
- 8.5. Be part of the international community building the circular economy evidence base through networks such as the Circular Economy Club and the Ellen MacArthur Foundation;
- 8.6. Integrate circular economy into current business support offering by seeking internal and external funding;
- 8.7. Review carbon targets in the light of consumption figures.

9. Appendix 1: Circular economy policy examples

	Where?	Links
Circular economy strategy/plan	Amsterdam	https://www.circle-economy.com/wp-content/uploads/2016/04/Circular-Amsterdam-EN-small-210316.pdf
	Peterborough	http://www.futurepeterborough.com/wp-content/uploads/2018/05/PREVIEW_Peterboroughs-Circular-City-Roadmap.pdf
	London	https://www.lwarb.gov.uk/wp-content/uploads/2015/04/LWARB-London%E2%80%99s-CE-route-map_16.6.17a_singlepages_sml.pdf
	Paris	https://api-site-cdn.paris.fr/images/97397
	Yorkshire and Humberside LEP	https://www.businessinspiredgrowth.com/circular-economy-strategy-action-plan/
	Circular economy strategies and roadmaps in Europe: Identifying synergies and the potential for cooperation and alliance building	https://circulareconomy.europa.eu/platform/sites/default/files/qe-01-19-425-en-n.pdf
Spatial plan	London (in draft)	https://www.london.gov.uk/sites/default/files/draft_london_plan_-_showing_minor_suggested_changes_july_2018.pdf
	Amsterdam	https://www.iamsterdam.com/en/business/news-and-insights/circular-economy
Economic development / industrial strategy	London	https://www.london.gov.uk/sites/default/files/economic-development-strategy-2018_1.pdf
Procurement	Toronto	https://www.toronto.ca/legdocs/mmis/2018/gm/bgrd/backgroundfile-115664.pdf
	London	https://www.london.gov.uk/sites/default/files/gla_group_rpp_v7.12_final_template_for_web.pdf

10. Appendix 2: Extrapolation of circular economy study data

			Population (2018)	CE benefit £	£ CE benefit per capita
London		Part business, part societal benefits	8,770,000	7,000,000,000	798
Netherlands		Business benefits	17,000,000	6,440,000,000	379
Scotland		Business benefits	5,295,000	3,000,000,000	567
<i>Average</i>					<i>581</i>
EU		Societal benefits included	512,800,000	552,000,000,000	1,076
		Societal benefits included		1,656,000,000,000	3,229
UK		Business benefits (TBC)	64,769,452	23,000,000,000	355
Oxfordshire	Using UK average value (knowing that Oxfordshire is a net contributing region therefore likely to be above this)		687,500	244,135,152	355
	Using average for London, NL and Scotland from above		687,500	399,568,438	581
	Using EU low value		687,500	740,054,602	1,076
	Using EU high value		687,500	2,220,163,807	3,229

11. Appendix 3 - Circular economy synergies with other similar sectors in Oxfordshire

	Aim	Opportunity/added value
Smart Oxford	Our aim is to build a stronger, safer, economically and environmentally sustainable city, to help its people to identify and be part of city solutions, to provide a testbed for world class researchers and innovators, to generate growth and jobs, to advance economic & social prosperity, and to help improve the quality, effectiveness and efficiency of city services. By 'smart' we mean creating an environment and infrastructure that engages with the current step-change in digital technologies to support the generation & sharing of city information and to facilitate the development of innovative city-related solutions more effectively, cheaply, sustainably, fairly and inclusively.	• Digital technology is a huge enabler for the circular economy – all the sharing economy is enabled by IoT, many giving social benefits, e.g. Globechain, Olio. Specifically: knowing where assets are, who's using them and what condition they're in. • Many Smart solutions are circular – but would be a useful check back to ensure Smart solutions are/could also be circular and not storing up resource issues for the future - could a circular business model be employed? • Brings a new stream of activity with new funding attached • What are the city circular economy challenges that can be explored?
GreenTech	• Create jobs and economic growth by promoting Oxfordshire as a centre for low-carbon solutions. • Support local organisations to develop services and products that enable low-carbon, resilient lifestyles. • Facilitate cross-sector collaborations through a forum for innovation and partnership-working. • Provide a platform for our members to showcase how they	• Circular economy is already a special interest group in the Oxfordshire GreenTech network bringing experience of circular business models and case studies to businesses in Oxfordshire • There are some really exciting and innovative circular economy businesses to showcase

