

# LONDON THE CIRCULAR ECONOMY CAPITAL



Towards a circular economy – context and opportunities

SUPPORTED BY  
**MAYOR OF LONDON**



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## KEY FACTS



## Vision for a circular economy in London

The London Waste and Recycling Board (LWARB) and Greater London Authority will work with stakeholders to focus on making sure London benefits from a new circular economy. By December 2016, we'll have set new targets to measure progress on:

- new jobs and training opportunities for Londoners.
- increasing the number of circular business start-ups, as well as existing circular businesses scaling up and more traditional businesses moving to a circular business model.
- a number of circular economy demonstration projects.
- increased rates of product recycling, sharing, re-use and remanufacture in focus areas.
- increasing the number of GLA group procurements that use circular economy principles.
- greater understanding of how a circular economy can contribute to London's greenhouse gas emissions reduction targets.

1 GLA: London's changing economy since 2008 (2015)

2 Amec Foster Wheeler: see focus area profiles in this document (pg 20-30) (2015)

3 WRAP: Employment and the circular economy – Job creation through resource efficiency in London (2015)

# TOWARDS A CIRCULAR ECONOMY ROUTE MAP



The Mayor has asked LWARB to develop a circular economy route map to 2036. The aim is to ensure London makes the most of this opportunity. He's also asked the wider GLA group to review its procurement policies to encourage more circular economy businesses.<sup>4</sup>

By adopting a circular economy approach, London can unite business interests with the city's wider development needs. This will help London remain globally competitive.

This document sets out the context and opportunities for a London circular economy route map. It aims to:

- inform upcoming environmental, economic and spatial policy development in the capital.
- raise awareness within both the private and public sector of what a circular economy is. That way they can start to identify where opportunities exist.
- engage stakeholders who want to work with LWARB and GLA in this area.

Initial focus areas for action in London have been identified as:

- the built environment
- food
- textiles
- electricals
- plastics

These focus areas have been chosen because of their high environmental impact, their retained financial value

and potential for re-use. These areas could benefit London to the tune of at least £7 bn annually by 2036.<sup>5</sup>

LWARB will set up a small stakeholder working group for each focus area and for the cross-cutting themes of business models and procurement. Many stakeholders are already working on circular economy business models in these focus areas. Our aim is to draw this experience through to the next stage of the process.

Each working group will write a chapter of the route map that identifies partners, actions, opportunities and challenges along the way. The circular economy route map for London will consist of this context and opportunities document and the forthcoming chapters. We will publish these in early 2016 on the LWARB website.

LWARB and GLA have also identified five enabling sectors in this document. These sectors have the skills and experience to support London in its transition to a circular economy.

These sectors are:

- digital
- finance and service
- media
- higher education
- government

Each working group will identify specific actions for these sectors within the forthcoming chapters of the route map.

The GLA and LWARB have joined with circular economy thought leaders the Ellen MacArthur Foundation.<sup>6</sup> This gives London the chance to network, share and learn from other cities, regions and businesses about the benefits of a circular economy.

We welcome input from stakeholders – whether in the form of investment, business pilots, consultation, policy support or innovation. This will be vital to the route map's development and implementation.

## To find out more, please contact:

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T 020 7960 3686

<sup>4</sup> Mayor of London, London Infrastructure Plan 2050 – Update (Chapter 10) (2015)

<sup>5</sup> Amec Foster Wheeler: see focus area profiles in this document (pg 20-30) (2015)

<sup>6</sup> Ellen MacArthur Foundation: <http://www.ellenmacarthurfoundation.org/>

# IN SUPPORT OF THE ROUTE MAP



**Boris Johnson**  
Mayor of London

London is leading the way in terms of the low carbon goods and environmental services economy which was valued in excess of £30bn in 2014/15. I want London to take the same leadership role for the circular economy. London is home to many of the enabling businesses that will deliver the circular economy including digital, finance, media and higher education but it also has immense buying power that can create the demand for the circular economy which will in turn pay dividends in increased employment and economic growth.



**Cllr Julian Bell, Chair, Transport and Environment Committee London Councils**

The transition to a circular economy will have a significant impact on Londoners, such as reducing the amount of waste generated and how that waste is collected. London local government will be at the forefront of this transition, using circular economy business models to change the way it operates and delivers key services. This document is an important step in London's journey towards a circular economy.



**Michael Mulhern, Director of Planning OPDC**

Old Oak and Park Royal Development Corporation welcomes the 'Towards a circular economy' document, and looks forward to working together with LWARB and its partners to understand how the principles of the circular economy could be applied to the regeneration of the area.



**Paul Turner, Deputy Chair London Sustainable Development Commission**

The London Sustainable Development Commission welcomes the development of a circular economy route map for London – circular economy is one of three important themes that the Commission is currently focused on. The circular economy has many benefits for London, including new jobs and new enterprises. The Commissioners look forward to actively engaging with LWARB as the route map is developed in order to ensure that London becomes recognised as a leading circular economy city.



**Andrew Morlet, CEO Ellen MacArthur Foundation**

Cities play a central role in global economic development, and can reap significant opportunities by transitioning to circular systems, enabling optimised material and information flows, innovation, jobs creation and well-being. This is the path that London has chosen, and given its prime position on the global map, there is no doubt that this example will act as a beacon for other progressive municipalities.



**Dr Liz Goodwin OBE, CEO WRAP**

In a world of dwindling natural resources and rising populations, the make-use-throw away, make another, business model is no longer fit for purpose. We need a circular economy approach where materials are valued and designed to last longer, and where opportunities for re-using materials are easily accessible.

It is fantastic that London is embracing this new approach and this context and opportunities document makes a strong case for action. The circular economy has the potential to directly benefit London, with latest research showing opportunities for more than 12,000 new jobs by 2030.

# IN SUPPORT OF THE ROUTE MAP



## **Gudrun Cartwright, Environment Director Business in the Community**

The circular economy provides a great framework to ensure the way we use resources, from design to post use processing, maximises the value at every step of the chain. BITC have recognised the opportunities for businesses in adopting a circular economy approach in terms of increased revenues, competitiveness and enhanced relationships with customers. We are delighted that London is placing such a strong focus on embedding the circular economy within development plans and look forward to working with our members to realise the opportunities.



## **Jonny Hazell, Senior policy adviser Green Alliance**

As a leading light in the global economy, it is all the more significant that London is committing to being a pioneer of the circular economy. With its concentration of supply and demand, London is well suited to leading the development of a circular economy. Successful implementation of the route map would be good news for Londoners, who will benefit from new job opportunities and access to lower cost goods and services, and good for the circular economy which will benefit from the entrepreneurial and creative talents of Londoners helping to take the concept from theory to reality.



## **Nitesh Magdani, Director of Sustainability BAM Construct UK**

BAM Construct UK are a construction services company, offering design, construction and facilities management services throughout the UK.

As part of the Royal BAM Group nv, and having completed a 'circular' building in the Netherlands, we appreciate the benefits of working towards a more circular economy. This proposition reduces waste and encourages more collaboration with our supply chain to offer the client benefits over the life cycle of their assets.

The benefits of a local government push towards a circular economy in the Netherlands is clear. With this city level support in London we believe that over time the city would realise a growth in the economy for businesses and also understand the true value of its built environment.



## **Cris Stephenson, Managing Director Environcom**

Environcom are delighted that LWARB and the GLA are making a route map to a circular economy. Circular economy is key to our white goods re-use business model and one of our beliefs as a company is that what is good for the planet is also good for the wallet. It would be great for the route map to look at the conditions required to get other circular economy businesses locating in London.

## STRATEGIC LINKS



London is growing rapidly. There are currently 8.6 million people living in the capital and it is predicted that will grow to 11 million by 2050. Jobs in London are projected to increase to 6.3 million by 2050. By 2022, London will be welcoming 21 million international visitors a year.<sup>7</sup>

The London Infrastructure Plan 2050 (LIP 2050) sets out what facilities we must provide for this growing population. An analysis of the waste infrastructure required for London showed the potential for £5bn cumulative savings to 2050.<sup>8</sup> This would be by creating a more circular economy-style waste infrastructure – one focused on more repair, re-use and remanufacturing facilities and is additional to the benefits identified in this document. As such, the circular economy route map is intrinsically linked to the future development of both the Mayor's municipal and business waste management policies.<sup>9</sup>

The LIP 2050 recognises the scale of the challenge facing London. It has also identified several cross cutting themes required to ensure efficient and innovative growth. The move to a circular economy is one of those cross cutting themes.

The route map will help to inform the development of new policy in London and may shape the future direction of the new Mayor's Environment Strategy, London Plan, Economic Development Strategy and Transport Strategy.

The route map will also help inform location-based developments across London. The London Plan has marked out 38 opportunity areas where large

developments will happen in the capital.<sup>10</sup> The LIP 2050 has identified three opportunity areas that will act as case studies for other new developments in London. These areas are Old Oak Common, the Upper Lee Valley and North Bexley.<sup>11</sup>

The area that currently offers most opportunity is the Old Oak / Park Royal development. This is set to provide 25,500 new homes and 65,000 new jobs by 2030.<sup>12</sup> The Old Oak Park Royal Development Corporation (ODPC) will be in a unique position to incorporate circular economy thinking at the design and planning stage. Learning from the work with the ODPC will inform planning for future opportunity areas.

