



LWARB
London Waste and Recycling Board



LONDON'S CIRCULAR ECONOMY ROUTE MAP

 Circular London



Circular economy has the potential to play a key role in achieving our environmental targets by keeping materials and products in use for longer, re-using and remanufacturing them. LWARB's route map outlines how we can take advantage of this opportunity and I look forward to seeing examples of circular economy throughout the city inspiring others to replicate London's success."

Shirley Rodrigues
Deputy Mayor for Environment and Energy



Saint-Gobain is both delighted and excited to support London's Circular Economy route map and through active collaboration with like-minded organisations looks forward to the challenge of accelerating the circular economy. This is central to our purpose to deliver a sustainable built environment that meets the needs of individuals and communities."

Andy Turner,
Strategic Development Director
and Director of Resource Services
Saint-Gobain Limited



This route map acknowledges the role London boroughs play in accelerating the growth and development of the circular economy across the capital and sets out an ambitious plan of action. We look forward to rising to this challenge and ensuring our residents see the environmental and financial benefits as London grows and changes in the years to come."

Cllr Julian Bell, Chair of London Councils'
Transport and Environment Committee,
London Councils

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This route map outlines a vision of a capital city thriving through the adoption of the principles of circular economy: an economy which keeps products, components and materials at their highest use and value at all times. It looks forward to an alternative to the current linear economy – defined as one in which we make, use and then dispose of products, components and materials – and it comes with significant benefits.



This route map is a first step in a journey to a London where it is commonplace for both businesses and consumers to access services rather than own products, to get furniture remanufactured instead of buying new, or where we can rent tools and equipment instead of buying them. On a larger scale our houses and infrastructure will be built in a way that allows the materials in them to be re-used or adapted. Businesses will see the benefit in recovering their products to remanufacture and re-sell them or recover parts and materials.

The potential prize is significant: London could receive a net benefit of up to £7bn a year by 2036 if we accelerate our transition, £2.8bn of which can be accessed by delivering the actions in this route map document. The other £4.2bn of benefit comes from the UK, Europe and the world embracing circular economy.

Collaboration is vital if we are to achieve this. We are working closely with the GLA (particularly on policy and procurement) and many other stakeholders in our focus areas of built

environment, food, textiles, electricals and plastics in order to leverage this opportunity for the capital. We're also collaborating with organisations such as the Ellen MacArthur Foundation, WRAP and the C40 to play our part in making this happen.

Our vision is for London to be the global leader in the delivery of circular economy, sharing learning and good practice with other cities around the world. This will make a substantial contribution to the Mayor's aspiration to become a zero carbon city by 2050.

The London Waste and Recycling Board (LWARB) has a circular economy programme which brings together £50m of investment to 2020, as well as setting up targeted demonstration projects, creating a collaboration hub, communicating circular economy benefits and inspiring policy development in the capital.

I urge you to join LWARB in bringing this route map to life for London.

Liz Goodwin OBE
Chair of LWARB



As the centres for innovation and economic activity, cities not only possess great catalytic power in driving the circular economy agenda forward, but are also amongst the greatest beneficiaries of such a transition. London has become a prime player in leading this transition, and with this new route map providing recommendations across key areas, it will without a doubt inspire other progressive cities along this path.”

Andrew Morlet, CEO,
Ellen MacArthur Foundation



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.”

Marcus Gover, Chief Executive, WRAP



Every office in London could be more circular. For example, maximising the reuse of unwanted business IT equipment is a no brainer: it generates revenues for the business, reduces environmental impacts and contributes to society by supporting work programmes for disadvantaged groups. Getting involved in the circular economy route map for London will help businesses find the networks to get started.”

Bridget Jackson
Director of Corporate Sustainability
PwC UK

INTRODUCTION



Cities are the engine room of the circular economy. Globally, for the first time ever, more than half of the world's population lives in urban areas. It is the power of cities that will drive the global development of the circular economy – an approach which provides a sustainable and profitable alternative to the way our economy currently works.

The current economy is linear, which means that things are made with virgin raw materials, used and then thrown away. In contrast, a circular economy keeps products and materials circulating within the economy at their highest value for as long as possible, through re-use, recycling, remanufacturing, delivering products as services and sharing.

A circular economy approach is not only more resource efficient but also protects businesses from fluctuating commodity prices. It provides an opportunity to develop a more stable operating environment for manufacturers, retailers and consumers. Circular economy business models may be of particular benefit to London in the post-Brexit economic environment creating the possibility of new revenue streams, markets and product lines.

This is LWARB's vision for London – a circular city which capitalises on these opportunities to become a more resilient, resource-efficient and competitive city of the future. Elsewhere in the UK others are aspiring to do the same, including cities such as Glasgow and Peterborough.

Other leading cities such as Amsterdam, Barcelona, Copenhagen, Paris and Phoenix are starting to develop circular economy actions and strategies too. This is a truly global movement; and because the circular economy embraces new business models that rely on new technology, it has the ability to be active at both the community level and the global corporate level.

London is growing fast. The capital's population is predicted to reach over 11 million by 2050, making a more flexible and sustainable approach to products, housing, office space and critical infrastructure crucial to London's ability to adapt and grow. The circular economy provides a sustainable and profitable solution to the challenges of this dramatic growth: by 2036, the circular economy could provide London with net benefits of at least £7bn every year¹ and 40,000 new jobs (12,000 net additional jobs) in the capital by 2036 in the areas of re-use, remanufacturing and materials innovation.²

The route map is an action-orientated document, developed in partnership with relevant London stakeholders. It is

conservatively estimated that the actions in the route map can contribute £2.8bn towards the £7bn opportunity identified.

LWARB, through this and continuing work, is positioning itself as the lead facilitator of circular economy activity in London, not just through collaboration but by developing and investing in circular economy business in London. The city is already home to a number of exciting circular businesses across a range of sectors, each one of them already contributing to the capital's economy, demonstrating that London is an outward looking city with one of the most open and dynamic economies in the world. London is open.

Our ambition is that, through collaborations with circular economy businesses and the work of stakeholders and policy makers across the capital, London will become the world's leading exponent of circular economy thinking and practice.

¹ LWARB: Towards a circular economy www.lwarb.gov.uk/what-we-do/accelerate-the-move-to-a-circular-economy-in-london/towards-a-circular-economy (2015)

² London Sustainable Development Commission: Employment and the circular economy – job creation through resource efficiency in London www.londonsdc.org/circular-economy/default-Copy-Copy.aspx (2015)

CONTEXT AND NEXT STEPS

This route map follows on from the context and opportunities document 'Towards a circular economy' published in December 2015.

The route map comprises of:

- Details of the cross cutting themes that will help to create the right conditions to accelerate the circular economy.
- Recommendations to support these themes and put them into practice in the capital.

For each of the five focus areas identified in 'Towards a circular economy' – built environment, food, textiles, electricals and plastics – this document goes on to outline:

- LWARB's vision for a more circular economy for London.
- Key challenges we need to address
- Some examples of organisations and projects that are already working in this space.
- Short, medium and long term action and policy options that set out how London can make progress towards its circular economy vision.

For each of the five focus areas, the recommended action and policy options have been developed with groups of expert and experienced stakeholders from the relevant sectors, through a series of facilitated workshops.

NEXT STEPS

LWARB will work with the GLA using the recommendations in this route map to inform the development of upcoming strategies, including the London Environment Strategy. LWARB has signed up to a number of actions within the route map that will inform its circular economy programme to 2020 and invites stakeholders to take ownership of other actions.

The actions have associated outputs, outcomes and impacts as well as, where possible, resources identified. Resources fall into one of three categories as set out below:

- Resource identified and plan in place
- Partners interested – resource not identified.
- No resources identified.

The level of impact achieved will be directly related to the level of resources given to the activity. Timescales for actions have also been identified as short (to 2020), medium (2020 – 2027) and long term (2027 – 2036). 2036 was chosen as the end point for this route map to reflect the developing London Plan. The end point for the London Plan has now been updated to 2041, which further updates to this route map will reflect. LWARB will develop a set of key performance indicators to measure direction of travel towards a more circular economy in London.

As an organisation we encourage others with an interest in circular economy to sign up to the actions in this route map. LWARB will also put together cases for funding and resources to help deliver those actions, looking for support from corporates, foundations, trusts and both national and EU grants where appropriate.

We will also provide an update on the route map on an annual basis, to reflect progress and participation across the capital. We invite organisations of all kinds to join LWARB in supporting the actions in this document, and help us all move this exciting opportunity forward.

For more information or to get involved contact:

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CROSS CUTTING THEMES – CREATING THE RIGHT CONDITIONS TO ACCELERATE THE CIRCULAR ECONOMY



LWARB's 'Towards a circular economy' document sets out the context and opportunities for London. But what needs to happen to realise these opportunities? The following eight cross-cutting themes were identified by our stakeholder groups as being key to creating the right conditions for a circular economy to flourish in London.

1. COMMUNICATIONS

The benefits of a circular economy need to be shared more widely amongst different sectors to ensure greater adoption. Communications must be clear and relevant to the sector. Case studies of existing circular economy projects should be provided to help people understand the concept and see what it can mean in practice. There is also a need for informal circular economy ambassadors in organisations – LWARB has already started recruiting ambassadors in local authorities.

It is also important to collate learning from demonstrator projects. There is a need to share lessons learned on projects that didn't work so well, as well as celebrating the successful projects.

LWARB will start to collate relevant case studies on its website and become a hub for circular economy projects in London. We will also publish a series of blogs about circular economy in London to encourage a debate on challenging issues.

2. COLLABORATION

To enable the circular economy, collaboration right across the supply chain is essential, ensuring that everybody in that chain benefits. This collaboration should take place both across London, strategically between cities and locally at the community level. Whilst there is now plenty of information and resources available about implementing the circular economy, it is often a lack of collaboration that prevents further progress. A London circular economy hub would promote collaboration by facilitating and hosting

conversations between businesses, the public sector and academia. LWARB will start to develop this hub for London.

LWARB and the GLA are members of the Ellen MacArthur Foundation's Circular Economy 100 (CE 100) network³ in order to collaborate with other cities, regions and businesses that are exploring circular economy approaches. The CE 100 gives London the opportunity to share experiences and learn from others in the areas of policy development, business support, demonstration projects and innovation.

3. POLICY

The Mayor of London has varying degrees of influence and powers around economic development, planning, and transport as well as waste. The Mayor has committed to reinvigorate efforts to increase the amount London recycles, so that we get back on track with hitting the 65% target by 2030, creating more jobs through re-use, remanufacturing, materials innovation and to London becoming a zero carbon city by 2050. Circular economy can support the delivery of all these commitments. To achieve this the development of a circular economy should be accelerated by integrating the concept into London's policy framework.

Local authorities also play a key role in the move to a more circular economy. They have powers around housing, local plan development and implementation, economic development, waste management and health and well being.

Opportunities to lobby the UK government to promote circular economy as a way of supporting national growth, especially in the light of the decision to leave the EU, should also be explored. For example, the LWARB consultation response to the developing Industrial Strategy emphasised the role circular economy can play in strengthening our wider economy.

4. PROCUREMENT AND MARKET DEVELOPMENT

Public sector organisations procuring goods and services in London should challenge the markets to use new and innovative circular economy business models that are resource efficient and financially attractive. The Mayor and the GLA family are leading development in this area, and have started by updating their responsible procurement strategy. Each organisation that is part of the GLA family will be writing an action plan for the effective delivery of the updated policy.

Together, the GLA family of organisations (Greater London Authority, Transport for London, Mayor's Office for Policing and Crime and the London Fire and Emergency Planning Authority) spend almost £11 billion a year on goods and services.⁴ London's 32 boroughs and the City of London spend in the region of £20bn annually based on 2014/15 budgets.⁵

There are also opportunities to leverage the huge buying power of the private sector in London, especially if companies

join forces to pool their procurements. Many of the Ellen MacArthur Foundation's Circular Economy 100 businesses⁶ are based, or have a significant presence, in London and these companies are well placed to lead the way in this area.

Learning from others in this area is key and the GLA will look to partners and projects in Europe that are demonstrating good procurement practice, particularly the Green Deal for procurement⁷ in the Netherlands.

5. FINANCE

Availability of affordable capital will be critical in driving a move to a circular economy in London. Due to the innovative nature of some circular economy business models, businesses often find it difficult to access traditional types of finance. This may be down to a lack of understanding by the financial community of circular economy business models, their perception of risk, or because these new models are not compatible with existing lending criteria.

In particular there is a lack of funding available for circular SMEs who are too small to secure bank finance, have limited cash flow or do not have the high growth rates required to attract venture capital investment.

LWARB is proposing to tackle this by implementing an investment strategy which supports the development and growth of circular economy SMEs from

3 Ellen MacArthur Foundation: www.ellenmacarthurfoundation.org/ce100/member-groups

4 GLA: 2015-16 Final budget

5 GLA: 2015-16 Final budget

6 Ellen MacArthur Foundation: www.ellenmacarthurfoundation.org/ce100/member-groups

7 Circle Economy: www.circle-economy.com/green-deal-procurement/

start-up through to maturity, through incubation/acceleration, venture capital and private equity funds.

6. BUSINESS SUPPORT

Exploring, adopting or expanding circular models can be a complicated and time consuming process for businesses, particularly those that have limited resources. Providing specialist advisory services and support networks will be fundamental in helping companies make the transition to a more circular business approach, along with sharing best practice from real-life case studies.

Corporates and existing advisory firms can help to disseminate circular ideas and support through encouraging disruptive innovation within their supply chains.

LWARB has established Advance London,⁸ a circular economy business support programme that is funded in partnership with European Regional Development Funds. Advance London will provide help and advice to businesses seeking to scale up an existing circular economy business model or transition into circular economy business models. Working with other business support organisations in London will be key and LWARB has already built relationships with organisations such as Capital Enterprise and the Federation of Small Businesses to share learnings.

LWARB is also developing an accelerator programme for start-ups looking to

operate within the circular economy in 2017/18. London is such a vibrant place for start-ups and LWARB wants to channel that entrepreneurial spirit into accelerating the circular economy.

7. DEMONSTRATION

Demonstration projects and business model pilots are a great way to show other companies and policy makers how the circular economy can work in practice. London is an ideal place to host these and the city should aspire to have a number of flagship demonstrator projects across a range of sectors.

It is vital to capture the learning from these demonstrators, both positive and negative, to frame future projects. It is also important to find a set of metrics and indicators that allow comparison between demonstrators.

8. INNOVATION

There is a real opportunity for companies to gain competitive advantage in the market by offering circular economy approaches rather than more traditional ways of doing business. The circular economy is already leveraging technology to find new ways of working and changing consumer behaviour.

London is already at the forefront of the digital revolution, with an existing ecosystem of accelerators and incubators in place – and harnessing these skills will be critical in turning circular ideas into sustainable, value

adding products, services and businesses. There are already inspiring examples across the city of circular innovation that have the potential to be scaled up on a global basis, from bioscience, materials, the Internet of Things through to nanotechnology applications.

London's higher education community also has a lot to offer here, providing the opportunity to research and test some of the new ideas being developed in the capital and find solutions to challenges in implementing those ideas. Both Imperial College London and UCL have shown great interest in supporting the route map and have their own circular economy programmes.