	are creating a low-carbon, sustainable world	
Low Carbon Hub	Each year, Oxfordshire spends £1.5 billion on energy. By encouraging energy efficiency, increasing local energy generation, supporting the shift to electric transport and championing community ownership, Low Carbon Hub is ensuring that more of this money stays local. In the process, we are creating a better energy template for not just Oxfordshire but the whole of the UK.	● Energy efficiency, renewable energy and mobility are key parts of a circular economy ● Some low carbon solutions are circular – but would be a useful check back to ensure Smart solutions are/could also be circular and not storing up resource issues for the future e.g. end of life of solar panels Could a circular business model be employed?
One Planet Oxfordshire	One Planet Oxfordshire is bringing together a wide range of local councils, organisations, businesses, schools and community groups from across the county to collaboratively create a ‘One Planet Action Plan’ for a better, more sustainable future. The plan is structured using Bioregional’s One Planet Living framework. These ten simple principles – from health and happiness and sustainable food to zero carbon energy – provide a common language to talk about sustainability and to drive positive change.	● Circular economy is included in the One Planet Oxfordshire action plan ● Link to Community Action Groups – great network for disseminating circular economy ideas to people with willing ears, brains and hands!

12. Appendix 4 - heat map of opportunities and activities

This heat map aims to identify existing activities and future opportunities against a range of themes. We have mapped OP2050 themes (economic growth, housing, communities, connectivity, etc.) against factors that we think are good enablers of circular economy - policy, procurement, communications, innovation and so on.

Example

Linking *policy* with *economic growth*: a relatively easy opportunity with a high impact is to set a high-level commitment to circular economy in spatial planning. Another high-impact action is to target the “right kind” of economic growth (low carbon/circular economy) but this is harder.

An action with a medium impact is to offer favourable terms to circular businesses - again, this might be challenging and only have a moderate impact across the county.

Fostering business interest in circular economy through interest groups is already happening but is likely to have a limited impact over the short- to medium-term.

Easier actions are listed in green. Harder ones are in orange. Where we have identified existing actions already in progress we’ve written those in blue. Our assessment of “ease” is subjective and we welcome an opportunity to review this in more detail with OCC.

Key	Happening already
	Idea - “easier” win
	Idea - more complex

		Economic growth
Policy	High impact	High level commitment to CE in spatial plan Targeting the right kind of economic growth - low carbon circular economy
	Medium impact	Beneficial terms for organisations with circular business models (e.g. business rates)
	Low impact	Grow business interest in CE through a Special Interest Group (or similar groups)

13. Appendix 5 - Circular economy references in the draft London Plan (due to be published in spring 2020)

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan>

Policy GG6 Increasing efficiency and resilience

To help London become a more efficient and resilient city, those involved in planning and development must:

A seek to improve energy efficiency and support the move towards a low carbon circular economy, contributing towards London becoming a zero carbon city by 2050.

3.1.10 To minimise the use of new materials, the following circular economy principles (see also Figure 3.1) should be taken into account at the start of the design process:

- building in layers - ensuring that different parts of the building are accessible and can be maintained and replaced where necessary
- designing out waste - ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build and re-use of secondary products and materials
- designing for adaptability
- designing for disassembly
- using materials that can be re-used and recycled.

Large-scale developments in particular present opportunities for innovative building design that avoids waste, supports high recycling rates and helps London transition to a circular economy, where materials, products and assets are kept at their highest value for as long as possible. Further guidance on the application of these principles is provided in London's circular economy route map

3.1.12 Figure 3.1 shows a hierarchy for building approaches which maximises use of existing materials. Diminishing returns are gained by moving through the hierarchy outwards, working through refurbishment and re-use through to the least preferable option of recycling materials produced by the building or demolition process. The best use of the land needs to be taken into consideration when deciding whether to retain existing buildings in a development. Figure 3.1 - Circular economy hierarchy for building approaches

3.7.11 The provision of accessible free drinking water fountains helps improve public health, reduces waste from single-use plastic bottles and supports the circular economy through the use of reusable water bottles. Free drinking water fountains that can refill water bottles as well as be drunk from should be provided in appropriate locations in new or redeveloped public realm. Appropriate locations for these water fountains should be identified by boroughs during the planning process. These locations include areas with high levels of pedestrian activity, such as in town centres and inside shopping malls, as well as areas of the public realm used for play, exercise and relaxing, such as parks and squares. The ongoing management and maintenance of facilities should be secured and agreed at

planning stage to ensure long-term provision is achievable.