<sup>7</sup> Mayor of London: London Infrastructure Plan 2050 – A consultation (Chapter 2) (2014)

<sup>8</sup> Mayor of London: Enabling infrastructure: green, energy, water and waste infrastructure to 2050 (Chapter 7) (2014)

<sup>9</sup> Mayor of London: Municipal waste management strategy and Business waste management strategy (2011)

<sup>10</sup> Mayor of London: London Plan, <https://www.london.gov.uk/priorities/planning/opportunity-areas/location-londons-opportunity-and-intensification-areas-0>

<sup>11</sup> Mayor of London: London Infrastructure Plan 2050 – Update (Chapter 5), 2015

<sup>12</sup> Old Oak Park Royal Development Corporation: [www.london.gov.uk/priorities/planning/old-oak-park-royal/who-we-are](http://www.london.gov.uk/priorities/planning/old-oak-park-royal/who-we-are)

# WHAT IS A CIRCULAR ECONOMY?



A circular economy is one that aims to keep products, components and materials at their highest use and value at all times. The current economy is linear. That means one in which we make, use and then dispose of products, components and materials.

The linear economy is incredibly wasteful. It relies upon virgin resources and energy being cheap and easily accessible. Any external environmental costs are borne by society – not the consumer or producer directly. Despite recent commodity price drops, after a decade of record price increases, the future of the linear economy looks bleak. As discussed in a recent Ellen MacArthur report, there are a number of converging factors that indicate that a change to our economy is both necessary and possible.<sup>13</sup>

## **Economic losses and structural waste**

The current linear economy is very wasteful and excess capacity is often underused.

## **Price risk**

Commodity prices over the last decade have shown increased volatility. This makes it difficult and expensive

to manage price risk. Many big manufacturers see the secondary materials market as offering some security against this risk.

## **Supply risks**

Many areas rely upon imports of resources and energy. For example, the EU imports six times as many resources as it exports.<sup>14</sup>

## **Natural systems degradation**

The linear economy relies upon cheap and easily available natural resources. As these are depleted, costs of production rise.

## **Regulatory trends**

Increasingly, policymakers worldwide are looking to price the cost of externalities through environmental taxes. For example, since 2009, the number of climate change laws has increased by 66 per cent, from 300 to 500.<sup>15</sup>

## **Advances in technology**

Mobile and information technology means we can transact in a different way. In particular, a sharing economy is emerging via new digital platforms.

## **Uptake of alternative business models**

There's been a surge in the uptake of new ways of consumption. This includes leasing and subscription, dematerialisation (e-books and cloud computing), and sharing (for example, Airbnb).

## **Urbanisation**

For the first time in history, more people live in urban rather than rural environments. Continued urbanisation and demographic growth is projected to add another 2.5 billion people to the urban population by 2050. This will bring the proportion of people living in cities to 66 per cent.<sup>16</sup>

13 Ellen MacArthur Foundation: Towards a Circular Economy: business rationale for an accelerated transition (2015)

14 Frans Timmermans, Jyrki Katainen, Karmenu Vella and Elżbieta Bieńkowska: Die Zeit 'Weg mit der Wegwerfmentalität' (2015)

15 M. Nachmany, S. Fankhauser, T. Townshend, M. Collins, T. Landesman, A. Matthews, C. Pavese, K. Rietig, P. Schleifer and J. Setzer: The GLOBE Climate Legislation Study:

A Review of Climate Change Legislation in 66 Countries. Fourth Edition (London: GLOBE International and the Grantham Research Institute, London School of Economics) (2014)

16 United Nations, World Urbanization Prospects – The 2014 Revision (2014)

# TYPES OF CIRCULAR ECONOMY BUSINESS MODELS

A circular economy offers significant opportunities for growth that companies realise as a result of retaining the value of products and materials circulating in the economy. It does so through re-use and by using excess capacity when it exists. Ultimately, this minimizes reliance on raw materials.

Accenture Strategy recently published *Waste to Wealth: The Circular Economy Advantage*,<sup>17</sup> which analyzed more than 120 companies from the high tech, textile, automotive and consumer goods industries, that are generating resource

productivity improvements in innovative ways.<sup>18</sup> The book identifies five unique circular economy business models, which Accenture Strategy suggests could be used singly or together to help companies 'achieve huge resource productivity gains.

By doing so, companies can boost differentiation and customer value, cut costs to serve and own, generate new revenue and reduce risk.' For the remainder of this document, these will be referred to as 'the five business models'.

## The five business models



<sup>17</sup> Peter Lacy, Jakob Rutqvist: *Waste to Wealth, The Circular Economy Advantage* (2014)

<sup>18</sup> This analysis of business models is very similar to the Ellen MacArthur Foundation RESOLVE Framework as outlined in their *Delivering a circular economy: a toolkit for policy makers* (2015)

# BUSINESS MODEL EXAMPLES IN LONDON



## Environcom

Founded in 2003, Environcom is the UK's largest independent electrical re-use and recycling specialist of waste electronic and electrical equipment (WEEE). Their multi-site operation processes in excess of 100,000 tonnes of domestic and business electronic waste each year. Environcom's re-use site in North London employs 50 people and produces more than 100 re-used white good products a day, fully refurbished, tested and PAT approved. The company re-use where possible rather than recycling, already re-using more than 15% of the product that comes to them.

Environcom won an Acquisition International Business Excellence Award in 2014 that celebrates firms whose commitment to excellence sees them exceeding clients' expectations on a daily basis while setting the bar for others in their industry.

[www.environcom.co.uk](http://www.environcom.co.uk)



## London Legacy Development Corporation

Hosting the 2012 Olympic and Paralympic Games required venues to be built that the area had no long-term need for in legacy mode. As a consequence, three venues on the Park were built as temporary buildings to be removed and re-used after the Games.

The Basketball Arena was built from several components that could be easily disassembled and re-assembled in new locations. For example 3,000 of the seats were re-used in the Lea Valley Hockey and Tennis Centre.

Mitie, Barr Construction, McAvoy Group and Slick were all involved in the construction and dismantling of the Basketball Arena.

[www.queenelizabetholympicpark.co.uk/~media/lldc/lldc\\_envreport\\_151029.pdf](http://www.queenelizabetholympicpark.co.uk/~media/lldc/lldc_envreport_151029.pdf)



## Uptown Oil

Uptown Oil, located under the arches in Southwark, produce biofuel from waste cooking oil. They were approached by PwC who were looking to find a low carbon energy solution for the tri-generator in their new office in London Bridge and had the idea to use the old cooking oil from their catering facilities.

Uptown Oil was, however, producing relatively small quantities of biofuel at the time, so the two organisations formed a collaboration to expand the operations and scale up to the 45-60,000 litres of fuel PwC needed each month. The waste oil collections were expanded to include many more restaurants and food outlets within the M25.

Since then, PwC has extended this 'circular' model to power its main headquarters, too. It's a major driver of a UK-wide reduction in energy of 43% in 2015 versus 2007, saving over £14m in cumulative costs, and some 85,000 tonnes of greenhouse gas emissions, in total, since 2007.

**For a video with more details, and interviews with the key people involved in this project, visit <https://vimeo.com/29806824>**

# PRIVATE SECTOR OPPORTUNITIES THROUGH A CIRCULAR ECONOMY



## Business size

- London has a diverse and vibrant economy. It has businesses of all sizes and an entrepreneurial spirit.
- Large firms account for two thirds of the £1.1 trillion estimated turnover generated by companies in London. They employ almost 50 per cent of the capital's workers.
- SMEs account for a third of estimated turnover in the city's private sector business economy. Micro-businesses account for 12 per cent of turnover. Over 80 per cent of businesses are microenterprises and account for 20 per cent of London's private sector employees. Other SMEs employ a third of London's private sector employees.
- 63 per cent of business units belong to firms set up before 2009. Another 17 per cent belong to 'start-ups' (established between 2012 and mid-2014).<sup>19</sup>
- For London to successfully move to a circular economy, all these businesses have an important role to play. This is because collaboration at all stages of the supply chain is a key part of circular business models that work.

## Business sectors

- In London, the service sector accounts for 91.2 per cent of GVA, with finance and insurance, real estate activities, professional, scientific and technical activities, and information and communication services contributing the most to economic activity. The next largest sector outside of the services sector is construction which accounts for 4.7 per cent of economic output, whilst the manufacturing sector in London contributes 2.5 per cent of GVA.<sup>20</sup>
- In terms of employment the trends are similar with the services sector the most significant, accounting for 91.8 per cent of the capital's 5.6 million jobs. Construction accounted for 5.3 per cent of total employment. There were 132,000 jobs in manufacturing in June 2015, just 2.3 per cent of the total.<sup>21</sup>
- Given this, the route map should focus on the service and built environment sectors in future work.

<sup>19</sup> Office of National Statistics; London Business Survey 2014 (published Nov 2014) All statistics in this paragraph come from this source.

<https://www.london.gov.uk/priorities/business-economy/publications/gla-economics/london-business-survey-2014>.

