REDUCING GHG EMISSIONS THROUGH SUSTAINABLE WASTE MANAGEMENT: LESSONS FROM THE C40 CITY LONDON

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ACTION AREA: Mitigation

FOCUS AREA: Strategising

COUNTRY: United Kingdom

SECTORS INVOLVED: Waste management

TIMEFRAME: August 2018 - ongoing

CASE SUMMARY: In line with the United Kingdom government's goals to reducing greenhouse gas emissions (GHG) by 80 % by 2050 compared to 1990, the Mayor of London signed the C40 Cities Zero Waste Declaration in 2018, an initiative run by the global C40 Cities Climate Leadership Group (C40). By doing so he pledges for the British capital to becoming a resource-efficient city by 2050.

Each year London's homes, public buildings and businesses produce around 7 million tonnes of waste, of which only 41 % is currently recycled and 54 % sent to landfill or incineration (Greater London Authority, 2018a). The London Environmental Strategy, published in 2018, outlines the city's policy and implementation actions to take in order to turn London into a zero waste city. Thereby, London seeks to shift from landfill and incineration to increasing recycling rates – for example by sending no biodegradable or recyclable waste to landfill by 2026 and recycling 65 % of London's municipal waste by 2030 (Greater London Authority, 2018a). By working closely with stakeholders – including the government, businesses, NGOs and individuals – to promoting resource efficiency and a circular economy, the initiative offers London the opportunity to become a sustainable, zero waste economy and take a leadership role in reducing greenhouse gas (GHG) emissions. The afo- remen-tioned measures for the waste sector set out in the London Environmental Strategy seek to achieve concrete emission performance standards: 101,000 tonnes of CO2 equivalent saved in 2021, 169,000 tonnes in 2025 and 535,000 tonnes in 2031 (based on a 2015/16 baseline) (Greater London Authority, 2018a).

London's commitments to reducing waste and improving waste management can be considered a good practice as a result of strong political buy-in, the alignment with national frameworks and policies as well as the innovative approaches used to involving stakeholders. The city´s efforts furthermore show that a comprehensive waste management strategy should be seen as instrumental to reduce GHG emissions and to mitigate climate change.

BACKGROUND:

In its 2008 Climate Change Act, the UK Government committed to an 80 % reduction of its overall GHG emissions by 2050 compared to 1990. In order to achieve this long-term goal and drive progress, the act has put in place a system of carbon budgets, which set legally binding emission caps to be met in successive five-year periods (Greater London Authority, 2018a). In 2017, the United Kingdom's (UK) GHG emissions (including the following GHGs: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride) were estimated at 460.2 million tonnes carbon dioxide equivalent (MtCO2e) (Department for Business, Energy & Industrial Strategy, 2019b). Since 1990, UK GHG emissions compared to 2017 have been cut by 42.1 % (ibid). However, in order to meet the country target of 57 % emission reductions (compared to the 1990 levels) during the fifth carbon budget period of 2028-2032, further efforts are necessary (Committee on Climate Change, 2016).

The waste sector emits GHGs in different areas, including waste degrading at landfill sites, waste incineration, and waste water treatment (Department for Business, Energy & Industrial Strategy, 2018). For example, when biodegradable waste at landfill sites breaks down anaerobically, it produces substantial amounts of methane – a very potent GHG. In 2017, the waste sector accounted for about 4 % of the country's GHG emissions – the largest emitting sectors in the UK being transport (27 %) and energy supply (24 %) in the same year. Emissions from waste rose by 1 % between 2016 and 2017, mainly due to increased emissions from landfills and waste-water handling (Department for Business, Energy & Industrial Strategy, 2019a). Whereas the waste sector was one out of two sectors (the other being agriculture) whose emissions rose in the period 2016-2017, on a longer term basis (from 1990 to 2017) emissions in UK´s waste sector have been reduced by 69 %. A number of factors enabled this reduction, inter alia the improvements in standards of landfilling, the rising amount of landfill gas used for energy and changes in the waste types that are going to landfill (e.g. reductions in the amount of biodegradable waste) (Department for Business, Energy & Industrial Strategy, 2019b).