RECOMMENDATIONS

LWARB will develop these recommendations to be smarter over the short term period of the route map by collaborating with the specific sectors mentioned.

The Mayor and the GLA

- That the Mayor takes a leadership role in the acceleration of the circular economy and sets a vision for London to be the global leader in a supporting circular business approach.
- That the GLA Group seeks to procure its goods and services in a way which develops the market for circular goods and services.
- That the Mayor incorporates circular economy into his main strategic documents such as the London Plan, the Environment Strategy, the Transport Strategy and Economic Development Strategy.

⁸ LWARB: Advance London www.lwarb.gov.uk/what-we-do/advance-london

London Waste and Recycling Board (LWARB)

- That LWARB acts as a hub for circular economy good practice, networks and learning for London.
- That LWARB works with stakeholders to identify and co-ordinate ways to support SMEs to use circular business models.
- That LWARB works with stakeholders to identify ways to access appropriate finance for SMEs working in the circular economy space, from start-ups to established businesses.
- That LWARB work on metrics to demonstrate the contribution circular economy can make to London's zero carbon city aspirations.

Private sector/trade bodies/business support organisations

- That the private sector analyses the opportunities that circular economy can bring to their businesses, exploring areas in which they can innovate.
- That the private sector looks to leverage its collective buying power to achieve good value outcomes from circular economy goods and services.

- That London-based business members of the Ellen MacArthur Foundation's CE 100 network come together and work with LWARB to pioneer new approaches in the acceleration of the circular economy at a city level.

Local authorities

- That local authorities explore ways in which circular economy business models can help them reduce costs and deliver improved services to residents.
- That local authorities look to develop local programmes to support the acceleration of the circular economy.

Education

- That London higher education institutions explore ways they can support the circular economy transition at a city level through research and shared experience.
- That the higher education institutions in London take on board identified challenges to the acceleration of circular economy as research opportunities.
- That education institutions at all levels develop teaching about the circular

economy, and skills to enable the transition to the circular economy.

Finance community

- That the London finance community explores the opportunity that circular economy presents and how it can respond to that opportunity.
- That the London finance community works collectively to address the issue of circular economy businesses not being able to access finance.

Digital community

- That the London digital community invests time in exploring the ways in which digital applications can enable the circular economy – for example in the areas of asset tracking and sharing.

Social enterprise and communities

- That social enterprises and communities continue to innovate and lead the way in delivering circular economy solutions to local challenges, creating not only environmental but also social benefits.

BUILT ENVIRONMENT



One of the challenge facing London is to provide access to the housing, business premises and infrastructure that the capital's residents and workers require – but in an efficient and sustainable way. This can be substantially helped by adopting a circular economy approach to the built environment in London.

INTRODUCTION

A circular economy approach will keep buildings, products and materials at their highest value for as long as possible. The latest estimates for net benefits of implementing circular economy opportunities in London's built environment are the most significant of our five focus areas. These opportunities could lead to GDP growth of between £3bn and £5bn annually by 2036.¹

LWARB's overall vision is for London to be a centre for both design and demonstrator projects that will exemplify:

- Buildings designed for adaptability, with the intention that they can be disassembled at the end of their life.
- Buildings that use innovative products and technologies to be more circular.
- Buildings being re-used and refurbished instead of demolished.
- Buildings deconstructed to enable maximum material re-use.
- The use of innovative business models which enable both current, and new, buildings to be used more flexibly and therefore perform more efficiently.
- Durable infrastructure that can adapt over time.

CONTEXT

London's office space will increase by 5 million m² by 2030, while over 40,000 units of housing per year need to be built over the next 10 years.² Infrastructure development in the city is also a high priority, with CrossRail and the Thames Tideway Tunnel currently being built and extensions to the Northern and Metropolitan underground lines planned. 38 opportunity areas have been identified in the London Plan as places that will see unprecedented levels of regeneration and development during the plan period. The largest of these opportunity areas is formed by the Old Oak Park Royal Development Corporation in north west London where 25,500 new homes and 65,500 new jobs will be created.

These massive projects generate a huge demand for new materials, while the demolition of existing buildings creates large volumes of waste that are typically 'downcycled' to lower grade products.

The construction industry in the UK consumes more than 400m tonnes of materials every year, making it the nation's largest consumer of natural resources.³ Since 2000, average resource prices have more than doubled and annual price volatility is almost three

times what it was in the 1990s. Even despite recent declines, on average commodity prices are still almost at the same level as in 2008, when the global financial crisis began.⁴

BUILT ENVIRONMENT HIERARCHY

In *Building Revolutions*,⁵ David Cheshire defines a hierarchy for building approaches (diagram right) which maximises use of existing materials, with the ideal being to retain existing buildings. 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 hierarchy is supported by some key design principles:

- Building in layers – ensuring that different parts of the building are accessible and can be maintained and replaced.
- Designing out waste.
- Designing for adaptability.
- Designing for disassembly.
- Selecting materials – for example, those that can be re-used and recycled.

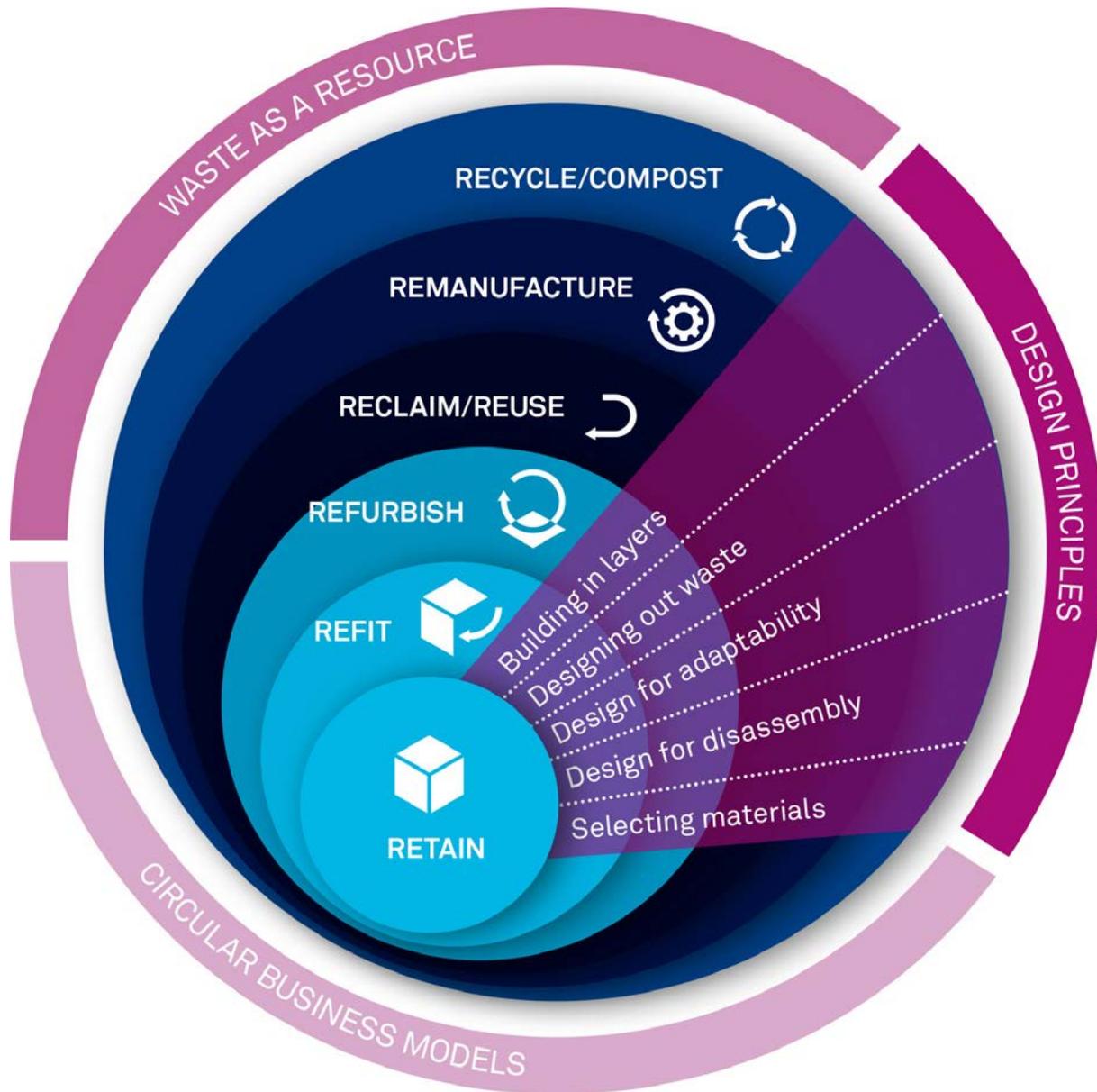
¹ LWARB: Towards a circular economy (2015).

² Building and Environment 44: Bribian, I. Z., Uson, A.A. & Scarpellini, S. 'Life cycle assessment in buildings: State-of the-art and simplified LCA methodology as a complement for building certification' (2009).

³ ARUP: The Circular Economy in the Built Environment (2016)

⁴ McKinsey Global Institute: Resource Revolution: Tracking global commodity markets (2013).

⁵ Building Revolutions: Applying the Circular Economy to the Built Environment, David Cheshire (2016).



Above: Building Revolutions: applying the circular economy to the built environment, David Cheshire (AECOM), RIBA, 2016

Ref: Building Revolutions' (2016), David Cheshire, RIBA Publishing

If the huge surge of new housing and infrastructure required in London, and in the UK, is to be efficient and sustainable, there is a need for all levels of government and business to adopt these principles, both in policy and in action.

Some examples of the hierarchy in practice:

Retain

When the Angel Building in Islington was redeveloped in 2010, much of the existing reinforced concrete frame was retained. This means that the overall embodied

energy (and the cost) of the building was substantially less than if it had been demolished and a new structural frame built.

<https://www.concretecentre.com/Case-Studies/Angel-Building,-London.aspx>

In 2014, to allow new access roads, Segro deconstructed an entire warehouse and rebuilt it on a new site within the same Berkshire business park. This offered a new challenge to the construction team and required them to re-use as much of the building as possible. The steel frame, concrete

beams and slabs were re-used, as was the lift. It is estimated that this yielded a 25% cost saving over a new building and a 56% reduction in embodied carbon.

<http://asbp.org.uk/case-studies/9-cambridge-avenue>

Refit/refurbish

The National Union of Students bought an office on Grays Inn Road, London in 2014 and then undertook a refit using a range of innovative and sustainable features, including a 'product as service' business model for lighting.

<http://www.nus.org.uk/greenoffice>

The refit of a Sainsburys store in Beckton, East London, involved a major reconfiguration of the internal customer areas, including the removal of a number of redundant structural elements which provided a significant source of recycled materials.

The decision to refurbish rather than rebuild had a major influence on the embodied carbon impact of the project. More than 80% of the existing building structure and 70% of the facade were retained. This has allowed significant savings in materials with higher levels of embodied carbon, such as concrete and steel.

http://www.ciria.org/CIRIA/Resources/Resource_Efficiency_Knowledgebase/Resources/REK/Resource_Efficiency_Knowledgebase_.aspx?hkey=53e7c2e9-bc63-446b-a10a-f88274fcb88d

Reclaim/re-use

PLACE/Ladywell is London's first pop up village, and is designed to be deconstructed and relocated. Located on a site that would otherwise have been left vacant, it provides much needed housing for Lewisham Council: 24 homes plus commercial space. The buildings are designed to be relocated within the borough in a few years, when the whole site is redeveloped.

<http://asbp.org.uk/case-studies/placeladywell>

In 2007, the National Industrial Symbiosis Programme set up and ran a collaboration with Thames Water to look at better use for waste clay and other spoil material from works on London's water mains. As a result, large volumes of material were recovered, reprocessed, transported down the Thames by barge and then re-used to inject new life into Peel Port's island facility

near Chatham Docks.

<http://www.wrap.org.uk/sites/files/wrap/2342%20-%20Engineering%20a%20new%20life%20for%20Hoo%20Island.pdf>

Remanufacture

Premier Sustain's Renew Centre in north London is an independent, commercial facility solely dedicated to remanufacturing desks, chairs and other office furniture. Furniture remodeling and refurbishment helps minimise waste and extends the lifecycle of office furniture. At their dedicated workshop they have invested in the tools and technology to ensure they are able to deliver high quality refurbished and resized desks.

<http://www.premiermoves.net/service/the-renew-centre/>

Cleveland Steel and Tubes supplied surplus steel tubes from the oil and gas industry for building into the Olympic stadium roof. These would otherwise have been recycled, which is a much more energy intensive recovery process. This steel has now been specified for the new retractable roof on Court No1 at Wimbledon.

<http://www.cleveland-steel.com>

Recycle

Saint-Gobain in the UK and Ireland includes some of the best-known and respected companies in the construction sector including: British Gypsum, Jewson, Graham, Weber, Isover, Celotex, Glassolutions, Saint-Gobain PAM, and Ecophon. Together they offer a range of high performance energy-saving products and solutions to help create great living places and improve daily life.

Using recycled content is one key way to minimise materials impact and divert waste from landfill and can be the first

step for suppliers and contractors wishing to contribute to a more sustainable construction industry. For example, Saint-Gobain Glass offers its clients a service to collect their waste glass, which it uses as feedstock within its production line, with new glass having 30% recycled content. This diverts waste glass away from landfill, and uses less energy and fewer raw materials in the manufacturing process, which, in turn, produces less of the greenhouse gas CO₂.

<http://uk.saint-gobain-glass.com/node/199>

National Grid now recycle their aluminium overhead transmission lines into new lines rather than down-cycling them into lower quality aluminium products. In October 2013 National Grid and Midal Cables completed a pilot project sending over 1.5 tonnes of aluminium conductor back to the Midal production facility. Following the technical and economic success of the pilot, a further 30 tonnes of conductor is due to be sent for reprocessing. Furthermore, Midal Cables are investing in connector degreasing equipment to further optimise the process.