<sup>20</sup> ONS: Regional Gross Value Added (Income Approach) (2014) [www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added-income-approach/-december-2014/rft-nuts1.xls](http://www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added-income-approach/-december-2014/rft-nuts1.xls)

<sup>21</sup> Workforce jobs by region and industry (2015) [www.ons.gov.uk/ons/rel/lms/labour-market-statistics/november-2015/table-jobs05.xls](http://www.ons.gov.uk/ons/rel/lms/labour-market-statistics/november-2015/table-jobs05.xls)

# ADOPTING A CIRCULAR ECONOMY BUSINESS MODEL

Many businesses in London are already starting to run circular economy business models and benefiting from the opportunity.<sup>22</sup> Customers in both the business to consumer and business to business sectors are seeing good value and convenience in these new market propositions.

WRAP's analysis of the potential for circular economy jobs in London shows that, with the right investment, by 2030 this economy could create 12,000 new jobs.<sup>23</sup> These would be in areas of circular economy activity like re-use, remanufacturing, repair and maintenance.

The opportunities to businesses are on three levels:

## Start up

London is home to an innovative and entrepreneurial SME community with a young, talented and diverse workforce. The city has a strong track record in incubating new and exciting start up businesses.

## Scale up

Existing circular economy businesses in London could scale up their businesses with increased demand. Supporting business to procure with circular outcomes in mind will support this.

## Transition

Businesses following a traditional 'make, use, dispose' linear economy have the chance to explore how their business could benefit by moving to a circular business model. This will be to the advantage of businesses with a culture of innovation. WRAP, through their REBus project, are looking at the business case for transition and identifying learning across business models and sectors.<sup>24</sup>

A number of the Ellen MacArthur Foundation's CE 100 business members have HQs or major operations in the capital.<sup>25</sup> London-based members that are moving towards circular business models include Kingfisher<sup>26</sup> and Unilever.<sup>27</sup>

From 2015, GLA and LWARB will work with up to ten London SMEs and trade bodies a year. The selected SME and trade bodies will benefit from the networking and training opportunities available thanks to GLA/LWARB's membership of the Ellen MacArthur Foundation.

The route map will explore options for London to support business in start up, scale up and transition towards a circular economy.

## Challenges to transitioning to a circular economy

Although there are clear benefits of a circular economy there are challenges to its implementation. A comprehensive list of barriers is included in a recent scoping study for the EU.<sup>28</sup>

Key challenges for London include:

- **Financing the transition** – Some new circular economy business models will find it hard to get finance as they're considered higher risk. There is a need to work with the finance

industry to build up understanding of circular economy and reduce the risk profile. In the short to medium term there is a need to provide other sources of funding such as venture capital to ensure further innovation in this area.

- **Transforming mind-sets** – Many businesses are risk averse. Changing a business model is seen as a big risk. The business case for change will need to be made using appropriate language for key roles within a business, for example. finance manager, operations manager and CEO.
- **Getting support from the supply chain** – Many circular business models work due to collaboration from the whole supply chain. Securing this agreement requires work and needs to assure value for every part of the chain.
- **Support services** – Providing collections, reverse logistics and space – getting product back to a retailer or manufacturer is key to many circular economy business models.

The route map chapters will consider these and other relevant challenges. It will look at how we can start to address these issues and how they can be best tackled within London.

22 Reference case studies on pg 10 and on Focus area profiles pg 20-30

23 WRAP: Employment and the circular economy – Job creation through resource efficiency in London (2015)

24 REBus project: [www.rebus.eu.com](http://www.rebus.eu.com)

25 Ellen MacArthur Foundation CE100 membership: [www.ellenmacarthurfoundation.org/ce100/directory?l=united-kingdom](http://www.ellenmacarthurfoundation.org/ce100/directory?l=united-kingdom)

26 Kingfisher: <http://www.ellenmacarthurfoundation.org/about/global-partners/kingfisher>

27 Unilever: <http://www.ellenmacarthurfoundation.org/about/global-partners/unilever>

28 Institute for Environmental Studies and Vrije Universiteit, Policy Studies Institute at the University of Westminster: Scoping study to identify potential circular economy actions, priority sectors, material flows & value chains (2014)

# PROCURING CIRCULAR ECONOMY OUTCOMES

Most large businesses in London are in the service sector. These businesses have several common procurement needs. This includes facilities management, IT, uniforms and catering. They also need buildings to operate in.

This is a big opportunity to boost the market for circular business models. It could be done by encouraging service-based firms to use circular procurement specifications. Businesses could review their existing sustainable procurement policies to take elements of the five circular business models into account.

London could help support market development and innovation in these areas. This would accelerate a circular economy. It would do so by engaging suppliers and raising awareness of the opportunities.

A number of London businesses and organisations are showing the way:

## CASE STUDY

### PwC

Having reached their goal of zero waste to landfill from their 30 UK offices in 2012, PwC now wants to do even more. It has committed to cut both its material consumption and the waste it generates by 50 per cent. PwC will also reuse or recycle as close to 100 per cent of all waste as possible by 2017. The company now wants to look at the opportunities that procurement provides. They're including circular

economy requirements in relevant supplier evaluation and selection processes as key contracts come round for renewal. They're also looking to find partners who can help create circular solutions – even if they're not yet available in the market. PwC has documented its experience and the lessons it has learned in their report 'Corporate Sustainability Lessons Learned - Going Circular'.<sup>29</sup>

## CASE STUDY

### National Union of Students

The NUS recently refurbished their head office on Gray's Inn Road, putting sustainability at the heart of the organisation. They wanted to show what is possible with a building refit – even for a relatively small organisation. A number

of core, structural green elements were built into the refit (rain water harvesting, green walls, and voltage optimisation). The NUS also worked with Philips to provide them with lighting as a service, one of the first organisations to do so.<sup>30</sup>



<sup>29</sup> PwC: Corporate Sustainability Lessons Learned - Going circular (2015): <http://www.pwc.co.uk/assets/pdf/pwc-going-circular-2015.pdf>  
<sup>30</sup> National Union of Students and Philips: [www.lighting.philips.co.uk/cases/cases/education/national-union-of-students.html](http://www.lighting.philips.co.uk/cases/cases/education/national-union-of-students.html)

# PUBLIC SECTOR PROCUREMENT OPPORTUNITIES

Together, the GLA group of organisations (Greater London Authority, Transport for London, Mayor's Office for Policing and Crime, London Fire Emergency Planning Authority) spend almost £11 billion a year on goods and services.<sup>31</sup> London's 32 boroughs and the City of London spend in the region of £20bn annually based on 2014/15 budgets.<sup>32</sup>

The GLA group has a responsible procurement policy. This will help spur the group's transition to circular economy thinking in procurement terms. Until now, the Responsible Procurement Policy on materials was focused on minimising excess. This meant procuring recycled and re-used content, recyclable and re-usable equipment and encouraging the procurement of goods derived from natural sources.

We believe this policy has been successful in creating demand for recycled content and recyclable goods. However, there is now an opportunity to encourage procurement behaviour associated with other more innovative circular business models. This is now being explored and the Responsible Procurement Policy reviewed.

The redrafting of the GLA group Responsible Procurement Policy will consider the following:

- procurement activities and service providers clearly incorporating elements of the five circular economy business models.
- the focus areas identified in this document – built environment, food, textiles, electricals and plastics.
- maximising value from procurement (of services and products) – ensuring products and services are kept at their highest value.
- movement away from product based to service/experience based procurement.

- movement away from capital investment to leasing arrangements where it shows value for money.
- using the 'idle capacity' within the system instead of buying new – ensuring assets are managed properly and used as much as possible by sharing where appropriate.

A separate piece of collaborative work is needed to find where the best opportunities lie and then create an action plan and/or procurement framework. This should be linked to local authority procurement networks in order to support a consistent approach. Some of the basic principles of this work will be:

- maximising value for the GLA group by reducing the need for procurement.
- getting value for money over a product's lifetime for those that do need to be purchased.
- ensuring that upcoming procurement opportunities are identified through market research.
- providing support to suppliers – discussing with GLA main suppliers what needs to happen to support them to respond to circular economy specifications.
- seeking opportunities for job creation and skills development. This will promote equal and new market entrant opportunities.

The GLA already carries out some circular procurement activity which is a starting point. For example (both for GLA group internally plus external service providers):

- demonstrating high re-used/recycled content in products.
- shared assets – desks/furniture, office space, mobility (cars, bikes).
- web-based platforms to share/buy re-usable products (for example WARP IT<sup>33</sup> and Globechain).<sup>34</sup>
- use of digital technology to reduce adverse environmental and social impacts – for example, SMART metering/demand management, virtual meeting capability.
- use of low carbon energy and low emission vehicles/services.

Challenges to procuring circular economy outcomes include:

- moving from fixed/set capital to revenue budgets.
- understanding where the best opportunities lie in providing value for money – need to find the quick wins.
- presenting fundamental change and challenge/resistance to the way we procure and for our suppliers to adapt.
- unknown/quantified cost and benefits, the latter of which likely to take time to be realised.
- unknown extra resource and skills needs to design and run different procurement business models.

We'll start to tackle this through our Responsible Procurement Group. The Netherlands, through their Green Deal Circular Procurement is leading in this area.<sup>35</sup> We must learn from their experience.