In 2018, the British Government published its 25 Year Environmental Plan that outlines the steps to take so to achieve the ambitious 80 % CO2 reduction mark by, inter alia, increasing resource efficiency and minimising waste (HM Government, 2018b) until the year 2043. Goal 7 of the 25 Environmental Year Plan to 'mitigate climate change' has been specifically linked to cutting GHG emissions from the waste sector and from the carbon footprint of consumer goods (HM Government, 2018a). To give a more dedicated and long-term policy direction with regards to waste management, the UK has published a dedicated strategy in the same year called 'Our waste, our resources: A strategy for England'. The strategy outlines the steps to take to transition towards a more circular economy (see figure 1), i.e. keeping materials in the economy for as long as possible to extract maximum value. It seeks to eliminate avoidable waste in all its forms by 2050 and avoidable plastic waste already within the timeframe of the 25 Year Environmental Plan and significantly increase resource productivity (HM Government, 2018a).

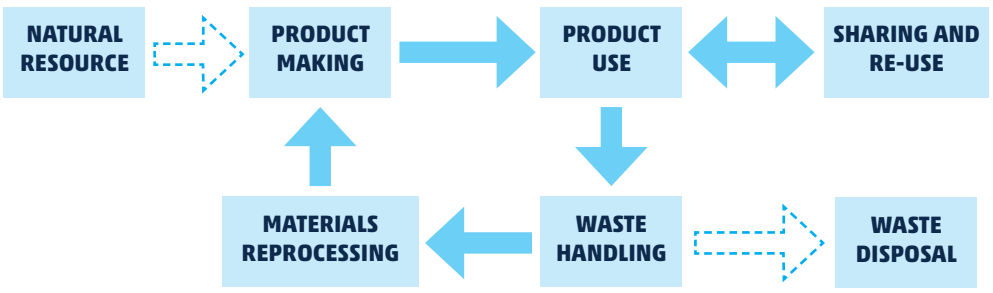

Figure 1: Circular Economy Model (London Assembly, n.a.)

WASTE MANAGEMENT IN LONDON

Each year London's homes, public buildings and businesses produce around 7 million tonnes of waste, of which only 41 % is currently recycled and 54 % sent to landfill or incineration (Greater London Authority, 2018a). Food waste and plastic packaging (including single-use coffee cups and water bottles), make up around a third of this municipal waste (Greater London Authority, 2018a). However, recycling rates are stagnating in recent years so that waste diverted from landfill has shifted to be incinerated instead of recycled (London Assembly, n.a.). In addition, the capacity of London's waste landfills is expected to run out by 2026. The city's waste bill is now in excess of GBP 2 billion (~EUR 2.2 billion, conversion rate: 1 GBP = 1,1011 EUR) a year and further rising (Greater London Authority, 2018a). Evidently, stagnating recycling rates and further waste going to landfill or incineration adversely impact the reduction of GHG emissions.

The Mayor of London has taken action to address the aforementioned waste-related issues. In its recently published Environmental Strategy, the British capital pledges to becoming a zero waste city, sending no biodegradable or recyclable waste to landfill by 2026 and increasing the city's recycling rate of municipal waste t o 65 % by 2030 (Greater London Authority, 2018b). This was preceded by one of the largest public consultations in the history of the city of London, inviting citizens and technical stakeholders to give their input on the draft strategy (London Assembly, 2019).

Furthermore, the Mayor has signed the Advancing Towards Zero Waste Declaration, an initiative run by the C40 Cities Climate Leadership Group (C40). Joining 22 signatory cities, London's Mayor thereby pledges to reduce waste generation per citizen by at least 15 % and diminish the amount of municipal waste sent to landfill and incineration by at least 50 % by 2030 compared to 2015. In addition, the signatory cities aim to increase the diversion rate away from landfill and incineration to at least 70 % by 2030 (C40 City Network, 2018). The declaration states that if all waste management actions (that includes disposal, composting and treatment and recycling) are taken into account, the sector could cut 10 to 15 % of GHG emissions on a global level. This number would further rise to 20 % if actions to reduce waste generation were also considered (C40 Cities Network, n.a.).