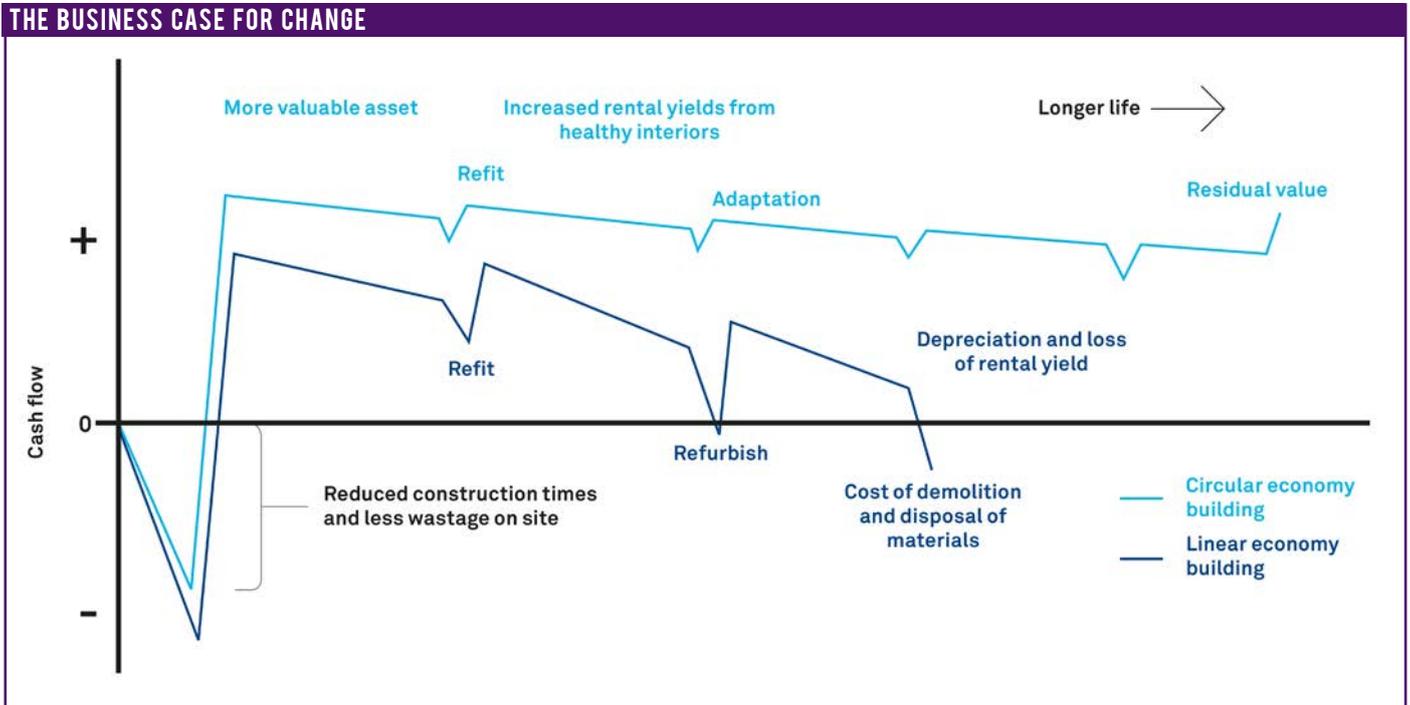
<http://www2.nationalgrid.com/Responsibility/Preserving/Managing-our-impact/Responsible-Resource-Use/>

THE OPPORTUNITY

The UK construction industry and broader built environment sector has significantly reduced its landfill contribution in the last 10 years while increasing the use of recycled materials. This has produced significant financial and environmental savings. The circular economy can build on this success and represents the next major area of potential savings for the industry. Below are some of the opportunities that can be embraced by the sector:

6 GLA: Making sense of business waste – The Mayor's business waste strategy for London (2011)

7 London Sustainable Development Commission: Employment and the circular economy – job creation through resource efficiency in London (2015)



Building Revolutions: applying the circular economy to the built environment, David Cheshire (AECOM), RIBA, 2016

- Further reducing construction, excavation and demolition waste – 48% of all waste in London comes from construction, excavation and demolition.⁶
- Job creation – WRAP’s 2015 analysis of the potential for circular economy jobs in London shows that, with the right investment, the circular economy could create 12,000 new jobs by 2030.⁷ With the construction sector employing almost 1 in 20 of working people in London there is a real opportunity to create new jobs in the construction industry in areas like re-use, remanufacturing, repair and maintenance.
- Making better use of existing assets – both buildings and products.
- Being more aware of materials that are used in buildings and understanding how to ensure retention, or enhancement, of the materials’ value over their lifetime by designing for adaptability and/or disassembly.
- Retaining the value of products and materials through re-use and high

level recycling, creating a positive financial business case for sustainable practices.

- Reducing the overall environmental impact of London’s growing construction sector – applying circular economy principles would significantly reduce the demand for virgin materials and the environmental impacts associated with manufacturing and processing those materials.
- London’s growth means that there will be an increased demand for materials. Supply chain disruptions can be caused by conflicts, disasters or by countries restricting trade in raw materials. Construction companies can be protected from supply chain volatility by managing supplies of existing resources through re-use and remanufacture.

The diagram above summarises the potential changes in revenues and costs associated with designing buildings with a long term, circular economy view. In this example the

circular economy building is designed to be refit, adapted and disassembled at the end of its life, retaining a significant residual value.

A linear economy building is more difficult to change over time and is not designed to be deconstructed, making it costly to demolish with little retained value. At this stage the asset often becomes a liability.

CHALLENGES

Our stakeholder group identified a number of challenges to achieving a more circular built environment in London which are summarised here.

Overview

- The circular economy is a relatively new concept and understanding of the opportunities are low in some areas of the construction sector.
- Materials are too often labelled as waste and require re-labelling in order to facilitate re-use.

Design

- Designing for re-use is critical but it can be difficult to ensure that re-use happens – this needs to be planned for.
- Designers have little or no incentive currently to use re-used products in their work.
- Design of a circular economy building currently requires extra effort in sourcing products and materials.

Managing building materials

- Re-use is essential within a circular system and must consider logistics as well as storage of products and materials.
- Reclaimed products need to out-compete new products and must find secondary market places, which are few and far between currently.
- Funding and time is required to dismantle buildings instead of demolishing them.
- Modern buildings, some of which are now being demolished, often have very little capacity for reclamation or even recycling – only down-cycling to lower value materials.
- Composite materials are increasingly common in the construction sector but difficult to re-use and recycle.

Operating buildings

- Developers sell their buildings to the client and have no incentive to develop lifetime solutions or ensure the building operates to specification.
- There are transaction costs for sharing and peer-to-peer renting as well as for solving related security and insurance issues.
- New risk profiles are needed to understand 'products as service' business models.

SUMMARY OF ACTIONS

The tables at the end of this section outline in detail the actions required to

accelerate the transition to a circular economy in London's built environment and attempt to respond to the challenges outlined above. Each action details resources identified or required, partners, outcomes and impacts. The key actions for the built environment can be summarised as:

Circular economy design

- Introduce circular economy principles into relevant university courses.
- Carry out a scoping study into how circular economy can be delivered through the development and regeneration of the Old Oak and Park Royal sites in north west London.
- Promote novel technologies that enable circular economy within the built environment.
- Incorporate relevant circular economy principles into London Plan and local plans.
- Invest in innovative circular economy building design and products.

Managing building materials

- Identify material requirements of major infrastructure and other developments in London.
- Work towards setting a re-use target for construction projects in London – carry out research on developing the market in re-used/reclaimed products including space and logistics required.
- Seek funding to ensure that London is home to projects that demonstrate circular economy, building on learning from ongoing research projects.
- Research constraints on refit, re-use and demolition activities.

Operation of buildings

- Carry out research on under-utilisation of public and private buildings in London.
- Share good practice amongst facilities managers to implement circular economy principles in the running of their buildings.

- Use 'meanwhile' spaces (unused spaces created during redevelopment that can be used for temporary positive uses) to demonstrate circular economy work.
- Pilot new circular economy business models in the operation of buildings.

WHAT'S HAPPENING ALREADY?

There is a lot happening in the UK and Europe to introduce circular economy principles into buildings and infrastructure. Here is a snapshot of projects and organisations working in this space:

Buildings as materials banks (BAMB) project

The BAMB project brings together 16 partners from eight European countries, and from different places in the value chain, for one mission - to move the building industry towards a circular economy. BAMB develops and integrates tools to enable the shift to a circular building sector, supported by business models, policy propositions and a management and decision making model. These new approaches will be demonstrated and refined with input from six pilots.

<http://www.bamb2020.eu/>

Major Infrastructure Resource Optimisation Group (MI-ROG)

The Major Infrastructure Resource Optimisation Group (MI-ROG) comprises the Highways Agency, HS2, National Grid, Network Rail, Anglian Water, EDF Energy and the Environment Agency. Whilst representing different agencies and projects, MI-ROG members have a common purpose: to avoid wasting valuable resources and to work with supply chains to embed this approach throughout their operations. MI-ROG members have many circular economy initiatives in place and plan further

integration of circular principles in their strategic plans and procurements.

For more information about MI-ROG, please contact Robert Spencer, AECOM robert.spencer@aecom.com

Alliance for Sustainable Building Products (ASBP)

ASBP is a mission-led, not-for-profit membership organisation based in London. The ASBP Re-usable Buildings Network meets quarterly to identify, characterise and overcome barriers to re-use and greater resource efficiency. It works with local planners to encourage circular economy approaches and devise policies to embed them in local plans; it also liaises with central government to inform policy. ASBP is collaborating with the University of Cambridge and SCI on a database to enable steel re-use. www.asbp.org.uk

CIRIA

CIRIA is the Construction Industry Research and Information Association. As a neutral, independent and not-for-profit body, CIRIA links organisations with common interests and facilitates a range of collaborative activities that help improve the industry. CIRIA now hosts the knowledge base created by WRAP on waste reduction and resource efficiency that was developed between 2002 and 2014; the knowledge base includes case studies, good practice guidance and reports.

http://www.ciria.org/CIRIA/Resources/Resource_Efficiency_Knowledgebase/Resources/REK/Resource_Efficiency_Knowledgebase_.aspx?hkey=53e7c2e9-bc63-446b-a10a-f88274fcb88d

Green Construction Board

The joint Government and industry Green Construction Board (GCB) has set up a Circular Economy Working Group to help catalyse the industry into

action. It supports both practice and research across the construction lifecycle and works with many different professionals and sectors to embed circular economy thinking in the built environment. The group has produced a knowledge bank of initiatives and activities on circular economy in the built environment.

<http://www.greenconstructionboard.org/images/stories/112212%20GCB%20Circular%20Economy%20April%202016%20v3.pdf>

<http://www.greenconstructionboard.org/index.php/resources/circular-economy>

BRE

BRE is the Building Research Establishment which helps government, industry and business to meet the challenges of our built environment. BRE is an independent, impartial research-based organisation, offering expert advisory support, concept testing and training in every aspect of the built environment and associated industries. This includes a long standing programme of work aiming to improve resource efficiency in the sector and, more recently, the development of circular economy approaches.

BRE are also a partner in the BAMB project (see above), leading the work package to develop decision making tools, business models, policy and regulation. They also have existing tools and guidance to support the construction sector, such as SMARTWaste, assessing design for deconstruction and BREEAM, a tool which includes credits for waste prevention, re-use and recycling as part of an overall assessment of building sustainability.

www.smartwaste.co.uk

<http://brebuzz.net/tag/design-for-deconstruction/>

<http://www.breeam.com/>

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OPDC/Environment Agency

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UK Green Building Council

1 DESIGN FOR CIRCULAR ECONOMY

Actions	Resources	Outputs	Outcomes	Impact
COMMUNICATIONS				
Introduce circular economy thinking in relevant university courses in London and look to develop modules for relevant courses where appropriate. (M)	Partners interested: resources not in place. Partners interested: Ellen MacArthur Foundation pioneer universities, BAM Construct UK, AECOM.	More young built environment professionals have an understanding of circular economy.	More buildings created with circular economy principles embedded.	CO ₂ equivalent emissions saved – both in use and embodied. Reduced resource use, more efficient resource use. Increased knowledge of sector professionals.
COLLABORATION				
Facilitate workshops for both public and private sector clients to share the benefits of embedding circular economy into retrofit projects including the business case. (S) Progress to similar activities for new build and infrastructure. (M)	Resources identified and plan in place led by LWARB (until March 2018). Partners interested: UK Green Business Council, Saint-Gobain, BAM Construct UK, Alliance for Sustainable Building Products, AECOM.	Clients become more aware of the opportunities offered by circular economy.	More buildings created with circular economy principles embedded.	Job and training opportunities created/ safeguarded. Financial savings in new value propositions.
POLICY				
Incorporate circular economy principles into the London Plan and appropriate guidance documents. (S)	Resources identified and plan in place led by the GLA (until March 2020) supported by LWARB.	Clients become more aware of the opportunities offered by circular economy.	More buildings created with circular economy principles embedded.	
Conduct scoping study on the potential to implement circular economy in London's opportunity areas, for example at the Old Oak and Park Royal (OPDC) sites. Share learning with other opportunity areas. (S)	Resource identified and plan in place led by LWARB (until June 2017) Partners involved: Old Oak Park Royal Development Corporation, GLA.	Circular economy vision, opportunities and recommendations for the Old Oak and Park Royal sites.	Circular economy opportunities are maximised at the Old Oak and Park Royal sites. Learning is shared with other opportunity areas.	

1 DESIGN FOR CIRCULAR ECONOMY (CONTINUED)

Actions	Resources	Outputs	Outcomes	Impact
DEMONSTRATION				
GLA family member organisation and/ or local authorities to encourage circular economy principles into a new build, refit or infrastructure project. (M)	Partners interested: no resources identified. Partners interested: GLA family.	More examples of circular economy principles in action.	More buildings created with circular economy principles embedded.	CO ₂ equivalent emissions saved – both in use and embodied. Reduced resource use, more efficient resource use.
BUSINESS SUPPORT				
Provide business support to built environment SME's through Advance London to scale up or develop circular economy business models. (S)	Resources identified and plan in place led by LWARB (until December 2019).	More businesses operating with circular economy business models.	More buildings created with circular economy principles embedded.	Increased knowledge of sector professionals.
Investigate the opportunities for an accelerator/incubator programme in the area of built environment. (S)	Resources identified and plan in place led by LWARB (until March 2020).	More businesses operating with circular economy business models.		Job and training opportunities created/ safeguarded.
INNOVATION				
Promote novel circular economy technologies (including the use of building information modelling – BIM), services and products to appropriate audiences in London. (M)	Partners interested: resources not in place Partners interested: BAM Construct UK, Supply Chain Sustainability School, BRE, Innovate UK, Construction Products Association, Alliance of Sustainable Building Products.	Greater awareness of circular economy technologies, services and products.	More buildings created with circular economy principles embedded.	Financial savings in new value propositions.
Seek opportunities to invest in circular economy building innovations such as design for adaptability, disassembly, re-use and remanufacturing, new products and services. (S)	Resources identified and plan in place led by LWARB (until March 2020).		More businesses to support circular economy in the built environment.	

2 MANAGEMENT OF BUILDING MATERIALS

Actions	Resources	Outputs	Outcomes	Impact
COMMUNICATIONS				
Ensure that learning from ongoing projects is fed into relevant organisations in London e.g. Buildings as Materials Banks and ASBP steel re-use projects. (S)	Resource identified and plan in place led by LWARB (until 31/03/20). Partners involved: BRE, Major Infrastructure-Resource Optimisation Group, Alliance of Sustainable Building Products.	Learning from ongoing projects is captured, shared and demonstrated.	Ability to manage resources more effectively in London.	CO ₂ equivalent emissions saved – both in use and embodied. Job and training opportunities created/safeguarded. Financial savings in new value propositions.
COLLABORATION				
Conduct a material resource requirements study of major infrastructure and other development. (M)	Partners interested – resource not identified.	Data on potential gaps in resources required for upcoming developments and opportunities for sharing/re-use.	Ability to manage resources more effectively in London.	Reduced resource use, more effective resource use.
Research current and former mechanisms for re-use of surplus and reclaimed construction materials in London (collection, transport and storage) building on the work of NISP and MI-ROG. Make recommendations for the way forward and undertake pilot. (S)	Resource identified and plan in place led by LWARB (until March 2020). Partners involved: GLA, Major Infrastructure-Resource Optimisation Group.	Recommendations and pilot experience to take forward with relevant industry representatives and bodies.		
Bring together a working group to make recommendations on developing the market for re-used and reclaimed materials in London. (M)	Partners interested – resource not identified Salvo, BRE, Alliance of Sustainable Building Products, National Federation of Demolition Contractors.	Recommendations to take forward with relevant industry representatives and bodies.	A more developed market for re-used and reclaimed materials supported by relevant infrastructure.	