31 GLA, 2015-16 Final Budget

32 GLA

33 WARP IT: [www.warp-it.co.uk](http://www.warp-it.co.uk)

34 Globechain:[www.globechain.com](http://www.globechain.com)

35 Circle Economy: <http://www.circle-economy.com/news/green-deal-circular-procurement/>

## FOCUS AREAS



As the scope of circular economy is so large, LWARB and the GLA have initially identified a smaller number of areas for the circular economy route map. The aim is to examine the benefits for London and how these might be achieved.

A review of current work in the city shows a lot of effort is already focused on renewable/ decentralised energy<sup>36</sup> and water.<sup>37</sup> However, more effort could yield bigger returns in the area of products and materials.

The criteria chosen to guide which areas of economic activity to focus on were:

- high environmental impact.
- retained financial value of the product.
- re-use/recycling potential.
- areas with pre-existing examples of circular business models.

The focus areas identified were:

- built environment
- food
- textiles
- electricals
- plastics

### Focus area profiles

LWARB and the GLA engaged Amec Foster Wheeler to write a profile for each focus area. The profiles start by looking at the current situation in each area, consumption levels and waste

generation. They then identify estimates of benefits and show examples of how those benefits could be achieved. In total, the benefits of circular economy activity identified by the five focus area profiles are at least £7 bn for London, however due to the nature of the circular economy some impacts will be felt by the wider economy.

The focus area profiles can be found in the Appendix of this document.

### Methodology

The headline estimates for built environment and food reflect the Ellen MacArthur Foundation's latest work as reported in the Growth Within document.<sup>38</sup> The headline figure is supported by examples of net financial benefits of using new circular business models in a particular focus area.

For the focus areas of textiles, electricals and plastics the headline estimates are built up from the new circular business model net financial benefit examples. In these cases the net financial benefit could

be even higher as further new business model opportunities are explored.

For all focus areas, adoption rates of new business models are applied. This reflects a realistic approach to the outcome. These adoption rates are conservative in nature. That means with greater up take the net benefit could be much bigger.

These focus area profiles are the best that can be currently achieved and they are not definitive. They are meant as a starting point for discussing a circular economy in London. This is the first time a high level analysis across data sets has tried to quantify net benefits in London. Lack of data means this analysis is limited. This is particularly the case in commercial consumption patterns, innovation and waste generation.

To develop this work further, we would need to acquire or create new data sets, and further investigate the full supply chain for each focus area, including stakeholder engagement.

<sup>36</sup> GLA: [www.london.gov.uk/priorities/environment/energy](http://www.london.gov.uk/priorities/environment/energy)

<sup>37</sup> GLA: [www.london.gov.uk/priorities/environment/looking-after-londons-water](http://www.london.gov.uk/priorities/environment/looking-after-londons-water)

<sup>38</sup> Ellen MacArthur Foundation, Growth Within: A Circular Economy Vision for a Competitive Europe (2015)

# FOCUS AREA PROFILE SUMMARY

## Built environment



**The circular economy opportunities in the built environment will add £3-5bn to GDP by 2036.**

Example interventions include:

- innovations like modular construction.
- more effective utilisation of buildings.
- design for building disassembly, material management and re-use.

## Textiles



**The circular economy opportunities in the textiles sector are over £1bn by 2036.**

Example interventions include:

- increasing the lifetime of clothes through design and innovative technologies.
- increasing the usage of clothes through renting or leasing.
- increasing the re-use, repair and recycling of clothes via incentivised return schemes.

## Plastics



**The circular economy opportunities in the plastics sector will be at least £200m by 2036.**

Examples interventions include:

- activities to reduce plastic use.
- increasing the recycling rate.
- innovative recycling technologies.

## Food



**The circular economy opportunities in the food sector will add £2-4bn to GDP by 2036.**

Example interventions include:

- raising consumer awareness and knowledge.
- reducing avoidable food waste.
- using unavoidable food waste to create energy/compost.

## Electricals



**The circular economy opportunities in the electrical and electronic equipment sector will be at least £900m by 2036.**

Example interventions include:

- sharing, renting and product as service business models.
- increased re-use/effective recycling rate.
- designing better products that enable longer product life.

## ENABLING SECTORS

London's strong business sectors and its world-renowned academic institutions are great enablers of a circular economy. The capital must use these strengths to accelerate change. The chapters that will be published after this context and opportunities document will look at how each of the enabling sectors can support the transition.

### Digital



London is a hub for world leading digital companies.<sup>39</sup> The link between SMART technologies and the acceleration of a more circular economy is clear, offering the opportunity to track and trace products, facilitate reverse logistics capabilities and offer online platforms for collaboration and the sharing economy.

### Finance



Financing the transition to a circular economy is a key challenge. It will be vital to use London's strength and versatility in the financial sector. An ING bank report in May 2015 'Rethinking finance in a circular economy' states that multiple forms of capital are needed to finance circular business models – from corporate debt to crowdfunding.<sup>40</sup>

New business models will demand that traditional forms of finance, such as leasing, be applied to new product sectors. New insurance products will be needed to provide cover for businesses using new approaches – for example, selling remanufactured goods – where more traditional cover isn't appropriate.

Venture capital can also support entrepreneurship and the creation of new businesses which tap into a circular economy. London can provide private equity to enable such innovation. LWARB is looking to develop a venture capital fund to back circular economy businesses and is seeking private sector partners to join them.

London is one of the main financial centres of the world. As such, it has a reputation and capability to innovate to support new markets. This should mean it can become a leader in financial products and services to support a circular economy – just as it became a leader in carbon markets.

<sup>39</sup> London Technology Week: [www.londontechnologyweek.co.uk/2015/06/london-cements-position-tech-capital-europe-launch-london-technology-week/](http://www.londontechnologyweek.co.uk/2015/06/london-cements-position-tech-capital-europe-launch-london-technology-week/)

<sup>40</sup> ING: Rethinking finance in a circular economy (2015) <http://www.ing.com/About-us/Our-stories/Features/Circular-economy-challenges-financial-business-models.htm>

## ENABLING SECTORS

### Media



London has a wealth of global, national and regional TV companies and media outlets. This is an opportunity to promote circular economy approaches while encouraging these companies to adopt circular economy principles into their procurement policies.

As work develops amongst London-based SMEs in particular, success stories can be shared via London media. These can showcase a circular economy and business innovation in action. Consumer-focused media outlets have already shown interest in the areas of textiles and fashion. This can be built on through related programmes of work with both WRAP and London-based start-ups and retail partners.

Specialised business media – many here in London – are likely to cover circular economy principles and practice. By promoting it to business stakeholders, they in turn may become circular economy ‘converts’.

### Higher education



London has many leading colleges and universities with a fantastic record of research. These can help underpin the innovation needed for a circular economy. LWARB is already talking to Imperial College London and University College London.

In 2015, Imperial College London published a report with Veolia about the value of a circular economy to the UK.<sup>41</sup> Through the Grantham Institute for Climate Change Research they’re drawing together circular economy experience from across the university. They are also keen to engage with policy makers to make sure that research is available in an appropriate format for it to be put into practise effectively.

University College London is developing a Circular Economy Lab, UCL CircEL, which is a cross-disciplinary research hub, aiming to develop the scientific and socio-economic understanding and technological basis for design and

implementation of products, processes, systems and policy that will support the transition to a circular economy.

Both institutions have said they would be interested to carry out research on issues that may challenge London’s move to a circular economy.

Universities also attract large numbers of people through their staff and student base. That means they have a key role to play in putting circular economy principles into the curriculum they teach. They also have considerable buying power. Like the many businesses in London, they could review their purchasing policies to achieve more circular results.

### Government



A circular economy would be well supported by targeted policy and tax reform at both UK and EU levels. The new EU circular economy framework was launched earlier in December 2015 and sets out new ambitions and targets.

Although the government estate in London is shrinking rapidly<sup>42</sup> managing organisations could join the GLA in committing to the inclusion of circular economy in their procurement policies.

<sup>41</sup> Imperial College: The Circular Revolution (2015) <http://www.veolia.co.uk/about-us/about-us/circular-economy/circular-revolution>  
<sup>42</sup> Cabinet Office: Governments Estates Strategy (2014) <https://www.gov.uk/government/news/whitehall-palaces-a-thing-of-the-past>

## NEXT STEPS SUMMARY

LWARB will set up a small working group of key stakeholders for each focus area, and for the cross-cutting themes of business models and procurement. Each working group will write a chapter of the route map. These will identify partners, actions, opportunities and challenges along the way to a circular economy.

The circular economy route map for London will consist of this context and opportunities document and the forthcoming chapters. We will publish these in early 2016 on the LWARB website.

We welcome input and support from stakeholders. This is vital to the route map's development and implementation.



**To find out more about London's  
circular economy route map contact:**

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# APPENDIX – FOCUS AREA PROFILES



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# BUILT ENVIRONMENT



The construction sector represents around 5% of London's economy, contributes £15 billion gross value added, and employs over 280,000 people of London's workforce of over 5 million – almost 1 in 20 of working people.<sup>1</sup>

London has one of the highest value markets for the built environment and infrastructure projects are of global scale and importance. The current development of the capital's flagship east-west Crossrail link is the biggest construction project in Europe. Demand for more traditional building requirements is also high. London's office space is forecast to increase by 5 million m<sup>2</sup> by 2030 and over 40,000 units of housing per year are to be built within the next 10 years.<sup>2</sup>

London is a focus for the circular economy because:

- London has more commercial construction activity than the rest of Great Britain combined.
- the majority of the construction activity in London is new build.<sup>3</sup>
- London consumes more than 20 million tonnes of construction material per year and produces 10 million tonnes of construction waste.