Policy SI7 Reducing waste and supporting the circular economy

A Waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:

- 1) promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible
- 2) encourage waste minimisation and waste avoidance through the reuse of materials and using fewer resources in the production and distribution of products
- 3) ensure that there is zero biodegradable or recyclable waste to landfill by 2026
- 4) meeting or exceeding the recycling targets for each of the following waste streams and generating low-carbon energy in London from suitable remaining waste:
 - a) municipal waste– 65 per cent by 2030
 - b) construction, and demolition and excavation waste – 95 per cent by 2020
- 5) designing developments with adequate and easily accessible storage space that supports the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

B Referable applications should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted, to demonstrate:

- 1) how all materials arising from demolition and remediation works will be re-used and/or recycled
- 2) how the proposal's design and construction will enable building materials, components and products to be disassembled and re-used at the end of their useful life
- 3) opportunities for managing as much waste as possible on site
- 4) adequate and easily accessible storage space to support recycling and re-use
- 5) how much waste the proposal is expected to generate, and how and where the waste will be handled.

Waste is defined as anything that is discarded. A circular economy is one where materials are retained in use at their highest value for as long as possible and are then re-used or recycled, leaving a minimum of residual waste. London should move to a more circular economy as this will save resources, increase the resource efficiency of London's businesses, and help to reduce carbon emissions. The successful implementation of circular economy principles will help to reduce the volume of waste that London produces and has to manage.

9.7.4a It is recognised that the particular characteristics of excavation waste are such that it is extremely difficult to recycle this waste stream. The Mayor expects referable applications to demonstrate through a supporting Circular Economy Statement that the best environmental option practicable for the management of excavation material will be used. This could, for example, include using the material as a resource within the construction of the proposed development or seeking opportunities for such material to be used in other local construction projects.

Policy SI8 Waste capacity and net waste self-sufficiency

A In order to manage London's waste sustainably:

- 1) the equivalent of 100 per cent of London's waste should be managed within London (i.e. net self-sufficiency) by 2026
- 2) existing waste management sites should be safeguarded (see Policy SI9 Safeguarded waste sites)
- 3) the waste management capacity of existing sites should be optimised
- 4) new waste management sites should be provided where required
- 5) environmental, social and economic benefits from waste and secondary materials management should be created.

B Development Plans should:

- 1) identify how waste will be reduced, in line with the principles of the Circular Economy and how remaining quantum of waste will be managed
- 2) allocate sufficient land and identify waste management facilities to provide the capacity to manage the apportioned tonnages of waste, as set out in Table 9.2 - boroughs are encouraged to collaborate by pooling their apportionment requirements
- 3) identify the following as suitable locations to manage borough waste apportionments:
 - a) existing waste and secondary material sites/land, particularly waste transfer facilities, with a view to maximising their capacity
 - b) Strategic Industrial Locations and Locally Significant Employment Sites / land
 - c) safeguarded wharves with an existing or future potential for waste and secondary material management.

9.8.16 Waste processing facilities should be well designed. They should respect context, not be visually overbearing and should contribute to the local economy as a source of new products and new jobs. They should be developed and designed in consultation with local communities, taking account of health and safety within the facility, the site and adjoining neighbourhoods. Developments supporting circular economy outcomes such as re-use, repair and re-manufacture, will be encouraged. Where movement of waste is required, priority should be given to facilities for movement by river or rail. Opportunities for combined heat, power and cooling should be taken wherever possible. Although no further landfill proposals in London are identified or anticipated within the Plan period, if proposals do come forward for new or extended landfill capacity or for land-raising, boroughs should ensure that the resultant void-space has regard to the London Environment Strategy.