2 MANAGEMENT OF BUILDING MATERIALS (CONTINUED)

Actions	Resources	Outputs	Outcomes	Impact
COLLABORATION (CONTINUED)				
Work with construction and demolition waste management companies to identify circular economy supply chain opportunities. (M)	Partners interested – resource not identified BRE, National Federation of Building Products, Build UK, Saint-Gobain.	Recommendations to take forward with relevant industry representatives and bodies.	A more developed market for re-used and reclaimed materials supported by relevant infrastructure.	CO ₂ equivalent emissions saved – both in use and embodied. Job and training opportunities created/ safeguarded.
POLICY				
Research the implications of a re-use target for built environment projects in London - adopt if appropriate. (M)	Partners interested – resource not identified LWARB, GLA, BRE (Buildings As Materials Banks EU project).	Recommendations to take forward with relevant industry representatives and bodies.	A more developed market for re-used and reclaimed materials supported by relevant infrastructure.	Reduce resource use, more effective resource use. Financial savings in new value propositions.
Lobby for reduction of VAT for refit to be in line with zero VAT for new build. (M)	Partners interested – resource not identified.	Encourage refit of existing buildings.		
DEMONSTRATION				
Seek funding to carry out built environment demonstration projects in London based on learning from ongoing projects. (S)	Resource identified and plan in place led by LWARB (until March 2020). Partners involved: BRE, Major Infrastructure-Resource Optimisation Group, Alliance of Sustainable Building Products.	More demonstration projects in London to show value to the economy.	A more developed market for re-used and reclaimed materials supported by relevant infrastructure.	
Work to understand the constraints on refit and demolition activities, especially with modern buildings that are not designed to be disassembled. (M)	Partners interested – resource not identified Partners interested: GLA, UK Green Building Council, Green Construction Board, BAM Construct UK, BRE, National Federation of Demolition Contractors, Saint-Gobain .			

3 CIRCULAR ECONOMY - OPERATION OF BUILDINGS

Actions	Resources	Outputs	Outcomes	Impact	
COLLABORATION					
Carry out a sample of public and private buildings in the capital to estimate levels of under utilisation – calculate possible financial and environmental savings for pilot area. (M)	Partners interested – resource not identified. Partners interested: GLA, LWARB, Ellen MacArthur Foundation, Respace Project.	Awareness of levels of under utilisation of buildings and opportunities to increase utilisation.	Increased building utilisation in London.	CO ₂ equivalent emissions saved – both in use and embodied.	
DEMONSTRATION					
Form a network of facilities and office managers to implement circular economy principles in running of their buildings - share their experience through relevant membership organisations. (S)	Resource identified and plan in place led by Business in the Community (until March 2018). Partners involved: PwC, LWARB.	Market place for circular office solutions is developed. More facilities and office managers understand the opportunities.	Buildings are operated more efficiently.		
Research, and demonstrate where possible, circular economy opportunities in 'meanwhile' spaces in the city. (M)	No resources identified.	Greater understanding of the opportunity to use 'meanwhile' spaces (unused spaces created during redevelopment that can be used for temporary positive uses).	Make best use of space in ongoing developments.		
INNOVATION					
Innovate and pilot circular economy initiatives to offer new circular economy business models in building operations e.g. pay per lux, etc. (M)	Partners interested – resource not identified Ellen MacArthur Foundation, CE100, Innovate UK, BRE, Buildings As Materials Banks EU project, Saint-Gobain.	A portfolio of innovative circular economy pilots to showcase in London.	More efficient use of resources and new ways of doing business.		

FOOD



The food challenge facing London is to provide for the capital's growing resident, worker and visitor population in an efficient, affordable and sustainable way. Embedding circular economy principles into the food economy of the capital creates the opportunity not just to build awareness of the value of food but also for stakeholders across London to experience financial and environmental benefits at a household, business and city level.

INTRODUCTION

A circular economy approach will ensure that food, food surplus and food waste is used to its greatest potential and value. The latest estimates for London's net benefits from circular food economy opportunities are that they could add £2 – 4bn annually to GDP by 2036.¹

LWARB's overall vision for a circular food economy in London is to:

- Ensure that no food waste is sent to landfill or incineration.
- Reduce food waste by 20% by 2025 against a 2015 baseline (Courtauld target) and contribute to the Mayor's municipal and business recycling targets.
- Ensure that food surplus and food waste are used to their greatest potential for the people of London.
- Encourage community and commercial food growing in London.

CONTEXT

Over 8 million tonnes of food is consumed in London per year² by the city's 8.6 million residents, around one million daily commuters³ and almost 17 million annual overseas tourists.⁴

THE OPPORTUNITY

London is an important part of the complex, global food supply chain as a major procurer and consumer. Food is an area of genuine innovation and focus in the capital, and many food-related challenges are already being tackled by London-based organisations and businesses; progress is being made and should be celebrated. However, there is much more that can be done.

The starting point however for a more circular food economy in London is delivering the food waste hierarchy effectively (see fig. 1)

Prevention (household)

Almost half of the total amount of food thrown away in the UK comes from our homes. In the UK as a whole we throw away 7 million tonnes of food and drink from our homes every year, and more than half of this could still have been eaten.⁵ Research shows that, by reducing the amount of food thrown away, the average household could save £470 a year, rising to £700 for a family with children.⁶

Prevention (business)

Savings from waste prevention are attractive to businesses too. The FoodSave initiative demonstrated savings of up to £6,000 a year for small hospitality/food retail businesses in London by reducing food waste at each stage of food preparation and delivery.⁷

There are also opportunities for entrepreneurs in this space to set up new businesses that use food surplus and food waste as a resource for a new product, for example Snact make fruit jerky from surplus fruit.

Redistribution (to people)

Positive social outcomes are gained by the redistribution of surplus food from retailers and food service businesses. Using food surplus in this way can alleviate emergency food needs, but is not a solution to the wider problem of food poverty. These redistribution schemes help people when they are vulnerable and require support, creating not only environmental but also financial and social benefits.

1 LWARB: Towards a circular economy (2015)

2 GLA: Round Demographic Projections; and Best Foot Forward: City Limits – A resource flow and ecological footprint analysis of Greater London (2015)

3 ONS: Neighbourhood Statistics (2011)

4 ONS: London Tourism Report 2013–2014

5 WRAP: Household food waste in the UK (2015)

6 WRAP: Love Food Hate Waste (2016)

7 Sustainable Restaurants Association: Evaluation of the FoodSave Project (2015)

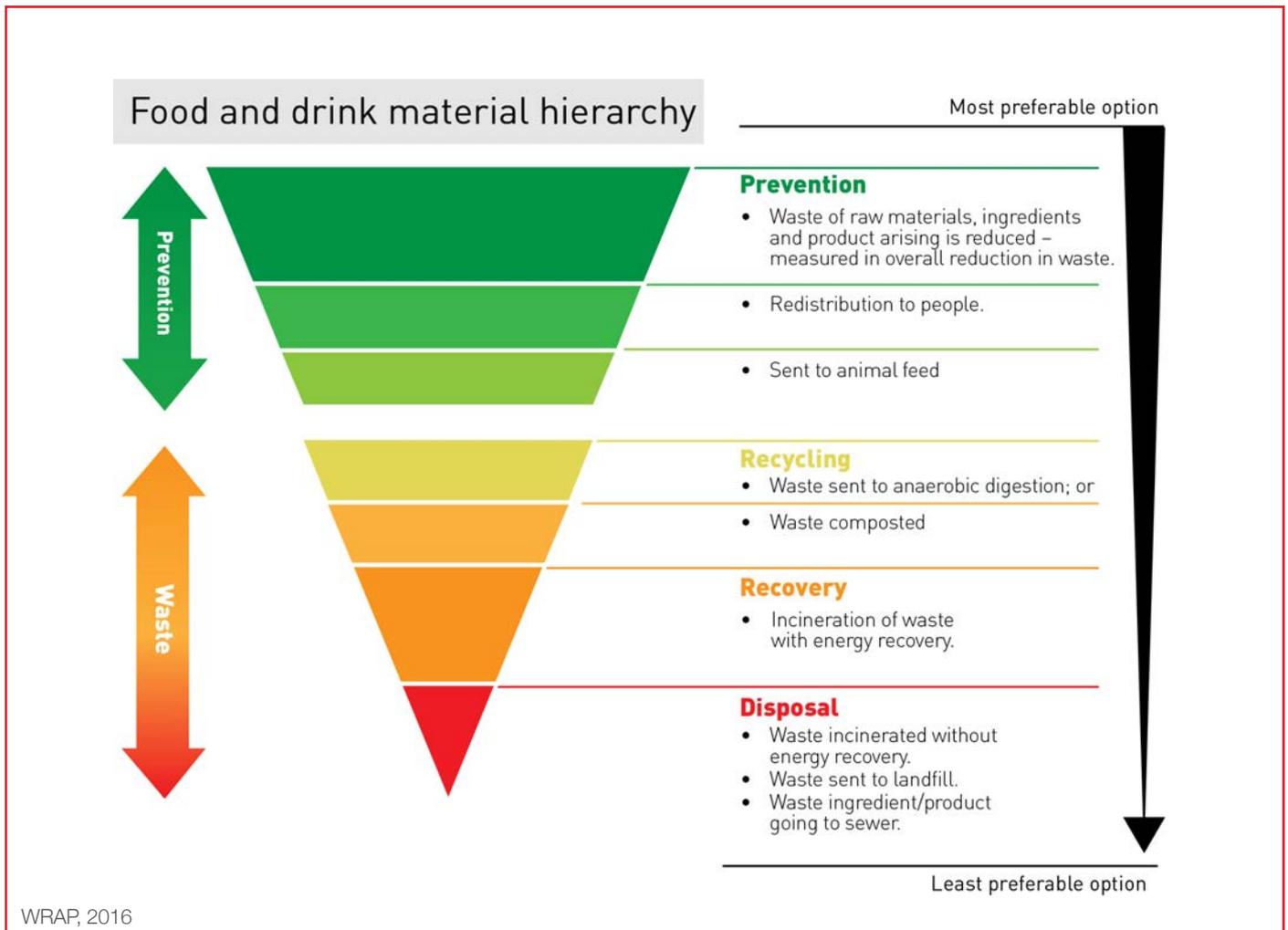


Fig. 1

Redistribution (for animal feed)

Quite a lot of the surplus food that farmers, wholesalers, manufacturers and retailers throw away can already be used for animal feed – there are plenty of good examples of food waste being used in this way, such as fruit, vegetables, trimmings, whey, spent brewers’ yeast and bread. There are regulations that make sure that this is safe, hygienic and not contaminated with animal products.

Recycling, recovery and disposal

Where efforts higher up the hierarchy have been unsuccessful in managing out food waste, the best outcome both environmentally and financially is for that unavoidable waste to be recycled. This involves capturing as much of it as possible from homes and businesses, sending it to be used as feedstock for anaerobic digestion facilities in and around London and converting it into renewable energy.

INNOVATION BEYOND THE FOOD WASTE HIERARCHY

Circular economy approaches in the food sector are not, however, only about enforcing the food waste hierarchy. Opportunities exist in the area of food growth and urban farming which would create more circular food systems for the city.

Growing fruit and vegetables in an urban setting both reduces transport (with its associated congestion, air pollution and carbon emissions) and provides healthy

activity within a community setting. It can also provide job opportunities within a commercial setting.

Community gardening connects people with food and where it comes from, helping people to value food and waste less, and providing an engaging place to raise awareness of wider food sustainability issues, such as reducing waste. Community gardens often use large amount of compost which can be produced by registered composting sites using segregated food waste from food manufacturing, such as fruit 'leftovers', and local-to-London livestock farmers can use surplus whey from cheese-making as animal feed for their pigs.

There are also exciting opportunities to use technology to expand our urban growing potential such as aquaponics, vertical growing and soil-less farms. Innovations are also in development to extract chemicals from food waste through bio-refining and other recovery processes.

CHALLENGES

Our stakeholder group identified a number of challenges to achieving a more circular food economy in London, summarised below:

Consumer behaviour

- Reducing household food waste – consumer habits which create food waste are difficult to change.
- Devising relevant approaches for raising consumer awareness and reducing avoidable food waste.
- Not all local authorities provide food waste collections to residents.

Business behaviour

- Reducing hospitality food waste – businesses can lack experience, knowledge and time.
- Cost of food waste collections are too much for small hospitality businesses.
- Lack of financial incentives and support for separate food waste collection.
- Reducing catering food waste from public and private staff restaurants and other outlets is complex.
- Many producers use composite food packaging that cannot be recycled, composted or anaerobically digested.
- It can be hard to navigate the complex regulatory environment in the food sector.

Urban growing – community and commercial

- Current urban planning and zoning approaches can discourage urban growing by imposing restrictions on it.
- Scarcity of urban space may limit urban growing opportunities, especially considering neighbour concerns (nuisance, safety).
- There is a lack of access to areas where people can grow food on housing developments and estates.

Innovation

- Lack of finance and limited industry support to progress bio-refining and other research and innovation into end markets.
- Lack of end markets for digestate from the anaerobic digestion process in London.

SUMMARY OF ACTIONS

The tables at the end of this section outline in detail the actions required to

accelerate the transition to a circular food economy in London and attempt to respond to the challenges outlined above.

Each action details resources identified or required, partners, outcomes and impacts. The key actions for the food sector can be summarised as:

Preventing avoidable food waste (both at household and organisational levels)

- Promote and build on existing voluntary agreements, consumer and business campaigns.
- Support public authorities and private companies to procure catering contracts that promote the food waste hierarchy.
- Explore opportunities to increase recyclability of food packaging.

Valuing food waste and food surplus

- Use edible food surplus as a way of contributing to the alleviation of food poverty.
- Raise awareness of options for using food waste as a valuable resource e.g. as animal feed, to create a new product or as an input for other industrial processes (e.g. bio-refining).
- Achieve maximum tonnage of food waste collected through local authority and business waste collection services.

Maximising use of urban space for food growing

- Advocate for the continued protection and promotion of land for food growing in the London Plan and Borough Local Plans including the use of green belt and 'meanwhile' development sites to host food-

growing and/or allotments to help increase the supply of local sourced produce.

- Promote the inclusion of space for food growing in the plans for new housing developments.
- Explore technologies to increase urban growing potential including aquaponics and vertical growing.

WHAT'S HAPPENING ALREADY IN LONDON IN THIS SPACE?

There is a huge amount happening in London related to valuing, growing and using food. Here is a snapshot of a number of strategies, campaigns and organisations working in this area.