Major construction companies operate today in a competitive global market.<sup>4</sup> London is home to five of the UK's largest construction companies<sup>5</sup> as well as influential architectural practices responsible for the design of novel and internationally-renowned buildings. While London is a leader in the development of concepts for the built environment worldwide, it is also a centre for decision-making in procurement. The supply chain now includes many experienced small businesses with specialist skills and high levels of self-employment. It is also very mobile – a quarter of the workforce commutes from outside London on a daily basis.<sup>6</sup>

1 Values for 2012 (GVA) and 2013 (Employment). Sources: ONS: Regional Gross Value Added (Income Approach) NUTS1 Tables (2014); and GLA 2015 (<http://data.london.gov.uk/dataset/london-s-sectors>).

2 The London Plan – The spatial development strategy for London consolidated with alterations since 2011, March 2015

3 GLA Economics: Laying the foundations London's construction industry (2006). This allows margin for rapid changes in the built environment towards a circular economy. However, note that maintenance, repair and refurbishment are activities of a built environment according to circular economy principles.

4 Department for Business Innovation & Skills, UK Construction: An economic analysis of the sector (2013).

5 Largest construction companies in the UK by turnover 2014, according to <http://www.theconstructionindex.co.uk/market-data/top-100-construction-companies/2014>. Furthermore, Laing O'Rourke was founded in London and is headquartered at its borders in Dartford.

6 Department for Business Innovation & Skills, UK Construction: An economic analysis of the sector (2013).

# BUILT ENVIRONMENT

## What does the circular economy mean for the built environment in London?

The size and scale of opportunities in all aspects of the built environment makes the sector ideally placed to introduce circular economy methods and to lead changes in building techniques and building use in London, elsewhere in the UK, and across the world. Furthermore, the pace of change in London provides an opportunity to introduce circular economy at an early stage and capture benefits soon afterwards.<sup>7</sup> The latest estimates for the potential from circular economy opportunities in the built environment<sup>8</sup> add £3 – 5bn annually to GDP by 2036 and reflect benefits both realised within London and attributable to activities which take place in London.<sup>9</sup> These include:

### Innovation such as modular construction

Modular construction of building components and innovative approaches such as widespread use of 3D printing and additive manufacturing can reduce structural waste as well as build time, delivering a benefit of over £800m per year.

### More effective utilisation of buildings

Peer-to-peer renting, better urban planning, office sharing, repurposing buildings and multi-purposing buildings increases the value of new buildings in London. The utilisation of 20% of buildings can be doubled by 2036, saving over £600m annually.

### Designing for effective building disassembly, material management and re-use

Management of building materials within high value closed loops for efficient disassembly techniques, material passports, innovative business models and reverse logistics ecosystems can save over £200m.

For London, the adoption of circular economy principles within the built environment has direct savings. It also means new opportunities across interconnected areas of the built environment can capture and leverage the full value of activities such as land restoration programmes, adoption of design principles (e.g. energy-neutral buildings), new materials, sharing of equipment and parking space, as well as integrating supporting information and communication technologies. Overall, the circular economy both benefits from and contributes to a reshaped economy.



## CASE STUDY

### Future Form

Futureform has over ten years experience of producing offsite permanent modular buildings with a life span equal or greater than any form of conventional construction. The buildings they produce use sustainable materials and techniques and are used in a number of permanent applications including housing, hotels and student accommodation including a number in London. They are also demountable and can be taken down and re-used.  
[www.futureformltd.com](http://www.futureformltd.com)



## CASE STUDY

### Globechain

Globechain is an online re-use platform that connects businesses, charities and people to enable them to re-use unwanted items within a global supply chain network creating a waste audit and social impact value for members. Their aim is to create a local supply chain within a global community to enable the redistribution of goods to social causes rather than landfill. Globechain have over 10,000 members ranging from corporates, charities, schools & universities, social enterprises, start-ups and individuals in industry sectors ranging from retail, banking, fashion, food, construction, education and health. One of Globechain's key areas of activity is looking at construction products.  
[www.globechain.com](http://www.globechain.com)

6 References include GLA Economics, Laying the foundations: London's construction industry (2006); London Assembly Economy Committee, Challenges facing the construction industry in London (2013)

7 Ellen MacArthur Foundation, Stiftungsfonds für Umweltökonomie und Nachhaltigkeit, McKinsey Center for Business and Environment: Growth Within: A Circular Economy Vision for a Competitive Europe (2015). Ellen MacArthur Foundation, McKinsey Center for Business and Environment, Danish Business Authority, Danish Protection Agency, NERA Economic Consulting: Delivering the Circular Economy – A Toolkit for Policymakers (2015).

8 Assuming an average make-up of construction costs (35% material costs, 20% labour costs) and average cost savings of the implemented changes with its associated adoption rates

# FOOD



Londoners consume a large volume of food, over 8 million tonnes per year. The population of 8.7 million, one in eight of all UK residents, will rise to over 10 million within 20 years, adding more than a million tonnes to consumption every year.<sup>1</sup> London has a large non-resident population which has a very different consumption behaviour. Almost 1 million people commute daily into London<sup>2</sup> and 16.8 million tourists per year visit bars, restaurants and are catered for at events in London.<sup>3</sup>

London is a worldwide leader and a vibrant food capital – its gastro scene is highly influential and world famous.<sup>4</sup> The strong immigrant communities and cosmopolitan life-styles of Londoners and its visitors leads to the import of a wide variety of specialty food with procurement decisions affecting supply chains around the globe.

Five of the UK's ten largest food retailers are headquartered in or in the periphery of London<sup>5</sup> and there are over 24,000 companies within London in the food and beverage service sector, almost 17% of the UK total.<sup>6</sup> There are over 1,000 local manufacturing firms such as bakeries generating gross value added (GVA) of almost £2bn, about 8% of the UK total.<sup>7</sup>

However, there is substantial waste in the current system. For example in the UK, 15 million tonnes (mt) of food and drink was wasted in the food supply chain in 2011-12, which is one third of the 40 mt of food purchased annually. 7 mt food and drink waste are generated by households and it is estimated that more than 4 mt of this is avoidable.<sup>8</sup> The annual cost of this avoidable household food waste to the UK is £12.5 billion.<sup>9</sup>

London produces 890,000 tonnes of household food waste which is 13% of the UK's total. Of this, approximately 540,000 tonnes are estimated to be avoidable.<sup>10</sup> For the 13% of UK households situated in London,<sup>11</sup>

the avoidable food waste, worth £2-3 per kilogramme,<sup>12</sup> has a value of almost £1.6bn.<sup>13</sup>

London's food service sector produces a considerable amount of avoidable food waste as well. During the FoodSave project which ran between 2013 and 2015, 170 small and medium food and beverage service sector businesses diverted 1291 tonnes of their collective annual food waste from landfill. 153 tonnes of this diversion was by food waste reduction and the rest through other means such as feed for livestock, charity, etc. The results from the programme generated over £550,000 of savings for these businesses.<sup>14</sup>

## What does the circular economy mean for the food sector in London?

London's overall influence on the food sector is pervasive and extensive, affecting national and international patterns of supply, energy and water consumption and waste management. It has the corresponding potential for realising change through implementing circular economy principles in almost every aspect of the food supply chain.

Using the latest estimates for a food system based on circular economy principles in Europe,<sup>15</sup> it is forecast that changes directly in London and attributable to consumption and procurement decisions in London can generate an additional £2-4bn of GDP by 2036.<sup>16</sup> These savings can be achieved directly in London.<sup>17</sup>

### Optimising technologies and management of food through raising consumer awareness and knowledge

Raising consumer awareness and knowledge, creating market solutions for unwanted food and optimising technologies and management in food consumption businesses lead to an additional reduction of avoidable food waste of at least 20%. For food waste from London households alone this add up to £280m. It is estimated that caterers can add another £70m and food retail another £17m.

### Reducing avoidable food waste

The savings from avoiding food waste through implementation of circular economy principles through London's effect on the upstream supply chain (via manufacturing and wholesale) of food consumed are estimated at £270m.

### Improve management of waste food via waste hierarchy (energy capture/compost)

For any remaining food waste that is unavoidable in London, further significant value can be yielded from the waste through energy capture or extraction, e.g. encouraging biogas production where feasible, an estimated £11m of savings can be generated.

These opportunities are part of the overall transformation towards a more circular food system necessary to yield the GDP benefit above. That transformation includes activities such as using London's influence to support more resource-efficient and regenerative agricultural practices (e.g. precision and organic farming), the use of all by-products and waste streams along the whole food supply chain at their highest value (e.g. bio-refining), extending urban and urban outskirts farming and making use of digital supply chains (e.g. online food retail).

1 Based on GLA 2015 Round Demographic Projections; and Best Foot Forward: City Limits - A resource flow and ecological footprint analysis of Greater London (2002).