9.10.3 Aggregates are bulky materials so Development Plans should maximise their use and re-use and minimise their movement, especially by road. The objective of proximity dictates the best and most local use of materials that can be extracted in London. The re-use/recycling of building materials and aggregates is a significant and well established component of the circular economy advocated in Policy SI7 Reducing waste and supporting the circular economy and reduces the demand for natural materials.

Waste and Circular Economy Infrastructure

11.1.52 As London's population increases so will the amount of waste it produces both at home and in the workplace. Continuation of the current linear economy - where we take resources, make products, use them until the end of their lifetime and then

dispose of them – would require significant investment in additional waste infrastructure to cope with this increase.

11.1.53 Transitioning to a circular economy, however, would bring about a net annual benefit of £7 billion by 2036 according to the London Waste and Recycling Board Circular Economy Route Map. This is because the circular economy is restorative and regenerative by design. Relying on system-wide innovation, it aims to redefine products and services to design out waste, while minimising negative impacts. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural and social capital.

11.1.54 Business will lead the transition to a circular economy, often through start-ups identifying a market opportunity. The investment required by these businesses will be a mixture of venture capital and equity, some of which will come from commercial investors but some of which will need to come from the public and not-for-profit sectors. The GLA and London Waste and Recycling Board have identified budget to invest in circular economy businesses on commercial terms, but accelerating the transition to a circular economy will require more investment.

9.8.11 To support the shift towards a low-carbon circular economy, all facilities generating energy from waste should meet, or demonstrate that they can meet in future, a measure of minimum greenhouse gas performance known as the carbon intensity floor (CIF). The CIF is set at 400g of CO₂ equivalent generated per kilowatt hour (kwh) of electricity generated. The GLA's free on-line ready reckoner tool can assist boroughs and applicants in measuring and determining performance against the CIF¹³³. Achieving the CIF effectively rules out traditional mass burn incineration techniques generating electricity only. Instead, it supports techniques where both heat and power generated are used, and technologies are able to achieve high efficiencies, such as when linked with gas engines and hydrogen fuel cells. More information on how the CIF has been developed and how to meet it can be found in the London Environment Strategy.

14. Appendix 6 - more detail on modular homes

The modular/prefabricated housing market has enjoyed steady growth over the past four years, up by 6.1% compound annual growth rate (CAGR) between 2014-17. The UK was the strongest market, jumping by 12.2% CAGR to around 12,000 units in 2017. Germany remains the stronger market in terms of absolute numbers, totalling 25,000 units in 2017.⁵⁵ There was some interest in exploring this area when we spoke to the OCC Innovation team.

Stated advantages of the modular building technique include:

- more affordable as they, on average, take about 50% of the time of a traditional build
- use less skilled labour as the modules are built in a factory production line type environment
- built indoors, poor weather doesn't stop work
- standardised, they create less waste and use less energy to make
- require less time to install on site giving less impact on the construction site

There is much discussion on the comparative carbon emissions of modular homes as compared to traditional builds. Overall, it seems that modular homes are less carbon intense. One research paper from the US on the topic stated that, on average GHG emissions from conventional construction were about 40% higher than for modular construction.⁵⁶ Of course, the choice of build materials and the energy efficiency of any home will impact its overall carbon as well as the build technique. Both Legal and General⁵⁷ and Berkeley Homes⁵⁸ have modular homes factories in the UK making 4000 and 1000 homes respectively each year.

⁵⁵ Consultancy Europe.eu, March 2018, <https://www.consultancy.eu/news/639/prefabricated-housing-market-in-central-and-northern-europe-on-the-rise>

⁵⁶ Construction Matters: Comparing Environmental Impacts of Building Modular and Conventional Homes in the United States, ResearchGate, 2012

⁵⁷ <https://www.legalandgeneral.com/modular/>

⁵⁸ <https://www.berkeleygroup.co.uk/about-us/our-brands/berkeley-modular>

15. Appendix 7 - full version of challenges and opportunities

Challenges

Oxfordshire County Council's suite of strategies lack commitments to circular economy

Due to the emergence of the circular economy in the last five years, few local authority documents reference and make commitments to circular economy principles as the strategies were written before development of the early evidence base. The OCC strategy that does include circular economy is the new Oxfordshire Resources and Waste Strategy 2018 - 2023. The strategy refers to circular economy and commits to 'embrace the circular economy, embedding it into council practices and procurements in order to minimise waste generation in the future', 'promote the circular economy to residents, and lobby Government to make it an essential part of national strategy' and 'work with OxLep and Growth Board to embed circular economy principles into Oxfordshire's growth agenda'. Whilst the inclusion in the Resources and Waste Strategy is strong, to send a message to the business community that Oxfordshire is a good home for circular economy businesses it requires more emphasis in other documents such as the Local Industrial Strategy.