London Food Strategy

The London Food Strategy was published in 2006. The strategy set out a vision up to 2016 and identified six priorities on which stakeholders should focus their effort, which included reducing food waste at the household, business and public organisation level. The strategy will be updated in 2017. <https://www.london.gov.uk/what-we-do/business-and-economy/food>

TRiFOCAL

TRiFOCAL London Project is a EU LIFE funded communications campaign to encourage sustainable food systems (in cities). It will target householders, food service businesses, local communities and schools and will seek to encourage three food centric behaviours:

1. The promotion of healthy and sustainable eating by changing purchasing and preparation practices.
2. The prevention of food waste by changing planning, shopping, storage and meal preparation behaviours.

3. The recycling of unavoidable food waste.

The project will engage with all 33 London Boroughs, 1000 hospitality and food service outlets (including 10,000 of their customers and staff), 20 community groups and 24 schools.

Courtauld 2025

Courtauld 2025 is an ambitious voluntary agreement, run by WRAP. It brings together organisations across the food system – from producer to consumer – to make food and drink production and consumption more sustainable.

By targeting hotspots of resource use, Courtauld 2025 will aim to cut the waste and greenhouse gas emissions associated with food and drink by at least 20% per person in ten years, with cumulative savings of around £20 billion. www.wrap.org.uk/content/courtauld-commitment-2025

Love Food Hate Waste campaign in London

Love Food Hate Waste communicates with householders about easy ways to reduce the amount of food they throw away (including the financial benefits – up to £50 a month per household). It does this by sharing simple ideas about meal planning, using up left overs and good food storage. The Love Food Hate Waste website has tips, recipes and info to help people do this. www.lovefoodhatewaste.com/node/4118

FoodSave

Under the auspices of the FoodSave project, 170 small and medium food and beverage businesses across London diverted 1,291 tonnes of their collective

annual food waste from landfill between 2013 and 2015. 153 tonnes of this diversion was by food waste reduction and the rest through other means such as feed for livestock and donations to charity. The programme generated over £550,000 of savings for these businesses.⁸ www.foodsave.org/about/

Social supermarkets

Social supermarkets help families on lower incomes to buy food more cheaply. Their food is in-date and wholesome and would otherwise be sent to landfill by big retailers for a variety of reasons, including items packaged and weighed incorrectly and over-production. <https://www.london.gov.uk/press-releases/mayoral/new-social-supermarkets-to-cut-food-poverty>

Capital Growth

Capital Growth is London's largest food growing network, with over 2,000 gardens throughout the city. The project offers in-kind support to people who grow their own food in London, including access to discounted training and networking events, support with growing to sell and discounts on gardening equipment. www.capitalgrowth.org/home/

Resource London

In 2015 LWARB and WRAP set up a collaborative programme to support London boroughs in their provision of waste and recycling services. While the programme is focused on recycling from flats, waste minimisation and the restriction of residual waste services, it also has a significant focus on introducing and improving food waste

recycling. This includes the roll-out of an EU-funded project promoting better food waste behaviours from sustainable diets to food waste prevention and the recycling of unavoidable food waste.
<http://resourcelondon.org/>

Some examples of organisations working to improve the food economy in London and wider:

FareShare

www.fareshare.org.uk/

Feedback

www.feedbackglobal.org/

Plan Zeroes

www.planzeroes.org/#/

Sustain

www.sustainweb.org/

Sustainable Restaurant Association

www.thesra.org/

Some examples of SMEs turning food waste into a business proposition in London:

BioBean

www.bio-bean.com/

GrowUp Urban Farms

www.growup.org.uk/

Rejuce

www.rejuce.co.uk/

Rubies in the Rubble

www.rubiesintherubble.com/

Snact

www.snact.co.uk/

Toast

www.toastale.com

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WRAP

1 REDUCING AVOIDABLE FOOD WASTE

Actions	Resources	Outputs	Outcomes	Impact
COMMUNICATIONS				
Design and deliver the Love Food Hate Waste consumer behaviour campaign in London to reduce avoidable food waste. (M)	Resource identified, and plan in place, led by Resource London (WRAP and LWARB) (until March 2020). Partners involved: Borough Councils, Waste Partnerships, GLA/Transport for London, Private sector.	Increased understanding by residents and school children of the financial and environmental benefits of reducing food waste.	Less food waste created by residents and schools, supporting London's municipal recycling targets.	Financial savings to residents and businesses. CO ₂ equivalent emissions saved. Reduced resource use, more efficient resource use. Improved local facilities.
Develop and expand the Love Food Hate Waste campaign in London after 31/03/20. (M)	Partners interested – resource not identified.			
Develop and deliver TriFOCAL EU project, a London wide project looking at how Londoners can reduce the amount of food they waste, joined up with messages on how they can recycle the food waste that couldn't be avoided, whilst also integrating messages about healthy sustainable eating. The project will target households, schools, community groups, hospitality and food services businesses as well as large businesses in the boroughs through an integrated communications campaign. (S)	Resource identified and plan in place led by Resource London (until March 2019). Partners involved: Groundwork London, London Boroughs and WRAP.	Residents make links between food waste, food recycling and healthy eating.		
COLLABORATION				
Support London's role within the Sustainable Food Cities Network. (S)	Resource identified and plan in place led by Sustain (until December 2019). Partners involved: Food Matters, Soil Association, London Food Board.	Residents make links between food waste, food recycling and healthy eating.	Less food waste created by residents and schools, supporting London's municipal recycling targets.	

1 REDUCING AVOIDABLE FOOD WASTE (CONTINUED)

Actions	Resources	Outputs	Outcomes	Impact
COLLABORATION				
<p>Support public authorities (GLA family and London Boroughs) and private companies to demonstrate that they are procuring catering contracts that promote the food waste hierarchy, and require specific commitments by service providers to actions taken and monitoring of success. (M)</p>	<p>Partners interested – resource not identified.</p> <p>Partners interested: GLA, Private sector.</p>	<p>GLA family organisations and large companies include good food waste practice in their catering contracts.</p>	<p>Reduced food waste reported as part of catering contracts.</p> <p>Support Courtauld Agreement food waste reduction target of 20% by 2025 and London's recycling targets.</p>	<p>Financial savings to residents and businesses.</p> <p>CO₂ equivalent emissions saved.</p> <p>Reduced resource use, more efficient resource use.</p>
<p>Encourage organisations in London to sign up to the Courtauld 2025 agreement. (S)</p>	<p>Resource identified and plan in place led by LWARB (until March 2018).</p> <p>Partners involved: WRAP, Waste Partnerships, GLA, Private and public sectors, West London Waste Authority, London Food Board.</p>	<p>15 London organisations sign up to the Courtauld 2025 Agreement.</p>		<p>Improved local facilities.</p>
POLICY				
<p>Strengthen policies around the need for dedicated space for food waste (and all other recyclables) in all new housing developments in the London Plan and local plans. (S)</p>	<p>Resource identified and plan in place led by GLA until 2018.</p> <p>Partners involved: GLA, WRAP, Borough Councils, London Councils, LEDNET.</p>	<p>Reviewed wording included in London Plan and local plans.</p>		
BUSINESS SUPPORT				
<p>Investigate ways to reduce food waste within the hospitality, food service and wholesale businesses, building on the success of the FoodSave project. (S)</p>	<p>Resource identified and plan in place led by GLA (until March 2018).</p> <p>Partners involved: Private sector, Sustain, Sustainable Restaurant Association, GLA, WRAP, LWARB, London Food Board.</p>	<p>Increased understanding of the financial and environmental benefits of reducing food waste.</p>	<p>Less food waste created by businesses in support of the Mayor's Environment Strategy.</p>	

2 VALUING FOOD WASTE AND FOOD SURPLUS

Actions	Resources	Outputs	Outcomes	Impact
COMMUNICATIONS				
Provide guidance and support to London Boroughs to introduce household food waste collections and to improve capture of food waste from existing schemes. (S)	Resource identified and plan in place led by Resource London (WRAP and LWARB) (until March 2020). Partners involved: London Boroughs, Waste Partnerships and Disposal Authorities.	Increased number of boroughs offering weekly food waste collections as well as increasing the tonnage of material from existing schemes through both improved performance and participation.		CO ₂ equivalent emissions saved. Reduced resource use, more efficient resource use. Financial savings to residents and businesses.
Review and refresh the Recycle for London website to ensure effective messaging on food waste recycling, as well as engaging digital content across social media channels which offer city wide and borough level communications support to residents on why, where and how to recycle food waste. (S)	Resource identified and plan in place led by Resource London (WRAP and LWARB) (until 31/03/20). Partners involved: London Boroughs, Waste Partnerships and Disposal Authorities.	Increased food waste recycling.	Support London's municipal recycling target.	Health benefits. Financial benefits of reduced resource use to business.
Use the new London Food Strategy and the London Food Board to highlight the importance of the food Circular Economy. (S)	Resource identified and plan in place led by LWARB (until March 2020).			
Evaluate the work of Resource London and Recycle for London and plan for further activity to reduce food waste. (M)	Partners interested – resource not identified.			
Maintain and promote an up to date list of organisations and platforms that can help businesses redistribute surplus food in London. (M)	Partners interested – resource not identified. FareShare, Other redistribution organisations, LWARB, GLA.	Ensure shops, supermarkets and other businesses know where to redistribute surplus food.	More businesses in London start to redistribute their surplus food.	Vibrant SME community prospering.
Facilitate the use of surplus food to support vulnerable groups in London through supporting additional social supermarkets in London. (S)	Resource identified and plan in place led by GLA until 2017.	Support 3 additional social supermarkets.		

2 VALUING FOOD WASTE AND FOOD SURPLUS (CONTINUED)

Actions	Resources	Outputs	Outcomes	Impact
BUSINESS SUPPORT				
Support entrepreneurial approaches to diverting food surplus to useful purposes. (S)	Resource identified and plan in place led by LWARB (until March 2018).	Increased food waste recycling.	Support London's municipal recycling target.	CO ₂ equivalent emissions saved. Reduced resource use, more efficient resource use.
Develop an online tool for businesses to help them understand whether their waste is eligible for animal feed, taking them through the relevant legislation. (S)	Resource identified and plan in place led by Feedback (until June 2017).			Financial savings to residents and businesses.
Promote small businesses in London that are making product from food waste/ food surplus through appropriate directories and awards. (M)	Partners interested – resource not identified. Partners interested: Sustain, LWARB.	Raise awareness of innovative smaller businesses, especially with larger companies who have a commitment to using local, sustainable food.		Health benefits. Financial benefits of reduced resource use to business.
Explore the opportunity to reduce business rates for food service companies that reduce food waste. (M)	Partners interested – resource not identified. Partners interested: Private sector, GLA, Borough Councils, London Councils.	Research the opportunity and outline a working methodology, including business case.		Alleviating food poverty.
Explore and assess the options for more joint contracting of food waste collections from businesses. (M)	Partners interested – resource not identified. Partners interested: Private sector, GLA, Business Improvement Districts.	At least two examples of joint food waste collections.		
Explore the establishment of a framework of food waste collectors. (M)	Resource identified and plan in place led by GLA until 2018. Partners interested – resource not identified: Private sector, GLA.	Establish a framework to incentivise businesses to reduce food waste.		

2 VALUING FOOD WASTE AND FOOD SURPLUS (CONTINUED)

Actions	Resources	Outputs	Outcomes	Impact
BUSINESS SUPPORT				
Provide business support to SME's through Advance London to scale up or develop food circular economy business models. (S)	Resource identified and plan in place led by LWARB (until December 2019).			CO ₂ equivalent emissions saved. Reduced resource use, more efficient resource use.
Investigate the opportunities for an accelerator/incubator programme in the area of food. (S)	Resource identified and plan in place led by LWARB (until March 2020).			Financial savings to residents and businesses.
Seek opportunities to invest in circular economy food innovations such as using food waste for industrial processes, biorefining and energy capture. (S)	Resource identified and plan in place led by LWARB (until March 2020).			Health benefits. Financial benefits of reduced resource use to business.
INNOVATION				
Conduct study to explore new uses and markets for compost and digestate made from food waste in London. (M)	Partners interested – resource not identified: WRAP, Sustain, Capital Growth, Private sector.	New uses and markets trialled in London.	Increase market for compost and digestate (made from food waste in London).	Alleviating food poverty.

3 OPPORTUNITIES FOR URBAN GROWING

Actions	Resources	Outputs	Outcomes	Impact
POLICY				
Advocate for the London Plan and local plans to strengthen the planning requirement for food growing spaces and onsite composting for new housing developments. (S)	Resource identified and plan in place led by GLA until 2018 Partners involved: Borough Councils, London Councils, Sustain.	Reviewed wording in London Plan and local plans supporting growing spaces (community and commercial).	More spaces for local food growing in London.	Availability of local food – both community and commercial. CO ₂ equivalent emissions saved. Reduced transport and associated air pollution and greenhouse gas emissions. Job opportunities.
Advocate for protection and promotion of land for food growing to be strengthened in the new London Plan and local plans, and to include the use of green belt/ 'meanwhile' development sites to host food-growing businesses and allotments to help increase urban and peri-urban food growing potential. (S)	Resource identified and plan in place led by GLA until 2018. Partners involved: Borough Councils, London Councils, Sustain.	Increase the number of growing spaces in London.	More Londoners able to grow their own food and London's food system to be more resilient.	Positive community activity. Physical and mental health benefits.
DEMONSTRATION				
Continue to develop and support the Capital Growth network of community food growing spaces in London. (S)	Resource identified and plan in place led by GLA until 2018. Partners involved: GLA, Sustain, London Food Link, London Food Board.		Less food being imported from outside London.	
Further develop the Capital Growth network. (M)	Partners interested – resource not identified.		Communities have access to positive local activities.	
BUSINESS SUPPORT				
Support pilots for commercial urban growing projects in the capital for example vertical farms, aquaponics and soil-less farms. (M)	Partners interested – resource not identified. Philips	New urban growing pilots.	New business opportunities.	

TEXTILES



London is home to a number of well respected fashion institutions such as the Textiles Futures Research Centre and the Centre for Sustainable Fashion, with London Fashion Week a highlight in the haute couture year. As such London is perfectly placed to influence both the design and production of clothes in a way that will have an impact both in our capital city and around the world.

INTRODUCTION

A circular economy approach to textiles in London would ensure that clothes and other textiles are used to their greatest potential throughout their lifecycle. This would lead to more items being repaired, shared, collected and recycled. The latest estimates for the net benefits from circular economy opportunities for textiles in London are that they could add over £1bn annually by 2036.

LWARB's overall vision is for London to:

- Send zero textiles to disposal (landfill or incineration).
- Act as a regional physical textiles hub for collection, re-use and recycling.
- Be a renowned centre for circular economy textile design.

CONTEXT

London is a leader in the global textiles market, from high street brands and retailers right through to high end fashion houses. In 2013, London's consumer clothing market was ranked third in the world after New York and Tokyo and by 2030 is forecast to be the largest, with a predicted value of £29.5 billion.¹

The UK currently spends around £44 billion² a year on clothing and, whilst some items are more durable, so-called 'fast' fashion creates an environment in which clothes are bought and discarded very quickly – or hoarded and left unworn at the back of the wardrobe.