2 824,000 net commuters in 2011. ONS: <http://www.neighbourhood.statistics.gov.uk/HTMLDocs/dvc193/#sty=true&flow=flow0&period=0&fix=E09000033&view=156.5619375834704,-83.78280894364474,716.8761248330592,722.5656178872895&tr=-205.10182586-15577,-138.96256289255552&sc=1.3195079107728946>

3 2013 data. ONS: <http://www.ons.gov.uk/ons/rel/ott/travel-trends/2013/info-london.html> and London and Partners: London Tourism Report 2013-2014.

4 Compare e.g. USA today (2014): <http://experience.usatoday.com/food-and-wine/story/news-festivals-events/food/2014/03/24/london-surpasses-paris-as-europe-dining-capital/6652057>.

5 Based on <http://www.retailereconomics.co.uk/top10-retailers-food-and-grocery>.

6 ONS: Annual Business Inquiry – Workplace analysis by industry (2014).

7 ONS: Annual Business Inquiry – Workplace analysis by industry (2014) and Regional Gross Value Added (Income Approach) NUTS1 Tables (2014).

8 Avoidable is defined as fit to eat.

9 Valued at retail prices. Department for Environment, Food and Rural Affairs: Food Statistics Pocketbook 2014.

10 WRAP: <http://www.wrap.org.uk/content/food-waste-campaign-saves-west-london-boroughs-over-%C2%A31million-1>.

11 Greater London Authority, Housing in London 2014; and ONS: <http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcn%3A77-383612>.

12 In line with WRAP's reference on the retail price of food and drink with £2,700 per tonne (or £2.70 per kilogramme) <http://www.wrap.org.uk/content/food-waste-campaign-saves-west-london-boroughs-over-%C2%A31million-1>.

13 There are 3.3 million households in London in 2014 out of 26.7 million households in the UK.

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

15 Ellen MacArthur Foundation, Stiftungsfonds für Umweltökonomie und Nachhaltigkeit, McKinsey Center for Business and Environment: Growth Within: A Circular Economy Vision for a Competitive Europe (2015).

16 Amec Foster Wheeler 2015.

17 Based on a set of assumptions, the most prominent of which are an average value for food waste avoided of £1.2-£2.6 per kg, varying adoption rates of the changes and a set of specific values for waste and by-product streams according to their use adapted from TNO: Opportunities for a circular economy in the Netherlands (2013).



## CASE STUDY

### Growup farms

GrowUp Urban Farms grow sustainable and healthy salads, herbs and fish in cities using aquaponics and vertical growing technology. In September 2015 they opened the UK's first commercial aquaponic urban farm, showing the viability of high density aquaponic production in urban areas. Aquaponics is a recirculating system that takes the waste from a fish farm and uses it as a natural fertilizer for plants. Each farm that GrowUp builds helps the local urban area improve its food security and creates jobs for young people in parts of the city that need them the most.

[www.growup.org.uk](http://www.growup.org.uk)



## CASE STUDY

### Snact

Snact is a London based firm that makes healthy fruit snacks from surplus produce – that's produce that would otherwise be discarded for being too big, too small, too ugly or simply too abundant. Snact was started by Michael and Ilana to have a positive impact on the world. What they love about food is that small changes can lead to big impacts. Even small numbers get large when you multiply them by a few million! By using surplus produce, they tackle the causes of food waste, so that every snack equals a positive act. Snact's first product is fruit jerky, a chewy dried fruit snack bursting with natural flavours and made with 100% fruit.

[www.snact.co.uk](http://www.snact.co.uk)



## CASE STUDY

### Food save

FoodSave case studies and resources are available online at [www.foodsave.org](http://www.foodsave.org). Any business can access DIY food waste audits, top tips to reduce food waste and details of waste collection contractors.

# TEXTILES



London is a major market for textile retailing as well as a leader in design and high end production. Globally, London's consumer clothing market was ranked third in the world after New York and Tokyo in 2013 and by 2030 is forecast to be the largest with a predicted value of £29.5 billion.<sup>1</sup>

London companies cover a range from high street brands to global high end fashion including British and international luxury brands. Textile, apparel and leather products manufacturing companies in London account for around 11% of employment and gross value added, worth £545 million (2012).<sup>2</sup>

This provides jobs for 10,000 people in textile manufacturing and 24,000 people in manufacturing and wholesale of clothing.<sup>3</sup> Britain is ranked 5th among the global importers of apparel and textile (£42bn) and 15th for its exports.<sup>4</sup>

The UK textile sector is considered to be a world leader in the design and manufacture of creative and stylish

apparel fabrics and clothing. Many producers now utilise cutting edge technology together with unique fabric finishes and new generation fibre and yarn blends to develop innovative performance fabrics and clothes.<sup>5</sup>

Today, pressure from consumers and new legislation is driving demand for more environmentally sustainable production. London, through the size of its market and its importance to players in the industry, has a key role to play in the shift away from consumption of raw materials and use of chemicals towards management of fibre sources throughout the value chain including substitution and re-use of materials.<sup>6</sup>

Use of textiles 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.<sup>7</sup> Once purchased, around 30% of clothes (2012) worth around £30 billion in UK homes are left unworn.<sup>8</sup> 700,000 tonnes of discarded clothing are re-used or recycled every year across UK, but more than 30% of our unwanted clothing currently still goes to landfill.<sup>9</sup> That corresponds to around 350,000 tonnes of clothing with a value of approximately £140 million every year if recycled or re-used. For textiles in total, as opposed to just clothing, the value of re-usable or recyclable used goods sent to landfill was estimated at £238 million in 2010.<sup>10</sup>

## What does the circular economy mean for the textiles sector in London?

The size of the retail market and the influence of design and procurement activities makes London an important focus for circular economy approaches throughout the textiles sector. Savings with an annual value of over £1bn can result from:<sup>11</sup>

### Lifetime extension through design and innovative technologies

Increasing the lifetime of clothes through enhanced design, innovative materials (e.g. nano coating), and consumer behavioural change reduces consumption of virgin resources. Simply using clothes for nine months longer would be worth £750m from savings in clothing manufacture, laundry and disposal.<sup>12</sup>

### Renting and leasing of clothes as service business models

Increased use of clothes during their lifetime, including renting and leasing of clothes, customised mass production and customer awareness can deliver savings of at least £200m.<sup>13</sup>

### Re-use, repair and recycling via incentivised return schemes

Improvements in clothing re-use, repair and recycling through take-back schemes and separate collection of unwanted garments could lead to savings of £20m.<sup>14</sup>

London's position and influence in the textile sector and in related sectors such as the financing of new technologies leads to further opportunities. Seamless knitting, stitch-free seams, and 3D weaving and sewing technologies can automate the production of almost an entire garment, reducing manufacturing waste and industrial emissions.<sup>15</sup> Demand management using information technology and communication channels allows forecasting and planning for demand, reducing consumption and production where feasible.<sup>16</sup>

## CASE STUDY

### REBus

Supporting textile manufacturers and retailers businesses to transition to more resource efficient business models is a key aim of the REBus project. Current pilots are looking to support businesses to look at leasing and incentivised return business models.

[www.rebus.eu.com](http://www.rebus.eu.com)

### Alexandra Wood

Award winning Saville Row tailor Alexandra Wood is working with WRAP to develop and test new services for customers that will extend the life of clothes.

[www.alexandrawoodbespoke.co.uk/](http://www.alexandrawoodbespoke.co.uk/)

### Rentez-Vous

Shoreditch fashion company Rentez-Vous has developed a peer-to-peer and designer-to-customer rental marketplace for high-end fashion with support from WRAP's REBus project, providing fashionistas with access to the latest garments at lower overall resource use.

<https://rentez-vous.com/>

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 ONS: Regional Gross Value Added (Income Approach) NUTS1 Tables (2014); and Warwick Institute for Employment Research: <http://www2.warwick.ac.uk/fac/soc/ier/ngrf/lmifuturetrends/sectorscovered/clothing/sectorinfo/subsectors/#Textiles>.

3 London figures are pro rata from UK textile figures provided in the national Guidance Research Forum. Ref: <http://www2.warwick.ac.uk/fac/soc/ier/ngrf/lmifuturetrends/sectorscovered/clothing/sectorinfo/subsectors/#Textiles>.

4 Michigan State University: <http://globaleedge.msu.edu/industries/apparel-and-textiles/tradestats>.

5 UK Trade & Investment: Textiles in Action - A guide to UK Performance Textiles (2012).

6 University of Cambridge Institute for Manufacturing: Well dressed? The present and future sustainability of clothing and textiles in the United Kingdom (2006).

7 WRAP: <http://www.wrap.org.uk/sites/files/wrap/Strategic%20loop%20-%20textiles.pdf>. Clothes that are not worn for at least a year. The majority of these clothes are

those that do not fit well.

8 WRAP: Valuing Our Clothes - the evidence base (2012).

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

10 The monetary estimates rely on a set of assumptions, such as: London's share of the UK value of clothes consumed, total textile waste and clothes left unworn is 15% (slightly higher than London's share of population of about 13%), 50% of the current value of textile waste and 10% of the value of clothes left unworn can be captured by 2036, all assumptions underlying sources used, notably WRAP: Valuing Our Clothes - the evidence base (2012).