Maintaining Oxfordshire's leadership position as a net contributor to the UK economy

To maintain this position the county will have to be looking for new sectors and approaches to keep at the cutting edge of available opportunities, including ones that offer opportunities such as circular economy that offer accessible jobs to the wider community.

Shortage of space for circular community activity and businesses (for example, "Library of Things" operations within residential and business communities)

Space for start ups and growing businesses is an acknowledged issue for the county through the LIS.

National Planning Policy Framework constrains how much OCC can support/require ambitious energy, mobility, service based and circular low carbon opportunities in new developments

Concerns are shared by both the planning and innovation teams at OCC as to whether the National Planning Policy Framework (NPPF) gives enough scope to go above and beyond the minimum standards set for energy, mobility and low carbon. OCC will need to work through planning and policy to highlight where service based provision makes sense both commercially and policy wise.

Focus of the Local Industrial Strategy breakthrough businesses purely on hi tech sectors

The business sectors identified in the LIS breakthrough business section are quite narrowly focussed on hi tech businesses which whilst good for growth might not bring wider community benefits.

Lots of good circular economy community projects and businesses in Oxfordshire that are not acknowledged as part of the circular economy scene that gives access to funding, investment and prestige

There are many interesting individual and test circular economy projects that are developing within the county and wider that need to be scaled up to have maximum impact.

Oxfordshire's current carbon targets don't reflect consumption impacts of government, businesses and residents the county

Funding

Very often, circular economy projects need some catalyst funding to get them going. Whilst investment is very possible, it takes time and effort. The future of the UK's access to European funding post Brexit is in the balance at the time of writing.

Oxfordshire businesses not aware of circular economy and its benefits

Opportunities

Include circular economy as a high level statement in the Oxfordshire Plan 2050 (OP2050) and adopt a circular economy statement approach as developed in the draft London Plan

The time is right as the planning team go into a process of developing new policies for OP2050 to include circular economy using the evidence in this study as a starting point. This demonstrates a commitment to the principles and gives members and officers the opportunity to explore, influence and prioritise circular economy potential throughout the plan period.

The draft London Plan⁵⁹ includes a high level low carbon circular economy policy hook as follows: “To help London become a more efficient and resilient city, those involved in planning and development must: seek to improve energy efficiency and support the move towards a low carbon circular economy, contributing towards London becoming a zero carbon city by 2050.”

The draft plan also includes circular economy building design principles and a policy on developing circular economy statements as part of referable planning applications. The plan is due to be published in spring 2020. A summary of all references to circular economy in the draft London Plan can be found at appendix 5. These circular economy statements would be in a similar to the energy statements required in the draft Oxford Local Plan.⁶⁰

Include circular economy in future iterations of the LIS, it's associated action plans and the investment portfolio alongside the low carbon sector

Include circular economy in other strategies as they are updated including the Local Transport Plan (review due in 2020) and the review of OCC procurement policy

Develop a short/medium term action plan on circular economy to gain momentum and build the local evidence base

Develop Oxfordshire as a circular leader

Oxfordshire has many enabling conditions that make it ripe to accelerate the circular economy - the research capabilities of the universities, the concentration of low carbon businesses and an informed community that interested in sustainability action to name a few. There is a real opportunity now for Oxfordshire to develop itself as a world leader in innovation, testing and developing a low carbon circular economy sector making use of the skills and experience of the universities and relevant businesses. The Saïd Business School already have a Circular Economy Lab⁶¹ focusing on research,

⁵⁹ <https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan>

⁶⁰ Oxford Local Plan 2036 - Proposed Submission Draft Policy RE1: Sustainable design and construction

⁶¹ <https://www.sbs.ox.ac.uk/research/centres-and-initiatives/skoll-centre-social-entrepreneurship/social-impact-education/circular-economy-lab>

tools, teaching and events to accelerate and amplify the innovation necessary to transition to a circular economy.