THE OPPORTUNITY

More than 30% of unwanted clothing currently goes to landfill or incineration every year in the UK.³ That corresponds to around 350,000 tonnes of clothing, with a value of approximately £140 million every year if they were to be recycled or re-used. For textiles in total, including non-clothing items, the value of re-usable or recyclable used goods sent to landfill was estimated at £238 million in 2010.⁴

Fibre recycling

There are opportunities to extract more value from unwanted textiles and significantly reduce the environmental impact of disposal. One such opportunity would be to bring scale to fibre-to-fibre recycling technologies that are currently available at a small scale, testing phase. For example, Worn Again is developing a

chemical textile to textile recycling technology that will enable end of use clothes and textiles to be collected, processed and made back into new yarn, textiles and clothes again and again.

Product as service

Further value can be created by retailers and manufacturers making more durable clothing and renting products rather than selling them. Good examples of this include Vigga and Mud Jeans: Vigga is a Danish company making and renting children's clothing; Mud Jeans is a Dutch company selling 'jeans for life', repairing and replacing as necessary.

Procurement

The service industry and public organisations provide many of their employees with corporate wear and uniforms. Across the UK, 39 million people are given corporate uniforms, adding up to nearly 16,000 tonnes of corporate wear. Nearly 10% of this is being recycled or re-used effectively when it is no longer needed, meaning that over 90% goes to landfill or gets incinerated.⁵ These items could be procured as a managed service rather than buying the products outright, and

¹ Oxford Economics: Future trends and market opportunities in the world's largest 750 cities – How the global urban landscape will look in 2030 (2014).

² WRAP: Valuing our clothes (2012)

³ WRAP: <http://www.wrap.org.uk/content/fast-facts-textiles>.

⁴ WRAP: Valuing our clothes (2012)

⁵ Oakdene Hollins: www.uniformreuse.co.uk

⁶ WRAP: Valuing our clothes (2012)

⁷ European clothing action plan (ECAP): <http://www.ecap.eu.com/>



this kind of approach offers a potentially more cost effective and environmental solution. The Metropolitan Police currently have a managed uniform service.

Longevity

Production of textiles also has important resource implications. Processing raw materials into finished products results in one-third of the waste and over three-quarters of the carbon and water footprint produced by the sector.⁶ By making our clothes last longer, we can significantly reduce the environmental impact of these high production levels; this focus on longevity is supported by WRAP's Sustainable Clothing Action Plan (now extending into Europe as the European Clothing Action Plan).⁷

CHALLENGES

Our stakeholder group identified a number of challenges to achieving a more circular textiles economy in London, which are summarised here:

Durable and timeless textiles

- Consumers currently show a preference for regularly buying new clothes according to changing fashion.
- High quality durable clothes are associated with higher costs.

Using clothes for longer

- Using clothes for longer implies a change in business model compared to the conventional sale of textiles. Changing a business model is considered extremely risky as it includes very different flows of income, costs and risks.

- Owning your own (new) clothes, as opposed to renting or buying second-hand, is deeply rooted in habits and culture. Some people may also have an aversion to wearing clothes previously worn by others (e.g. cultural, hygiene, etc.).
- Many people have lost the ability to repair clothes.

Take back, collection, re-use and recycling

- A lack of awareness of the environmental (and social) impacts of textile production may mean that consumers do not engage in take-back schemes without incentives
- Collection of used textiles from households and sorting them for re-use both pose logistical or

technical challenges and are costly.

- More cost-effective recycling technologies are needed and larger or more profitable markets for recycled textiles have to be identified.
- Driven by fashion and technology, textiles often use blended materials, mixed fibre trimmings, etc. which make products hard to recycle.
- Offering warranties and/or repair services are associated with increased risks and costs.

SUMMARY OF ACTIONS

The tables at the end of this section outline in detail the actions required to accelerate the transition to a circular textiles economy in London and attempt to respond to the challenges outlined above. Each action details resources identified or required, partners, outcomes and impacts. The key actions for the textiles sector can be summarised as:

Design

- Increase knowledge and expertise by incorporating circular economy design into relevant textile design courses and create design competitions to incentivise and promote innovation.

Embedding circular economy into the textile supply chain

- Offer business support to textiles industry start-ups and existing SMEs to help them transition to more circular economy business models.
- Invest in circular economy textile SMEs and in technologies that allow for more sustainable textile manufacture.
- Look at opportunities to 're-shore' textiles manufacture and production in the capital from overseas.
- Encourage large textile brands and

manufacturers to use more circular business models.

- Lobby for extended producer responsibility for textiles, as happens in France.
- Provide procurement advice and support to organisations to help them procure textiles more sustainably, using circular economy business models such as increased percentage of recycled content.

Re-use and recycling

- Continue to influence consumer behaviour through the Love Your Clothes campaign.
- Assess how collections and infrastructure for textile re-use could be improved.
- Invest in fibre sorting and fibre-to-fibre recycling technologies.

WHAT'S HAPPENING ALREADY?

The textiles sector is one of the most innovative and engaging in terms of advancing circular economy approaches, with a lot happening in London, the UK and Europe more widely. Here is a snapshot of a number of projects and organisations working in this space:

Textiles Futures Research Centre

TFRC is one of the eight research centres established at the University of the Arts London, and is based across two of its eminent design colleges: Central Saint Martins and Chelsea College of Arts. TFRC hosts a community of practice-based researchers who explore how materials and textiles can enable a more sustainable future.
<http://www.tfrc.org.uk/about/>

Centre for Sustainable Fashion

Centre for Sustainable Fashion (CSF) is based at London College of Fashion. Their work explores vital elements of Better Lives, London College of Fashion's commitment to using fashion to drive change, build a sustainable future and improve the way we live.
<http://sustainable-fashion.com/about/>

Textiles Environment Design

Over the last ten years TED has been developing a set of practice-based sustainable design strategies that assist designers in creating textiles that have a reduced impact on the environment. All of their research is based on the estimation that decisions made in design are responsible for eighty to ninety percent of a product's environmental and economic costs. This places a clear responsibility in the lap of the designer and is the driver for the development of the sustainable textile design strategies.
<http://www.tedresearch.net/about/>

Love Your Clothes

Launched in 2014, the Love Your Clothes campaign was developed together with industry organisations to help change the way that UK consumers buy, use and dispose of their clothing. The ultimate aim is to reduce the environmental impact of clothing across the UK and influence a more circular approach to clothing globally.
<http://loveyourclothes.org.uk/about>

European Clothing Action Plan (ECAP)

This EU Life-funded project involves a range of pan-European partners, all of whom are delivering activities which will:

- Reduce the carbon, water and waste footprints of clothing in Europe.

- Ensure that fewer low grade textiles go to incineration and landfill.
- Reduce waste in the clothing supply chain.
- Encourage innovation in design, recycling of textile fibres and service models to boost business growth in the sector.
- Influence consumers to buy smarter and use clothing for longer by using the existing Love Your Clothes consumer campaign.

<http://www.ecap.eu.com/>

Textile Recycling Association

The UK's trade association for collectors, sorters, processors and exporters of used clothes and textiles. One of their key aims is to strengthen the economic opportunities for all their members by promoting all forms of textile recycling and the second hand clothing/shoe recycling industry.

<http://www.textile-recycling.org.uk/>

SME's working in this space:

Worn Again

Worn Again is developing a chemical textile to textile recycling technology that will enable end of use clothes and textiles to be collected, processed and made back into new yarn, textiles and clothes again and again.

<http://wornagain.info/>

Vigga

Danish startup VIGGA.us is the founder of an award-winning business model for a circular economy in the textile industry. The VIGGA™ product-service-system enables parents to lease organic childrens wear.

<http://www.vigga.us/in-english/>

Mud Jeans

Mud Jeans offers the opportunity to lease your jeans for a monthly fee. You can return them whenever you want but if they wear out you send them to Mud Jeans, they recycle old ones and send you a new pair.

<http://www.mudjeans.eu/>

Large companies in this space:

H&M

In 2013, H&M launched their garment collecting initiative worldwide. You can drop off your unwanted garments – no matter what brand and what condition – in all H&M stores across the globe. They are committed to changing the way they make, use and dispose of clothes. Once the old garments have been dropped off in a store, their partner I:CO collects and sorts them into three categories – rewear, re-use and recycle. <https://about.hm.com/en/sustainability/get-involved/recycle-your-clothes.html>

Marks and Spencer

Marks and Spencers offers customers the opportunity to drop off any unwanted clothing in instore Shwopping boxes. Shwopped items are resold, re-used or recycled with the profits going to Oxfam. They hope this project will help to see a move away from 'disposable' fashion where we throw away clothes when we've had enough of them.

<http://www.marksandspencer.com/s/plan-a-shwopping?OmnitureRedirect=schwopping>

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WRAP

1 DESIGN

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact
BUSINESS SUPPORT				
Identify and engage with universities and colleges to incorporate circular economy principles and activity into textile design courses, including use of WRAP's clothing knowledge hub tools. (S)	Resource identified and plan in place led by LWARB. Partners interested: WRAP, private sector partners.	Circular economy principles are taught throughout textile design courses in London, producing a generation of designers for which circular economy forms an integral part of textile design.	Greater uptake of and better skills/ tools for circular economy design in the textile sector. More durable, versatile clothing available. Increased innovation activity in London.	Reduced resource use, more efficient resource use. CO ₂ equivalent emissions saved. Increased job opportunities. Further strengthened profile of London as fashion design capital.
Design competitions and awards to engage directly with professional designers to develop and promote circular economy solutions for clothes/ textiles. (M)	No resources identified.	Inspired young designers engaged and encouraged to incorporate CE concepts into design.		
INNOVATION				
Carry out a study on the extent and character of textile/clothing re/ manufacture in London, identifying opportunities to develop and challenges. (M)	Partners interested – resource not identified. Partners interested: WRAP, LWARB, Soloman.	Knowledge base for encouraging the formation of a tech cluster for textiles in London.	More resource efficient supply chain and innovation in the London textiles sector.	

2 EMBEDDING CIRCULAR ECONOMY INTO TEXTILES

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact
COLLABORATION				
Encourage uptake of circular economy business models, utilising the Mayor's position with retailers and brands. (S)	Resource identified and plan in place led by LWARB (until March 2018).	Active uptake and implementation of circular economy initiatives among major retailers and brands.		Financial savings to both consumers and businesses adopting more efficient circular business models.
Lobby for an extended producer responsibility (EPR) scheme for textiles as has been introduced in France to help finance clothing/textiles collection, communication, etc. (M)	Partners interested – no resources identified.	Extended Producer Responsibility scheme in place in the UK.	More funding is available for improving the environmental impact of the textiles supply chain.	Improved recycling rates, less textile waste to landfill. Reduced resource use, more efficient resource use.
Undertake a small scoping study to look at the opportunities and barriers of an EPR for textiles. (S)	Resource identified and plan in place led by WRAP (until March 2018) to undertake a small scoping study in this area. Partners involved: LWARB.			CO ₂ equivalent emissions saved.
PROCUREMENT				
Identify opportunities to embed circular economy requirements into textile procurements and demonstrate successful pilots in the public sector as best practice. Include recycled content and access to product through new business models. (S)	Resource identified and plan in place led by GLA (until March 2018). Partners involved: GLA Responsible Procurement Group, private sector.	A series of pilots conducted by London public sector bodies with circular economy requirements, demonstrating best practice, successes and learning.	Increased demand for circular economy business models in London. Private companies follow from public sector example.	Financial savings to public sector bodies through improved procurement practices.

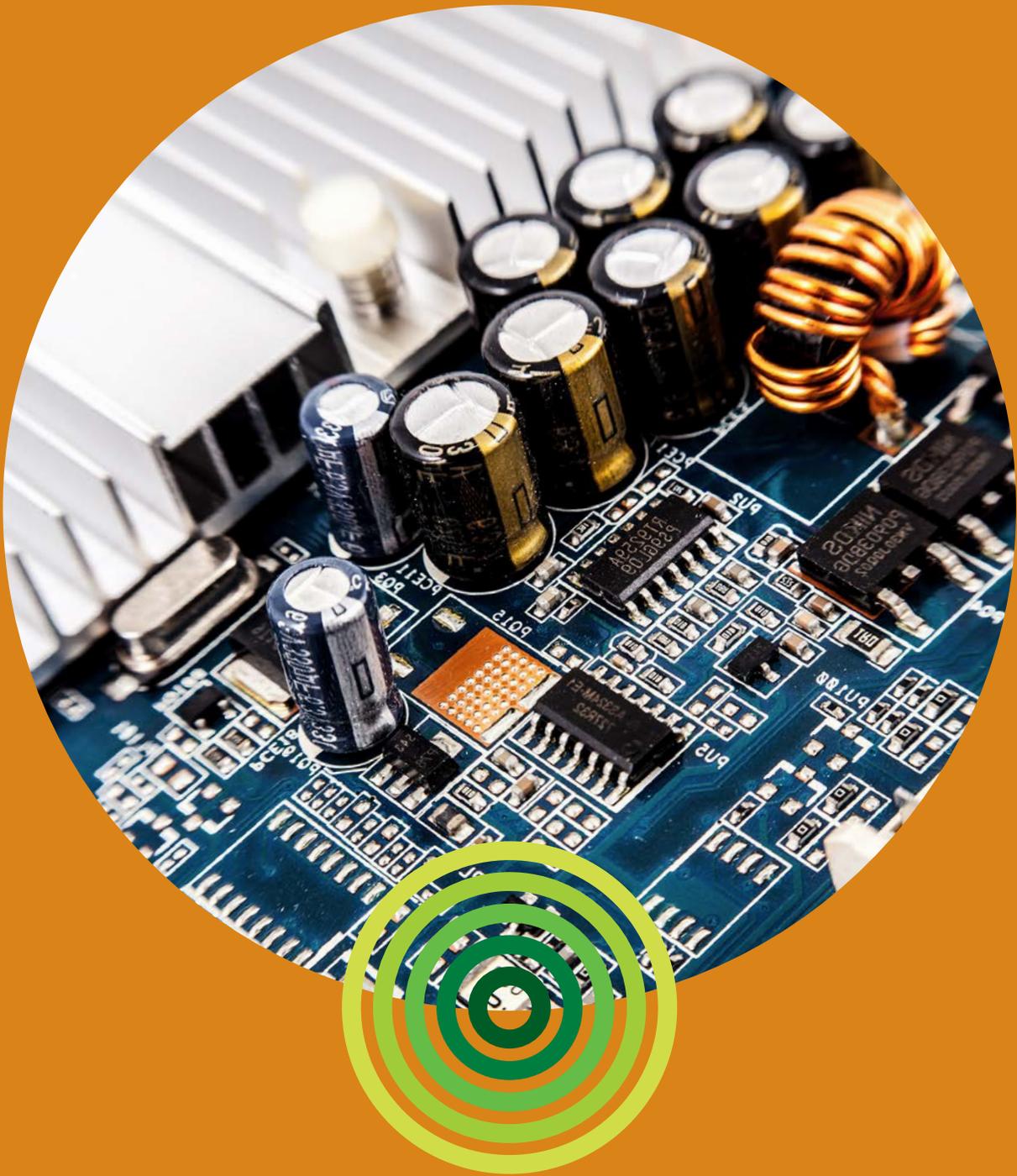
2 EMBEDDING CIRCULAR ECONOMY INTO TEXTILES (CONTINUED)

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact
BUSINESS SUPPORT				
Provide business support to textile SMEs through Advance London to scale up or develop circular economy business models. (S)	Resource identified and plan in place led by LWARB until December 2019.	<p>Innovative SME approaches are identified and supported, eventually reaching scale-up stage.</p> <p>A well-equipped set of SMEs with circular economy business models integrated into the London market.</p> <p>A portfolio of learnings and experience gathered from the pilots.</p>	<p>The establishment of new circular economy solutions and London as a hub for such solutions.</p> <p>Increased uptake of circular economy models throughout London's textile sector.</p>	<p>Potential for financial savings to both consumers and businesses adopting more efficient circular business models.</p> <p>Learning to share with other companies who are interested.</p> <p>Increased innovation activity in London.</p>
Investigate the opportunities for an accelerator/incubator programme in the area of circular economy and textiles. (S)	Resource identified and plan in place led by LWARB (until March 2020).			
Offer investment to companies developing new technologies that reduce textile resource use. (S)	Resource identified and plan in place led by LWARB (until March 2020).			