11 Amec Foster Wheeler 2015 based on WRAP: Valuing Our Clothes (2012).

12 Amec Foster Wheeler 2015.

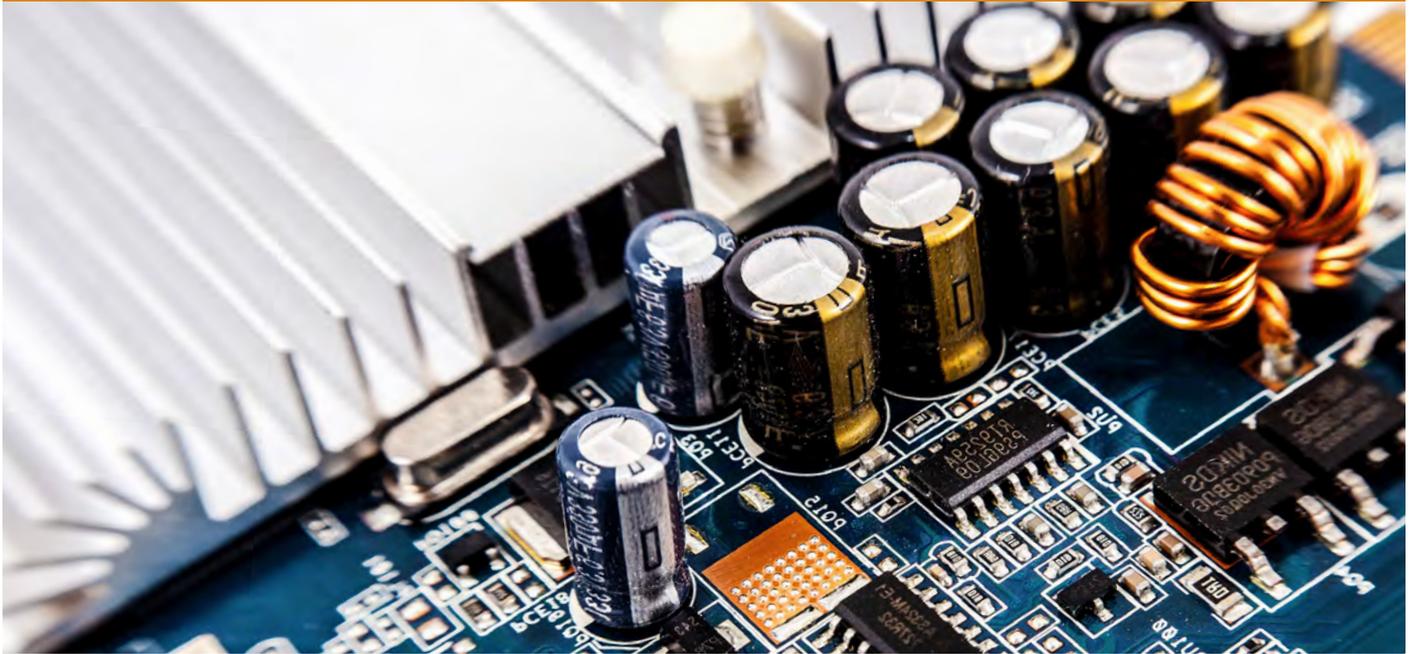
13 Amec Foster Wheeler 2015.

14 WRAP: Valuing Our Clothes - the evidence base (2012).

15 Sitra, Circle Economy: Business Models & Circular Strategies for Textiles (2015).

16 WRAP: <http://www.wrap.org.uk/sites/files/wrap/Strategic%20loop%20-%20textiles.pdf>.

# ELECTRICAL AND ELECTRONIC EQUIPMENT



The manufacture and sale of computer, electronics and electrical equipment is a major UK economic sector. Every year the average household in the UK spends around £800 on new electrical and electronic goods.<sup>1</sup> Nationally, annual sales of electrical and electronic products are worth £21bn.<sup>2</sup> The manufacture of computer, electronics and electrical equipment currently produces gross value added of £14bn<sup>3</sup> while growth in consumer electronics sales is the highest of all UK retail sectors.<sup>4</sup>

There are significant flows of goods and materials within this sector. By weight, the UK purchases and disposes of around 1.4 million tonnes of electronic and electrical equipment per year.<sup>5</sup> Less than 10% of this is re-used despite the fact that much of it either still works or could be repaired.<sup>6</sup> 50% is recycled and 40% is disposed of to landfill.

In London, computer, electronics and electrical equipment manufacturing has a

relatively small presence. It accounts for 4%, or £575 million, of the UK's gross value added in the sector.<sup>7</sup>

In contrast, London is a major market for retail sales. Over £3.3 billion is spent on new electrical and electronic goods in the city annually, around 16% of spending nationwide.<sup>8</sup>

The discarded volumes of electricals are also substantial. London's population

produced 225,000 tonnes<sup>9</sup> of waste electrical and electronic equipment (WEEE) in 2013 which is worth about £180 million in terms of its material value.<sup>10</sup> 11% of the WEEE arising in London is re-used, which is in line with national estimates.<sup>11</sup> Re-use reflects early adoption of circular economy business models of take-back and redeployment for vending machines and industrial, scientific and medical equipment<sup>12</sup> but which are yet to develop for other electricals.

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

2 WRAP: *esap - Generating value for business through sustainability* (2015).

3 ONS: *Regional Gross Value Added (Income Approach) NUTS1 Tables* (2014).

4 UK Trade and Invest: <https://www.gov.uk/government/publications/electronics-and-it-hardware-in-the-uk-investment-opportunities/electronics-and-it-hardware-in-the-uk-investment-opportunities#locations>

5 LWARB: *The current material flow of WEEE in London and the opportunities for increasing its collection, re-use and recycling* (2015).

6 LWARB, *The current material flow of WEEE in London and the opportunities for increasing its collection, re-use and recycling* (2015), Appendix 1\_WEEE material flows model Oct 2012.

7 ONS: *Regional Gross Value Added (Income Approach) NUTS1 Tables* (2014).

8 Based on WRAP: *esap - Generating value for business through sustainability* (2015);

and LWARB, *The current material flow of WEEE in London and the opportunities for increasing its collection, re-use and recycling* (2015).

9 Waste authority (bulky & HWRCs); Re-use (business to business (B2B), collectors & retail); Other obligated take-back to approved authorised treatment facilities (AATFs), including retailers; Other collectors taking large domestic appliances (LDA) to light iron (including retailers and scrap merchants); Landfill/incineration/Illegal export. LWARB, *The current material flow of WEEE in London and the opportunities for increasing its collection, re-use and recycling* (2015).

10 At 2012 material prices. Based on WRAP: *Electrical product material composition* (2012).

11 LWARB, *The current material flow of WEEE in London and the opportunities for increasing its collection, re-use and recycling* (2015).

12 LWARB, *The current material flow of WEEE in London and the opportunities for increasing its collection, re-use and recycling* (2015).

# ELECTRICAL AND ELECTRONIC EQUIPMENT

## What does the circular economy mean for the electricals sector in London?

It is forecast that London could generate savings of at least £900 million from circular economy opportunities by 2036 in this sector and further contribute to GDP by supporting electrical products designed according to circular economy principles.<sup>13</sup> These benefits will be realised in London and attributable to activities which take place in London. The following specific benefits could be achieved:

### Sharing, renting and servitised business models

Because of the density of its market, London provides a vast potential for servitised business models. Sharing, renting and leasing schemes as well as maintenance can increase the utilisation and lifetime of existing assets and therefore achieve savings through the reduced need for purchasing new assets. Reducing the demand for new electrical and electronic equipment by 20% can

save consumers £800m.<sup>14</sup> This does not include commercial and industrial applications, which can generate additional savings.

### Increase recycling/re-use rate

Despite improving rates of recycling and re-use for WEEE in recent years, according to WRAP, the Waste and Resources Action Programme, there is still scope for improvements through changing consumer behaviour.<sup>15</sup> Nearly 25% of WEEE that's taken to household waste recycling centres could be re-used, worth around £40 m a year in London.<sup>16</sup> Recovering just half of the material value of hoarded or landfilled WEEE in London 2036 through recycling is worth another £40 m.<sup>17</sup>

### Designing better products<sup>18</sup>

WRAP has assessed that changing how we design, make, buy and dispose of electrical and electronic equipment

could extend product life and reduce our carbon footprint by up to 15% and add £800 million in GDP to the UK economy.<sup>19</sup> Considering London's share of electrical and electronic equipment in the UK, it is estimated that using its influence from consumer choices and procurement London can contribute £120 million to increased GDP.<sup>20</sup>

London's circular economy for electrical and electronic equipment interconnects opportunities across many areas and sectors such as plastics, metals, information and communication services and technologies. Further scope for implementing the circular economy can include additional waste electrical and electronic equipment collection infrastructure such as banks, cages and collection vehicles, and different approaches to recycling schemes through innovative collaboration between local authorities, producers and recyclers.

## CASE STUDY

### REBus/WRAP/Argos Gadget trade-in service

Supporting electrical manufacturers and retailers businesses to transition to more resource efficient business models is a key aim of the REBus project. Working in partnership with WRAP, major UK retailer Argos has rolled out a gadget trade-in service in over 750 stores across the UK. The key aims of the service for Argos are to increase customer loyalty, footfall and spend and to continue to improve their environmental credentials by keeping products in play for longer. Customers benefit from this service by being able to recycle their old gadgets and, financially, by receiving an Argos voucher for the value of the returned item.