Create, or build on an existing cross sector network, to build knowledge and experience around circular economy in the county

A circular economy cannot be achieved by businesses and the public sector working in silos, collaboration is key. It would be useful to review the success of initiatives such as Project Leo⁶² to see if a similar approach for circular economy might be appropriate. Project Leo is cross sector working group around renewable energy in the county.

Include planning policy to ring fence space for circular economy activities (including community hubs) and businesses. (some will be commercial business, some community-led, some in social-purpose business area)

Innovation within the planning system led by innovation team at OCC. Build on work on mobility in partnership with Homes England to look at circular economy opportunities.

The Innovation Team at OCC are working with Homes England to see how they can meet governments legal needs around transport provision whilst also pushing the boundaries to create a more sustainable service for residents. This pilot is happening with a couple of willing companies including Grosvenor. It would be groundbreaking to try a similar approach with circular economy housing innovations.

It would be useful to reflect on the early stages of the NW Bicester Eco Town development with BioRegional, lead developer A2Dominion and the planning authority, Cherwell District Council to see if there is any planning learning to be taken into account for other projects. One interviewee suggested that an OCC officer with a brief to share planning learning on sustainability outcomes of developments would be extremely useful. Grosvenor do this for themselves once a quarter. By gathering information centrally and sharing with all developers this would serve to push the market forward.

Build the demonstration case for how circular economy contributes to NPPF objectives while delivering carbon benefits in parallel.

Potential to look how circular service/remanufacturing business model could drive local economic development

Extend cornerstone and breakthrough sectors in the Oxfordshire Local Industrial Strategy to create more balance- include circular economy and low carbon sectors.

There is clearly a focus in Oxfordshire on the high-tech sectors in the current Local Industrial Strategy (LIS). It would be a change for the county to include a focus on a low carbon circular economy sector, some of which is hi tech and some quite low tech. However, here is a sector that can meet the needs of a growing and community focussed county. should have a focus on having a balance between growth and businesses that bring wider benefits to the county such as the low carbon circular economy sector and agriculture.

Explore the opportunities within the agricultural and food sectors to embed circular economy principles in the county

⁶² <https://www.energy.ox.ac.uk/wordpress/project-leo-local-energy-oxfordshire/>

Develop a directory of Oxfordshire businesses that have circular economy elements in their offer

Oxfordshire as host of circular economy Living Lab for the UK

There are many interesting individual and test projects that are developing within the county that need to be scaled up to have maximum impact. For example, learning and operational detail from Share Oxford, could be replicated in other towns and villages in the county. In London, the Library of Things has created a franchise like opportunity for others to set up in different parts of the city.

Other ideas such as building for disassembly, whilst having been explored at a single building level, need to be tested at scale. Oxfordshire could create a circular housing living lab in some of the soon to be developed areas such as the Garden Village at Eynsham, the Northern Gateway site and the Grenoble Road site (has particularly interesting transport and business connections).

Include circular economy projects in Local Industrial Strategy investment prospectus.

Investigate/innovate around circular economy ideas that could be added to the investment prospectus that supports the delivery of the Local Industrial Strategy. For example, one idea that received positive feedback from Richard Byard from OxLEP, was around shared electric vehicles with community based mobility hubs. Shared EV's increases access within the community and the service element means that items such as electricity charging points and street lights can be repaired and re-used/remanufactured as necessary, keeping carbon lower, increasing local skills.

Develop the evidence base on consumption to inform carbon targets. Review targets and associated action plans.

Committing to circular economy within OP2050 and many of the other opportunities here will signal to the wider community that Oxfordshire is the place to do circular economy business. This will support funding applications and investment potential. This will be crucial in using levers such as Section 106, Community Infrastructure Levy, Inclusive Growth Commission and UK Shared Prosperity Fund, DfT infrastructure funding and Innovate UK.

Create a new circular economy business support service within existing business innovation and support systems. Share experience through existing accelerators and incubators.