ACTIVITIES:

In order to achieve the targets set in the C40 'Advancing Towards Zero Waste Declaration', both London and its partner signatories commit to implementing a diverse portfolio of actions including reducing food losses, supporting sustainable procurement, reducing or banning single-use plastics, and strengthening reduction, reutilisation and recycling programmes and policies (C40 Cities, 2018). These goals and the associated measures described below are also set out in the London Environmental Strategy, acting as a vital policy instrument to steer London´s efforts. Setting the pathway for London to accelerate the transition away from a disposable economy, the Mayor works in close cooperation with a number of actors:

- The London Waste and Recycling Board (LWARB) – a partnership between the Mayor of London and London´s boroughs to improve the management of resources and waste in the city of London (see LWARB website);
- the Waste and Resource Action Programme (WRAP) – a registered charity working on resource efficiency (see WRAP website);
- the Greater London Authority (GLA) – the governance body of London, offering a robust policy framework to waste management;

- London's 33 boroughs – acting as London's waste authorities, the boroughs (districts) are responsible for local waste and recycling collections as well as procuring waste management services to recycle, process and treat collected waste (London Councils, 2019).

Through a collaborative effort, a number of measures is being implemented, including:

- **ADDRESSING FOOD WASTE:** London currently produces between 1.5 million and 1.75 million tonnes of food waste per year (Greater London Authority, 2018a). Costs for food and drinks that are purchased by consumers and thrown away in London amount to GBP 1.4 billion per year (~EUR 1.54 billion), generating 2.1 million tonnes of CO2 equivalent (TRIFOCAL, n.a.).

  - **TRIFOCAL:** The initiative 'Transforming City Food Habits for Life' (Trifocal) is led by Resource London (a partnership between WRAP and LWARB) and Groundwork London. It has three general objectives: i) it seeks to prevent food waste at home by encouraging behaviour change regarding different aspects such as planning or meal preparation; ii) it aims to promote sustainable and healthy eating; iii) it encourages the recycling of unavoidable food waste (TRIFOCAL, 2018). Set out in 2016, the initiative pioneered in eight London boroughs and envisions to be applied across all London boroughs (TRIFOCAL, n.a.). Throughout its active phase, the initiative aims to engage with 1,000 food service businesses, 30 large employers, 24 schools and the city's residents and commuters. In addition, it aims to offer 100 workshops and 100 training sessions for 2000 individuals (TRIFOCAL, 2018). The initiative uses innovative approaches to achieve its targets, such as creating a brand identity and collaborating with a number of chefs and food businesses (TRIFOCAL, 2018). Through the approaches used, the initiative aims to reduce 430,000 tonnes of CO2e per annum (TRIFOCAL, n.a.).

  - **LOVE FOOD HATE WASTE:** The Love Food Hate Waste campaign, run by WRAP, raises awareness about food waste and offers practical advice and solutions to reduce food waste to all kinds of stakeholders, including citizens and businesses. A dedicated website provides a wide range of ideas and free resources. Its main focus lies on communities and how best to bring the campaign to practice. Innovative ideas such as the introduction of 'Leftover Lunch' (where groups meet up at lunchtime to compare food that was forgotten or left over) are supported by guidelines and materials provided on the online platforms (WRAP, 2019a).

- **PROMOTING SUSTAINABLE PROCUREMENT:** On a yearly basis, the GLA Group spends around GBP 11 billion (~EUR 12.11 billion) on its own procurement activities. Adopting its own policy on sustainable procurement is a first step to lead the way in this area and encourage London-based businesses to follow suit. The Mayor´s 'Responsible Procurement Policy' is set to steer demand towards services and products with high environmental performance (Greater London Authority, 2018a). For instance, waste authorities should show how they will transform their fleets to zero or low emission options (Greater London Authority, 2018a). In addition to its own activities, the city is also taking action to support sustainable procurement within the private sector. Through the 'Advance London' programme, LWARB has been supporting over 150 small and middle-sized businesses (SMEs) in London to transition to circular economy business models and to scale circular innovation (Advance London, n.a.).