3 RE-USE AND RECYCLING

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact
COMMUNICATION				
Design and deliver the Love Your Clothes behaviour change campaign in London to reduce textile waste. (S)	Resource identified, and plan in place, led by Resource London (WRAP and LWARB) (until March 2020). Partners involved: Borough Councils, Waste Partnerships, GLA, Transport for London, Private sector.	Consumer communications campaign and workshops.	Changed consumer behaviours lead to: • Reduced textiles to landfill. • More textile re-use.	Increased recycling rates, less textiles to disposal (landfill/incineration). CO ₂ equivalent emissions saved. Reduced resource use, more efficient resource use.
Develop and expand the Love Your Clothes campaign in London after 31/03/20. (M)	Partners interested – resource not identified LWARB, WRAP.			
Develop a network of businesses and people that support the Love Your Clothes campaign with practical activities such as repairers, recyclers, super crafters, stylists. (M)	Partners interested – resource not identified LWARB, WRAP.			
BUSINESS SUPPORT				
Identify and assess the infrastructure needs for an enhanced textiles circular economy in London e.g. regional textiles hub (M)	Partners interested – resource not identified LWARB, GLA, WRAP, universities.	London prepared to provide the necessary infrastructure for increased uptake of circular economy models and innovation as they emerge or reach a critical mass.	Overall increase of textile collection efficiency, rates and quality.	Financial savings to public sector bodies through improved waste management.
Encourage and promote piloting further R&D on fibre sorting and fibre to fibre technologies. (M)	Partners interested – resource not identified Made-By, Textile Recycling Association.	Business case for fibre sorting and fibre to fibre technologies are clear and attractive. Existing textile collectors and collection centres collaborate with the recycling plant.	More textiles are diverted from landfill and successfully recycled.	Overall increase of recycling rates and quality.

ELECTRICALS



While London does not differ greatly from the rest of the UK in terms of consumer electricals, it does represent a significant opportunity due to the large number of businesses based in the capital requiring IT equipment and support.

INTRODUCTION

A circular economy approach to electricals in London would ensure that those products were used to their greatest potential and value, and will require the investigation of ways to repair, re-manufacture, lease, share or re-sell more items in the city. The latest estimates of circular economy opportunities for electricals in London – both consumer and business – suggest that up to £900m of net benefits could be available annually by 2036.¹

LWARB's overall vision is for London to:

- Send zero electricals to disposal (landfill or incineration).
- Act as a regional electricals hub for collection, re-use and recycling.
- Re-use more electrical gadgets in the capital.

CONTEXT

From a consumer perspective the average UK household spends around £800 a year on new electrical and electronic goods.² We often demand the newest and fastest gadgets well before the original ones have come to the end of their serviceable lifetime; this acquisition cycle means that many of us are hoarding items such as phones and laptops at home as we don't know how to dispose of them properly and are concerned about the safety of data stored in them. On the other hand we want our white

goods, such as freezers and washing machines, to last as long as possible.

According to WRAP, nearly 25% of waste electrical and electronic equipment (WEEE) that's taken to UK household waste and recycling centres could be re-used.³

Clearly, businesses in London have a very high demand for access to IT equipment. Larger businesses have IT replacement schedules and often contract out procurement and disposal of IT equipment to a third party.

THE OPPORTUNITY

There is a significant opportunity for London to get better value out of our electrical equipment, thereby supporting the creation of new jobs in the capital while reducing our resource and environmental impact.

By weight, the UK purchases about 1.4 million tonnes per year of electrical and electronic products and disposes of a similar amount. Nearly 40% of this goes to landfill and less than 10% is re-used, despite the fact that much of it either works or could be repaired. At the point of sale, a tonne of product has an average value of £15,000.⁴ By the time this product is landfilled or recycled the value is only in the material: notionally around £800 per tonne on average.

The reason for this is depreciation of the assets, hoarding of equipment due to concerns about data security and poor storage of equipment. This is a missed opportunity both for businesses and consumers.

London can capture some of this lost value through re-use, repair and remanufacture: supporting and promoting a variety of approaches through charity, social enterprise and commercial routes will increase the time that materials and appliances are kept in use and generate economic returns for those involved.

Manufacturers and retailers are increasingly looking to new business models that enable sharing, renting, leasing and more effective maintenance schedules to extend the period that a product is making money for them.

CHALLENGES

Our stakeholder group identified a number of challenges to achieving a more circular electricals economy in London, which are summarised below.

Design for durability, reparability and recyclability

- High quality durable products are assumed to have higher costs and lower overall sales.
- Many IT manufacturers are strongly

¹ LWARB: Towards a circular economy (2015)

² WRAP: Switched on to value (2014)

³ WRAP: Switched on to value (2014)

⁴ WRAP: Switched on to value (2014)



opposed to providing repair manuals for their products, usually citing concerns over intellectual property.

- Many consumers and businesses alike have concerns about the quality of data wiping services when products are being repaired, re-used or recycled.

New business models – sharing, renting, leasing, maintenance

- This implies a strong change in the business model compared to the conventional sale of electronics. Changing a business model is considered extremely risky as it includes very different flows of income, costs and risks.
- Owning your own products is deeply rooted in habits and culture.
- High labour costs for maintenance and low prices for new products hamper the competitiveness of maintenance compared to replacement with new products.

Increasing recycling/re-use rate

- Consumers may not engage in take-back schemes without incentives and there is a lack of awareness about the possibilities for recycling electrical and electronic devices and appliances.
- Collection and sorting of used electricals pose logistical or technical challenges and can be costly. More cost effective recycling technologies are needed and larger or more profitable markets for recycled electronics have to be identified to match those costs.
- Electronics are made of a highly complex mix of materials which makes products hard to recycle.

SUMMARY OF ACTIONS

The tables at the end of this section outline in detail the actions required to accelerate the transition to a circular

electricals economy in London and attempt to respond to the challenges outlined above.

Each action details resources identified or required, partners, outcomes and impacts. The key actions for the electricals sector can be summarised as:

Design

- Use the joint procurement power of cities to influence the design of office equipment so as to embrace circular economy principles.
- Engage with university courses to embed circular economy thinking into relevant courses on electricals design.

Extending the life of products

- Pilot a consumer campaign to promote re-use and recycling of electrical equipment.
- Develop a larger repair economy in London by raising awareness of existing repair businesses and encouraging others.
- Support local authorities, other public sector organisations and businesses to track and trace their electrical assets and use an online platform to enable re-use of items within their organisation and beyond.
- Review organisational IT strategies including procurement, replacement cycles and disposal routes.
- Support SMEs that repair, re-use or remanufacture electrical equipment or new start ups in this field.
- Invest in businesses that improve product lifetimes.

Effective collection and recycling

- Bring together producer compliance schemes to consider service packages to local authorities.
- Lobby for more stretching targets for producer compliance schemes.
- Support innovative ideas on collection, recycling and WEEE treatment.

WHAT'S HAPPENING ALREADY

There is a lot of inspiring work happening in London, the UK and Europe to introduce circular economy principles in electricals. Here's a snapshot of a number of projects and organisations working in this space:

Restart Project

The Restart Project is a people-powered platform for change, helping demand emerge for more sustainable, better electronics.

By working with communities, schools, and companies to value and use electronics longer – and documenting the barriers to doing so – Restart aims to drive a global movement which moves beyond the throw-away economy.

They take local action to prevent electronic waste through hands-on learning events at which people are helped to fix their own electronics – and then help others to do the same globally. <https://therestartproject.org/>

Electrical and Electronic Equipment Sustainability Action Plan (esap)

WRAP is working with the electrical and electronic equipment industry using collective action to generate value through sustainability. Their industry-led collaborative framework aims to deliver an industry that has a positive environmental impact on the communities it trades in, takes care over the resources it uses and delivers tangible economic benefits to society. WRAP's esap programme aims to achieve this by focusing on five main areas:

- Product durability.
- Minimising product returns.
- Consumer behaviour and sustainable products.
- Resource efficient business models.
- Re-use and recycling.

<http://www.wrap.org.uk/sustainable-electricals/esap>

iFixit

iFixit is a wiki-based site that teaches people how to fix almost anything. Anyone can create a repair manual for a device, and anyone can also edit the existing set of manuals to improve them. Their site empowers individuals to share their technical knowledge with the rest of the world.

<https://www.ifixit.com/>

Globechain

Globechain is an online re-use platform that connects businesses with charities and other organisations and individuals to enable them to re-use unwanted items. They have effectively created a global supply chain network which produces both a waste audit and social impact value for members.

Their aim is to create local supply chains within a global community and enable the redistribution of goods to social causes rather than sending them to landfill.

<https://www.globechain.com/>

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1 DESIGN

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact
COLLABORATION				
Use the joint power of cities to influence brands and manufacturers to design circular economy principles both into their products (e.g. durability, repairability, modularity) and their business models (eg. incentivised return, lease/hire). Utilise the Mayor's position to introduce collaboration with other cities, align a common vision and leverage cities' purchasing power. (M)	Partners interested – resource not identified.	Collaboration of cities leveraging influence and purchasing power and addressing key players.	The combined purchasing power and influence of the collaborating stakeholders and cities impacts both local and global players. Circular solutions are encouraged by increased demand both locally and on the global electricals market.	<p>Potential financial benefits of differentiation on the market for first-moving manufacturers.</p> <p>Financial savings for consumers from decreased consumption of 'new' equipment.</p> <p>Reduced resource use, more efficient resource use.</p> <p>CO₂ equivalent emissions saved</p>
COMMUNICATIONS				
Identify and engage with universities and colleges to incorporate circular economy principles and activity into electronic engineering courses. (S)	<p>Resource identified and plan in place led by LWARB (until March 2018).</p> <p>Partners interested: Restart Project.</p>	The EEE community increasingly adopts a circular economy mind-set. Greater uptake, innovation and better skills for CE design in the EEE sector.		Established collaboration platform between cities with a potential to be expanded to other areas.

2 PRODUCT LIFE EXTENSION

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact
COMMUNICATIONS				
Pilot a campaign targeting residents and businesses to promote, reuse and recycling of electrical equipment. (e.g. Love Food Hate Waste approach). (M)	Partners interested – resource not identified. Partners interested: Restart Project, LWARB.	Residents and businesses are better informed about the ongoing value and environmental impact of their electrical equipment.	Fewer electrical products going to landfill and incineration. Increased re-use of electricals. Increased use of existing local re-use, repair and recycling establishments.	Reduced resource use, more efficient resource use. CO ₂ equivalent emissions saved.
Develop KPIs to enable effective collection of re-use data. (M)	Partners interested – resource not identified Interested partners are: Restart, DEFRA, LWARB.	Agreement on the appropriate system and method of collecting CE data.	Increased re-use backed up with real-time data. Better informed market.	
DEMONSTRATION				
Encourage local authorities'/ companies' to track electrical assets to ensure best use of existing products and reduce need for procurement/use online platform to facilitate re-use. (S)	Partners interested – resources being sought Interested partners are: London Environment Directors Network.			
Encourage review of local authorities/ 'companies' corporate IT strategy (e.g. replacement cycles, procurement and disposal) with circular economy principles (e.g. extending product life, use of remanufactured product, re-use). (M)	Partners interested – resource not identified.	Identified areas to embed CE that make financial sense.	More sustainable use of IT.	
Explore the potential to collect, re-use and sell on office electrical equipment in London (linking London offices to London SMEs and communities for re-use). (S)	Partners interested – resources being sought. Partners interested: LWARB, WRAP, Inlecom.	Linked collection between office and communities.	More closed loop solution for office IT equipment in London.	

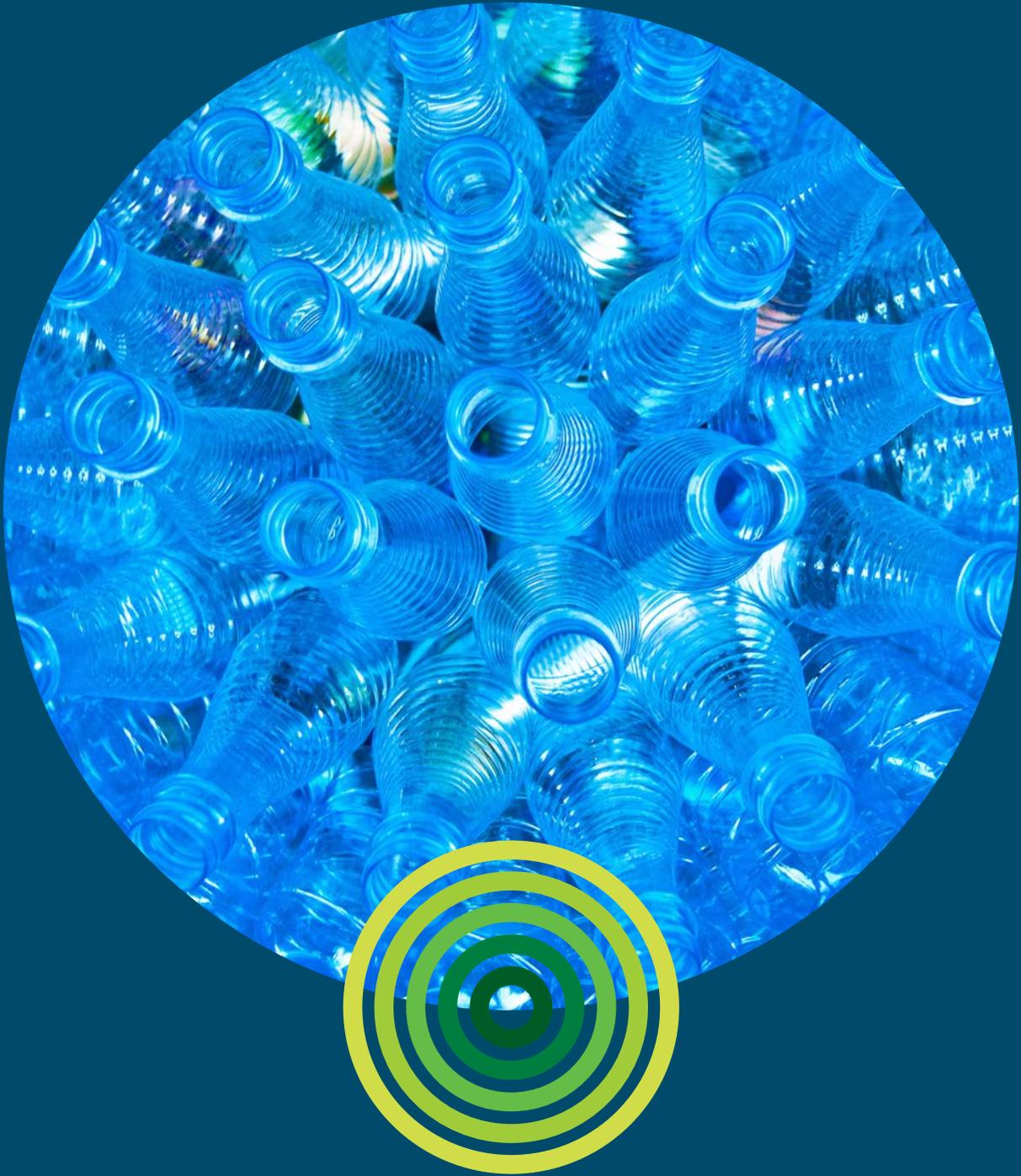
2 PRODUCT LIFE EXTENSION (CONTINUED)

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact
BUSINESS SUPPORT				
Provide business support to electricals SMEs through Advance London to scale up or develop circular economy business models. (S)	Resource identified and plan in place led by LWARB (until January 2019).	More businesses in London using circular economy business models.		
Seek opportunities to invest in circular economy electricals innovations such as design for adaptability, disassembly, re-use and remanufacturing, new products and services. (S)	Resource identified and plan in place led by LWARB (until March 2020).			