[www.rebus.eu.com](http://www.rebus.eu.com)

[www.wrap.org.uk/content/argos-gadget-trade](http://www.wrap.org.uk/content/argos-gadget-trade)

## CASE STUDY

### Restart Project

The Restart Project is a London-based social enterprise that encourages and empowers people to use their electronics longer in order to reduce waste. It helps people learn to repair their own electronics in community repair events, called Restart Parties, in workplaces and universities.

To date, over 200 Restart Parties have been held by local groups in 8 countries, preventing over 2 tonnes of electronic waste. In London, a vibrant Restarter community of 45 repair coaches runs weekly events. The Restart Project shows the opportunities for the future of the repair economy.

[www.therestartproject.org](http://www.therestartproject.org)

13 Amec Foster Wheeler 2015

14 Amec Foster Wheeler 2015

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

16 Based on <http://www.wrap.org.uk/content/facts-and-figures>

17 Amec Foster Wheeler 2015 based on WRAP: <http://www.wrap.org.uk/sites/files/wrap/>

[Electrical%20product%20material%20composition%20overview.pdf](#)

18 WRAP: <http://www.wrap.org.uk/category/subject/product-optimisation>

19 WRAP: <http://www.wrap.org.uk/sites/files/wrap/Switched%20on%20to%20Value%2012%202014.pdf>

20 Amec Foster Wheeler 2015 based on the above.

# PLASTICS



Each person in the UK consumes 50 kg of plastic annually, according to data from 2011<sup>1</sup>, and, for London, this amounts to more than 400,000 tonnes each year.

Of the 400,00 tonnes of plastics consumed in London, the majority – over 150,000 tonnes – is packaging, while use in construction is a close second at around 100,000 tonnes and transport, furniture and electricals a much smaller third, only 30,000 tonnes per year.<sup>2</sup> Manufacture of plastics is an important activity in London. Despite making up just 2% of total UK manufacturing across all sectors, London produces 125,000 tonnes of plastic products annually<sup>3</sup> and is home to around 375 companies, 5% of the 7,500 plastics companies in the UK.<sup>4</sup>

Local plastics firms account for 6% of all gross value added by manufacturing in London.<sup>5</sup>

The circular economy practice of recycling is already well-established in the plastics sector. Plastic packaging has achieved a more than 50% relative increase within the last decade - from 20% in 2005 to 32% in 2013.<sup>6</sup> New technology which better extracts plastics from mixed waste and stronger social expectations of recycling are behind the much higher target of 57% set by the

British packaging waste regulations to be legally binding in 2017.<sup>7</sup>

Market demand for recycled plastics looks set to remain strong, with growth in many areas, such as agriculture, horticulture and new applications for recycle in food grade packaging and the construction sector emerging.<sup>8</sup> A major shift towards a low carbon economy will see an estimated £150 billion being invested in low and ultra-low carbon vehicle technologies in the UK over the next 20 years, and plastics are set to play a huge role in this shift.<sup>9</sup>

1 Applied Market Information: <https://www.amiplastics.com/pressreleases/newsitem.aspx?item=1000161>

2 Based on BPF: UK Plastics Industry Capability Guide (2012).

3 In terms of number of businesses as well as GVA, London accounts for roughly 5% of the UK plastics sector, which produces 2.5 million tonnes of plastic products (BPF: UK Plastics Industry Capability Guide [2012]).

4 British Plastics Federation (BPF): UK Plastics Industry Capability Guide (2012).

5 ONS: Regional Gross Value Added (Income Approach) NUTS1 Tables (2014).

6 WRAP: Plastic Packaging Market Study (Plastic Flow) 2014; and UK Plastics Waste – A review of supplies for recycling, global market demand, future trends and associated risks (2006).

7 Environment Agency: <https://www.gov.uk/guidance/packaging-producer-responsibilities#packaging-producer-charges>.

8 WRAP: UK Plastics Waste – A review of supplies for recycling, global market demand, future trends and associated risks (2006).

9 BPF: UK Plastics Industry Capability Guide (2012).

## What does the circular economy mean for the plastics sector in London?

Plastics are very widely used however they are a non-renewable type of resource. Their prevalence in all economic activities and London's high population concentration makes circular economy benefits possible from extending existing well-proven practices and from innovative approaches which can be offered at a variety of scales. At a minimum, annual circular economy savings of £200m can be achieved by 2036<sup>10</sup> through the effects of incentives such as:<sup>11</sup>

### Reduce plastics use

Financial incentives which highlight the benefits of changes in behaviour and provide an earmarked revenue stream, such as the recent 5p charge for plastic bags. Other methods include take-back schemes which incentivise manufacturers to design longer lasting and more easily recycled products, and optimised container sizes, liquid products packed in higher concentrations and packaging design that considers the use of the

package beyond the initially sold product, for example through re-use, which can lead to a further decrease of plastic packaging consumption. Sharing schemes can reduce consumption of a range of plastics-containing products, such as electrical and electronic equipment, furniture and furnishings, tools, leisure goods, toys, etc. It is estimated that this can lead to a 50% reduction of London's overall plastic consumption, saving around £150m.<sup>13</sup>

### Increase recycling rate

Increase the volume of plastic recycled. Targeting the upper end of an overall recycling rate of 80% is estimated to be possible from changes including enhanced sorting of waste and standardised labelling schemes. Direct savings to recyclers are £15m with end-use values much higher.<sup>14</sup>

### Innovative recycling technologies

Increase the quality of the recovered material from plastics recycling<sup>15</sup> and improve collection, sorting and consumer

behaviour. Combined with the development of new products from recycled plastics, the value of recycled plastics can be raised. Currently the market price for recycled plastics is about 55% of the price of virgin (i.e. new) plastics.<sup>16</sup> Increasing this value to 80% leads to benefits of £6.5m in London.

By carrying out the combined activity of increasing the volume of plastic recycled and the quality of the recovered material from plastic recycling and improve collection, sorting and consumer behaviour, this leads to additional benefit value to about £25m.

Bio-based plastics constitute another area of opportunity for London. Manufactured from renewable resources they provide the prospect of further closing material loops, decreasing the depletion of non-renewable hydrocarbons and contributing to the reduction of greenhouse gas emissions.<sup>17</sup>

## CASE STUDY

### Project Mainstream

The global plastic packaging roadmap (GPPR) aims to address endemic issues of the current linear plastics economy, and provide an action plan towards an economically and environmentally attractive alternative – a new plastics economy. It will do so by focusing on the root cause of the problem and accelerating systemic change through innovation and collaboration.

Mobilised in 2014 as part of Project MainStream, the GPPR initiative leverages the convening power of the World

Economic Forum, the analytical capabilities of McKinsey & Company, and the circular economy expertise of the Ellen MacArthur Foundation. A steering board composed of nine global leading company CEOs has been established, and an extensive analysis and consultation process undertaken over the past 12 months to shape and build support for this initiative.

[www.ellenmacarthurfoundation.org/programmes/business/project-mainstream](http://www.ellenmacarthurfoundation.org/programmes/business/project-mainstream)

<sup>10</sup> Amec Foster Wheeler 2015.

<sup>11</sup> The monetary estimates rely on a set of assumptions, the most important of which are: the average value per tonne of plastics consumption avoided is equal to the current value of plastics produced in the UK (note this does not imply the avoided consumption applies to only UK-produced goods, as it is more likely to affect imported goods to a larger degree), average plastics consumption per household is the same in London as UK-wide.

<sup>12</sup> Note that the savings calculated in this sector reflect only reduced plastics consumption when less electricals are used. Savings from all resources due to reduced electricals consumption are addressed in the electricals chapter.

<sup>13</sup> Amec Foster Wheeler 2015. For lack of better sources, an underlying value/tonne (£760/t) from the lower end of the plastics value chain was used. The value reflects sales/production of the UK plastics industry and thus more than the material value but less than the value of all finished products (since the industry partially only produces precursors).

<sup>14</sup> Amec Foster Wheeler 2015. Regarding how the value fails to reflect end-use values, see previous footnote.

<sup>15</sup> This is assuming that there is no increase in the volume of plastic recycled.

<sup>16</sup> Wrap: Market Situation Report Autumn 2007 - Realising the value of recovered plastics.

<sup>17</sup> Department for Environment, Food and Rural Affairs: Bioplastics: Assessing their environmental effects, barriers & opportunities (2010).

# THE LONDON WASTE AND RECYCLING BOARD (LWARB)



London **Waste** &  
**Recycling** Board

The London Waste and Recycling Board (LWARB) is a group of London's waste stakeholders and several partners. It was set up to change how waste is managed in London. It aims to reduce the amount of waste being produced and increase the proportion of waste that is re-used or recycled.

LWARB will promote methods of waste collection, treatment and disposal that are better for London's environment. It works in three main areas:

- a three year circular economy project aimed at accelerating London's transition to a circular economy by working with the public and private sector, and international partners.
- Resource London – a programme of support for London waste authorities jointly funded by LWARB and WRAP.
- an infrastructure investment programme that will provide the necessary facilities to treat London's waste, by providing funding in partnership with the private sector. Funds are partly allocated to the London Green Fund (LGF).