- **REDUCING SINGLE-USE AND NON-RECYCLABLE PLASTICS AND OTHER MATERIALS:** Overall plastic arisings in the UK amount to approximately 3.7 million tons, of which about 59 % (or 2.2. million tons) is packaging plastic. Only half of this packaging plastic is recycled (WRAP, 2016). The UK produces about 825,000 tonnes of plastic bottles on a yearly basis –around 125,000 of which in London (Greater London Authority, 2018a). Earlier emission estimates show the high relevance of recycling plastic for addressing climate change: In 2013-14, 456,000 tonnes of plastic packaging were collected kerbside from UK households. Recycling all of this packaging would save around 400,000 tonnes of CO2e compared with sending it to landfill, which would be equivalent to taking about 125,000 cars off the road (WRAP, 2016). In line with the C40 Advancing Towards Zero Waste Declaration, the city of London aims to reduce single-use and non-recyclable plastics and plastic packaging providing Londoners with access to drinking water in public spaces. This is supported by 'Refill London', an initiative to encourage businesses and shops to offer the public free tap water refills (London Assembly, 2019). Through a dedicated Refill app and stickers, Londoners are given the opportunity to identify and locate participating businesses (London Assembly, 2019). In order to further reduce plastic waste and increase recycling rates, the strategy formulates the goal to work with partners to introduce a deposit return scheme for plastic bottles as well as other recycled materials (Greater London Authority, 2018a).

- **SUPPORTING AND MONITORING LOCAL POLICIES:** In order to contribute to the roll-out of the zero waste policy in London and stronger ownership at the local level, London´s Environmental Strategy has set out a number of concrete provisions. Inter alia, the Mayor will work with the waste authorities (i.e. London´s boroughs) as well as LWARB to develop and to implement waste reduction and recycling plans. Further, in order align and standardise service arrangements across different waste authorities, a publicly accessible waste contract register is to be established (Greater London Authority, 2018b). The Mayor also plans to set up an industry group, which will optimise data sharing on commercial waste and institute a baseline figure measuring commercial waste performance for the year 2018. Furthermore, a London Waste Map has been established and is being updated on a regular basis to indicate the capital's waste facilities and to give Londoners the opportunity to responsibly manage waste (ibid). A GHG calculator will be made available to boroughs in order to enable them to monitor their waste activities and associated GHGs (Greater London Authority, 2018b).

- **PROMOTING SUSTAINABLE FASHION CLOTHING CONSUMPTION PATTERNS:** Since 2014, WRAP has been engaged in raising awareness on clothing going to waste and how to change associated consumption patterns through its 'Love Your Clothes', campaign. Every year around 300´000 tons of clothing are going to landfill in the UK. Over 5 % of the UK´s total annual water and carbon footprint derive from clothing consumption. According to WRAP, actively using clothing for only nine months longer (which would extend the average lifetime to three years) would reduce the water, carbon and waste footprint by 20 to 30 % (WRAP, 2019c). WRAP seeks to inspire consumers to diminish the associated environmental impacts through caring, repairing, re- and upcycling their clothes through a dedicated platform (WRAP, 2019b).

INSTITUTIONS INVOLVED:

- **MAYOR OF LONDON**

- **THE GREATER LONDON AUTHORITY (GLA)** is the administrative body for Greater London, comprising the Mayor and the London Assembly (the city parliament) (European Commission, 2019)

- **LONDON'S 33 BOROUGHS** acting as waste collection and disposal authorities

COOPERATION WITH:

- **THE WASTE AND RESOURCE ACTION PROGRAMME (WRAP):** WRAP is a registered charity working closely with UK businesses, UK Government, trade bodies, local authorities and individuals (see WRAP website)
- **LONDON WASTE AND RECYCLING BOARD (LWARB):** LWARB is a partnership between the Mayor and London´s boroughs working on improving resource and waste management (see LWARB website)
- **INDUSTRY / COMMERCIAL SECTOR**
- **INDIVIDUALS & HOUSEHOLDS**

FINANCE: While an exact amount of the overall financing is not available, the LWARB overseas a GBP 20.4 million (~EUR 22.46 million) budget for the years 2017 – 2020 (Greater London Authority, 2018a).