3 COLLECTIONS AND RECYCLING

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact	
COLLABORATION					
Bring together the PCSs (producer compliance schemes) to consider service packages to local authorities. (S)	Plan in place led by WRAP (until March 2018). Partners involved: DEFRA, LWARB, London Boroughs, compliance schemes.	A co-ordinated approach for effective collection and communications.	More sustainable collection of electricals.	CO ₂ equivalent emissions saved.	
POLICY					
Encourage UK government to increase the target for producer responsibility scheme and oblige contractors to work with local authorities. (M)	Partners interested – resource not identified.	Close partnerships between contractors and local authorities.			
DEMONSTRATION					
Support innovative ideas on collection, recycling and WEEE treatment (e.g. dismantling, material extraction, etc.) by backing pilots and offering advice. (M)	Partners interested – resource not identified.	Testing and demonstration of innovative collection and recycling solutions.	An innovative, more efficient and effective collection and recycling system.		

PLASTICS



Plastics bring many benefits to our lives: from protecting our food to the clothes we wear, from cosmetics production to household appliances. The use of plastics is widespread and diverse. Unfortunately, plastics usage can have significant and adverse impact upon the environment.

INTRODUCTION

Plastics are made from oil which has a significant climate impact from its production and when burned in incinerators. Plastics are a huge source of marine pollution.

The Ellen MacArthur Foundation estimates that, if we continue to use plastics in our current linear fashion, the weight of plastic pollution in the sea will be equal to the weight of fish in the world's oceans by 2050. Plastic will consume 20% of the world's oil and be responsible for 15% of CO₂ emissions.

However there is a huge opportunity to use these resources more efficiently and in a way that does not damage our environment. For example, how can plastic waste be prevented and its incineration reduced, and how can the volume of plastics making their way into the Thames and onwards into the world's oceans be stopped?

A circular economy approach will ensure that plastics are used to their greatest potential and value in the capital. The latest estimates of the net benefits this could bring for London are up to £200m annually by 2036.

LWARB's overall vision for plastics in the capital is to:

- Increase the amount of plastic captured from households in London through harmonising the materials collected for recycling.
- Work in partnership with other cities, organisations and voluntary agreements to influence the plastics supply chain through the Ellen MacArthur Foundation's New Plastics Economy initiative.

CONTEXT

According to the Ellen MacArthur Foundation, after a short first-use cycle, 95% of plastic packaging material value is lost to the economy – around £64–95 billion annually.

A staggering 32% of plastic packaging escapes collection systems, generating significant economic costs by reducing the productivity of vital natural systems such as the ocean and clogging urban infrastructure.

Overall UK plastic waste is estimated to be around 3.7 million tonnes. Packaging is the main source of this waste, accounting for approximately 2.2 million tonnes (59%), with non-packaging plastic estimated to be 1.5 million tonnes. Because of this and the fact that data is less readily available for the

1.5 million tonnes of non-packaging plastics, the focus of the following section will be plastic packaging.

Plastic packaging

Of the 2.2 million tonnes of plastic packaging arising in 2014, 1.5 million tonnes comes from packaging used in the consumer sector (e.g. households) and 0.7 million tonnes is used in the non-consumer sector, which includes commercial and industrial, construction and demolition and agriculture. The plastics recycling rate in the UK in 2015 was 40%.

Plastic recycling in London

All of London's 33 boroughs offer kerbside collection of plastic bottles for recycling, with 29 boroughs also collecting pots, tubs and trays. All boroughs offer some level of advice to residents on what plastics to recycle, supported by the Recycle for London campaign.

THE OPPORTUNITY

The supply chain for plastics is global, so it is vital for London to be part of larger partnerships that work together to drive change. This is why the London Waste and Recycling Board has signed up to be part of the Ellen

- 1 Ellen MacArthur Foundation, The New Plastics Economy: rethinking the future of plastics, (2016)
- 2 LWARB: Towards a circular economy (2015)
- 3 Ellen MacArthur Foundation, The New Plastics Economy: rethinking the future of plastics (2016)
- 4 World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, The New Plastics Economy – Rethinking the future of plastics (2016)
- 5 WRAP, Plastics Market Situation Report (2016)
- 6 WRAP, Plastic packaging market study (2014)
- 7 Environment Agency: National Packaging Waste Database
- 8 World Economic Foundation and Ellen MacArthur Foundation, The New Plastics Economy – Catalysing Action (2017)



MacArthur Foundation's New Plastics Economy initiative.

The Ellen MacArthur Foundation's latest report on reshaping the global plastics economy identifies three strategies to transform the sector:

- Redesign and innovation – without fundamental rethinking, about 30% of plastic packaging will never be re-used or recycled.
- Re-use – for at least 20% of plastic packaging, re-use provides an economically attractive opportunity.
- Recycling with radically improved economics and quality – with concerted efforts on design and after-use systems, recycling would be economically attractive for the remaining 50% of plastic packaging.

Within London, the following opportunities have been identified within these three strategies.

Redesign and innovation

Plastic packaging in the food sector:

Increasingly there is an opportunity to collect more plastic packaging 'on the go' when people are out and about at railway stations, in tourist attractions or take away eateries. Food retailers and manufacturers could also make these items more recyclable, re-usable or capable of being anaerobically digested/composted.

Business and public

sector procurement:

Procurement will play a key role with public and private organisations having

the ability to specify products that are re-usable, easily recyclable and/or have a minimum recycled content to support the recycled plastics market.

Re-use

Consumer behaviour change:

Residents should also be encouraged to use products that can be re-used, anaerobically digested, composted or recycled. Policy measures used in other cities or regions across the world include bans and taxes (e.g. for single-use plastic bags – or the recent decision in France to ban plastic cutlery and crockery) or the provision and promotion of alternatives (e.g. a campaign to promote tap water, or the provision of water fountains, to reduce single-use water bottles) should be explored.

Recycling

Harmonisation of plastic recycling:

A first priority is to drive harmonisation of the plastics collected for recycling in London. This increases clarity for Londoners and allows for consistent communication and labelling, which in turn could increase capture rates from residents and reduce sorting mistakes further down the line. It could also enable economies of scale which are especially important in sorting activities.

Resource London are heading up the work on harmonisation, working with London boroughs and government.

Plastic manufacturers and retailers can also benefit from the consistency agenda, providing them with one single system to design towards, which could increase the share of packaging that is economically worth recycling.

Promotion of plastic recycling:

Further work to promote dry recycling amongst 18-34 year olds in the capital will start in 2017 through the Recycle for London campaign, where possible targeting those in rented households as they regularly move across borough boundaries and would benefit most from consistent services and messages. There is an opportunity to focus on plastics for at least one full year of this campaign.

CHALLENGES

Our stakeholder group identified a number of challenges to achieving a more circular economy for plastics in London; these challenges are summarised below. The actions at the end of the section respond to some of these challenges.

Effective recycling requires harmonisation and consistency

- Quality of recycling depends on the quality and uniformity of input. This requires either improved sorting and pre-treatment of waste or enhanced sorted collection.
- Harmonisation and convergence towards consistent design and collection systems require collaboration across cities and countries, which is challenging to achieve for an individual city.
- Whilst there is a tax on landfilling, there is no such tax on incineration or energy from waste.
- Not all local authorities collect pots, tubs and trays at the kerbside, and very few collect flexible plastic packaging such as films and plastic bags.
- Products are not standardised and may contain mixes of materials.
- Reverse logistics require infrastructure and investment.

Reduction the amount of plastics that cannot be re-used or recycled

- Consumer habits: Though alternative materials and behavioural options such as re-use exist, single use plastics packaging is the status quo and perceived as effective, functional and easy.
- Due to market failures (unexpected external costs of plastics such as pollution in the oceans), plastic prices don't reflect the true cost to society.
- There is an increasing amount of plastic packaging emerging in the market that there is not currently a cost-effective recycling solution for.

Design for material efficiency, durability, re-usability and recyclability

- Higher quality, durable and economically recyclable products are assumed to be associated with higher costs, and the additional value created across their lifecycle (e.g. through recyclability) can often not be captured by the designer/producer of the plastics packaging who is bearing the costs.
- Except through producer responsibility legislation covering packaging and WEEE, designers and producers have no responsibility for the waste resulting from their products after use, so they have little incentive to design for re-usability, recyclability etc.

SUMMARY OF ACTIONS

The key actions in the following plans to accelerate London towards a more circular economy for London's plastics are, in summary:

- Support London boroughs to harmonise collection systems across the capital, in line with emerging national and/or international standards (e.g. Global Plastics Protocol).
- Support London boroughs to be consistent in the plastics packaging they recycle so that all residents can recycle plastic bottles, pots, tubs and trays – and, in the near future, plastic film such as carrier bags.
- Give Londoners clear communications about which plastic containers and packaging they can recycle and which they cannot.
- Provide more widely available recycling services in public areas.
- Encourage and support consumers and private and public organisations to procure items that are re-usable, easily recyclable and/or include recycled content.
- Collate procurement needs across public organisations, private organisations and other cities to drive change by retailers and manufacturers.
- Work with the New Plastics Economy to develop collaborative ways of working to drive change within the global plastics supply chain.

WHAT'S HAPPENING ALREADY

There is a lot happening in the UK and Europe around introducing circular economy principles in plastics. Here's a snapshot of a number of projects and organisations working in this space:

Zoological Society for London OneLess project

The new #OneLess campaign, led by ZSL and partners in the Marine CoLABoration, is working to make London the first capital city to stop using single-use plastic bottles. <https://www.zsl.org/conservation/habitats/marine-and-freshwater/one-less>

New Plastics Economy

Cross-value chain collaboration is at the heart of the New Plastics Economy initiative of the Ellen MacArthur Foundation. The initiative brings together global consumer goods companies, retailers, plastic producers and packaging manufacturers, cities and businesses involved in collection, sorting and reprocessing, to drive collaborative demonstration projects and co-shape the initiative. <http://www.newplasticseconomy.org/>

Resource London

In 2015 LWARB and WRAP set up a collaborative programme to support London boroughs in their provision of waste and recycling services. Working towards the harmonisation of recycled products, including plastics, across London Boroughs is a key focus. <http://resourcelondon.org/>

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WRAP

1 REDUCE AND RECYCLE

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact	
COMMUNICATIONS					
Support householders to be clear what plastic packaging they can recycle. (S)	Resource identified and plan in place led by Resource London (until March 2020).		More of the right type of plastic packaging is collected without being contaminated with other types.	More plastics recycled. Less virgin resources used. CO ₂ equivalent emissions saved.	
COLLABORATION					
Support all boroughs in London to collect plastic tubs, pots and trays as well as plastic bottles to create harmonisation across London contributing to and learning from the Global Plastics Protocol. (S)	Resource identified and plan in place led by Resource London (until March 2020).	Consistency across all London Boroughs to collect plastic bottles, tubs, pots and trays.	More plastic tubs, pots and trays are collected.		
Facilitate discussions around innovative opportunities for new 'on the go' food packaging solutions in London, carrying out pilots where possible. (S)	Resource identified and plan in place led by Business in the Community (until March 2018). Partners involved: Private sector, LWARB, PwC.	Innovative food packaging solutions are developed in London.			
DEMONSTRATION					
Facilitate re-use of plastic packaging pilots in a B2B context. (S)	Resource identified and plan in place led by LWARB (until March 2018).	Less single use plastic is used in a B2B context.			
POLICY					
Encourage public and private organisations to procure plastic items with an appropriate level of recycled content. (M)	Partners interested – resource not identified.	More products with recycled content purchased.	Supports the market in recycled products.		

1 REDUCE AND RECYCLE (CONTINUED)

Actions (S/M/L)	Resources	Outputs	Outcomes	Impact	
POLICY					
Collate procurement requirements across public and private organisations in London to feedback to retailers through WRAP e.g. reducing the number of polymers used to aid sorting and recycling, reducing use of composite packaging to aid recycling, not using black plastic for packaging as it cannot be sorted easily. (M)	Partners interested – resource not identified.	Develop further consistency in the plastics industry to reduce the amount of plastic that cannot be recycled.	More of the plastic collected can be recycled.	CO ₂ equivalent emissions saved. More plastics recycled. Fewer virgin resources used.	
Utilise the Mayor's position to introduce collaboration with other cities, align a common vision and leverage cities' purchase power. (M)	Partners interested – resource not identified.				
BUSINESS SUPPORT					
Utilise the Mayor's position to introduce collaboration with other cities, align a common vision and leverage cities' purchase power. (M)	Partners interested – resource not identified.				
Feed into the work of the Ellen MacArthur Foundation's New Plastics Economy initiative and gain funding for, and pilot, new innovations in London. (S)	Resources identified and plan in place led by LWARB (until March 2020).	More joined up approach to plastics supply chain at a global level.			
Provide business support to plastics SMEs through Advance London to scale up or develop circular economy business models. (S)	Resources Identified and plan in place led by LWARB (until January 2019).				
INNOVATION					
Explore the possibility of an accelerator/incubator for start ups working around circular economy opportunities for plastics. (S)	Resource identified and plan in place led by LWARB (until March 2020).	Innovation within the plastics industry.			

For more information about the route
map and to get involved please contact:

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LWARB
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