IMPACT OF ACTIVITIES: The projected impacts for the aforementioned activities include:

- **REDUCTION IN CO2 EMISSIONS:** Meeting the goals of the London Environment Strategy for the waste sector is projected to save 101,000 tonnes of CO2 equivalent in 2021, 169,000 tonnes in 2025 and 535,000 tonnes in 2031 (based on a 2015/16 baseline) according to the Greater London Authority (2018a).
- **REDUCTION IN FOOD WASTE:** As a result of its activities, the Trifocal initiative estimates a 20% reduction in the per capita tonnage of food waste that can be avoided and around GBP 330 million (~EUR 363.33 million) savings in terms of annual living costs for London´s citizens (Life, n.a.).

WHY IS IT GOOD PRACTICE: London's efforts to transition towards a zero-waste economy constitute a good practice as they show strong political engagement and support, are well aligned with local and national strategies and innovative in nature.

- **POLITICAL BUY-IN:** The Mayor Sadiq Khan has been strongly committed to improving waste management practices early on. Already in his election manifesto, Khan stated that he regards waste as an opportunity for job creation in the re-use, repair, materials innovation and re-manufacturing industries (London Assembly, n.a.). He also committed to getting back on track with hitting the 65 % recycling target by 2030, which has materialised in the London Environmental Strategy.
- **ALIGNMENT WITH NATIONAL FRAMEWORKS:** London´s efforts to reduce its municipal waste and improve waste management are well embedded in local and national policy frameworks such as the London Environmental Strategy, the 25 Year Environmental Plan and the Clean Growth Strategy.
- **INNOVATION:** The city of London has leveraged different ways to involve stakeholder groups in its efforts – reaching from the introduction of leftover lunches to fostering circular business initiatives. This innovative way of going about governmental targets has proved to be successful in directly reaching and incentivising stakeholders to contribute to action against avoidable waste.

SUCCESS FACTORS:

- **STAKEHOLDER ENGAGEMENT:** The draft for the London Environmental Strategy was published for a public consultation of 14 weeks and attracted a great number of responses and inputs, including from 370 technical stakeholders (London Assembly, 2019). Apart from the consultation, the city strongly involves businesses, NGOs such as WRAP and citizens in the implementation of its strategy.

- **TRANSPARENCY:** The establishment of various monitoring mechanisms serves local authorities as well as individual citizens. Tools such as the GHG calculator or the waste contract register effectively help to disseminate information on waste management. To assist boroughs with the use of the GHG calculator and to enable them to understand how to achieve the highest performance, a user guide will furthermore be made available (Greater London Authority, 2018b). Through such a tool, users can be sensitised for the repercussions of the management of waste on GHG emissions.

- **TRANSFORMATIONAL CHANGE:** The various initiatives and programmes that are part of London´s efforts to becoming a resource-efficient city address behavioural patterns of consumers from point of purchase to end usage. They are well poised to contribute to an increased awareness amongst citizens and to a behavioural shift towards preventing waste in the first place or responsibly recycling it (see figure 2).

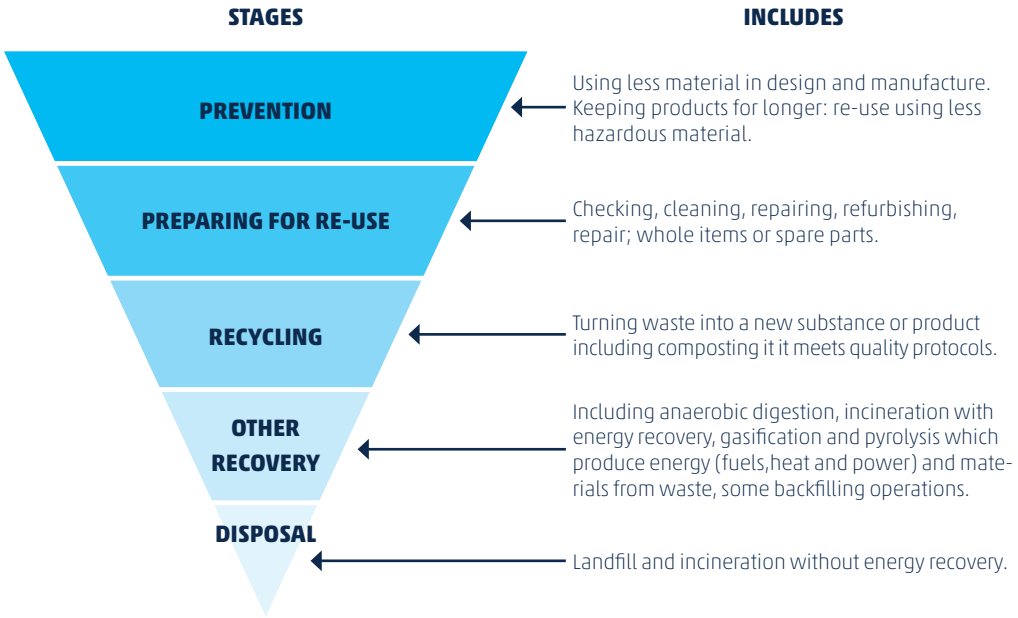

Figure 2: Waste Hierarchy (London Environmental Strategy Implementation Plan, 2018)

OVERCOMING BARRIERS / CHALLENGES:

WHAT WERE THE MAIN BARRIERS / CHALLENGES TO DELIVERY?	HOW WERE THESE BARRIERS / CHALLENGES OVERCOME?
CAPACITY: London's landfills are expected to run out of space by 2026 (Greater London Authority, 2018a).	Supporting policies will be embedded into the draft London Plan (due for publication in 2019/20) to ensure London has sufficient infrastructure to manage the waste being produced by providing for enough waste sites. The regular maintenance and update of the London waste map will be instrumental in locating existing and safeguarded waste management sites (Greater London Authority, 2018b).
URBANISM: On average, 50 % of London´s residents live in flats. Flats often do not have sufficient or accessible space to recycle, which constitutes a barrier to higher recycling rates (Greater London Authority, 2018a).	This barrier is being addressed (partly) through an in-depth research programme from Resource London (a partnership between WRAP and LWARB) running from 2018-2020 to explore the barriers to recycling in flats and to test potential solutions (Doherty, 2019).

LESSONS LEARNED:

- **INVEST IN INNOVATION:** Through financially supporting businesses to transition towards a circular-economy model, the business sector is effectively involved in public efforts – thus building an industry ready for handling waste in a sustainable way.

- **ENSURE AN EARLY ENGAGEMENT WITH STAKEHOLDERS:** The timely engagement with a wide range of stakeholders has secured the success of London's effort to build a strategy for a resource-efficiency. By giving them the chance to contribute to building policies around waste management, citizens cannot only be made aware for the issue, but also experience increased ownership for action (information obtained from interview).

- **EQUIP KEY STAKEHOLDERS WITH CONCRETE MEANS TO UNDERSTAND THE ENVIRONMENTAL IMPACTS OF THEIR WASTE ACTIVITIES:** Through tools such as the GHG calculator, boroughs have a concrete means at hand that can help them measure their GHG emissions and design their activities around achieving the emission performance standards set for the waste sector (Greater London Authority, 2018b).

HOW TO REPLICATE THIS PRACTICE:

- **DELIVER TARGETED INFORMATION TO THE LOCAL LEVEL:** To enable the local level to take action, sharing information in an applied way is instrumental. By giving citizens concrete guidance on how to reduce waste from different sources and reuse different materials, policies can trickle down and become actionable.

- **UNDERLINE THE CO-BENEFITS OF TAKING ACTION:** Improving waste management delivers multiple (environmental, social and financial) benefits. The latter can be leveraged to achieve the buy-in from citizens (information obtained from interview). For example, sensitising citizens for the adverse effects of unsustainable waste management and associated GHG emissions can help them become aware of and understand the interlinkages between waste and climate change. In addition, through communicating consumers the financial benefits from saving food, they can be effectively incentivised to abstain from throwing away food that is still edible.

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