Imperial College London
Centre for Environmental Policy
Environmental Quality Research Group

Investing in waste infrastructure for sustainability benefits

Presentation at the
3rd International Conference on Sustainable Solid Waste Management
2-4 July 2015, Tinos island, Greece

2 July 2015

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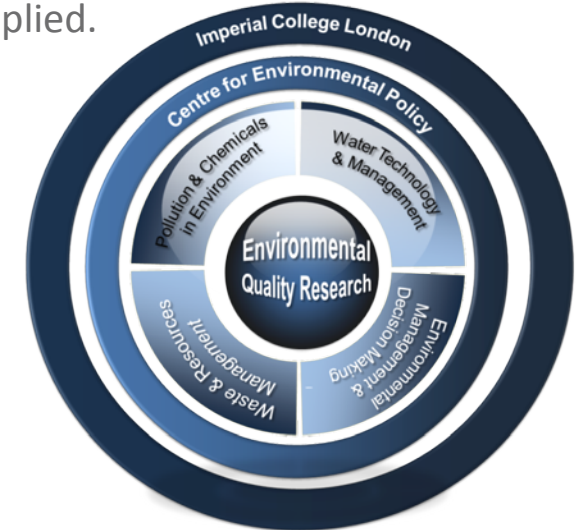
Introduction

- **Imperial College London** embodies and delivers world class scholarship, education and research in science, engineering medicine and business, with particular regard to their application in industry, commerce and healthcare.

- The **Centre for Environmental Policy** at Imperial provides a unique research interface between science and technology and the economic and policy context in which it is developed and applied.



- The **Environmental Quality Research Group** focuses on the integrated scientific study of the environment with emphasis on waste, water and wastewater management. Complemented by the development and application of tools in sustainability analysis, multi-criteria optimisation and lifecycle assessment.

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Findings from three related projects

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Waste Infrastructure Requirements for England

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March 2014

RGL Forensics

Discovering & Defining Financial Value

Ex Post Evaluation of Cohesion Policy Interventions 2000-2006 Financed by the Cohesion Fund (including former ISPA)

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Work Package A:

Contribution to EU transport and environment policies

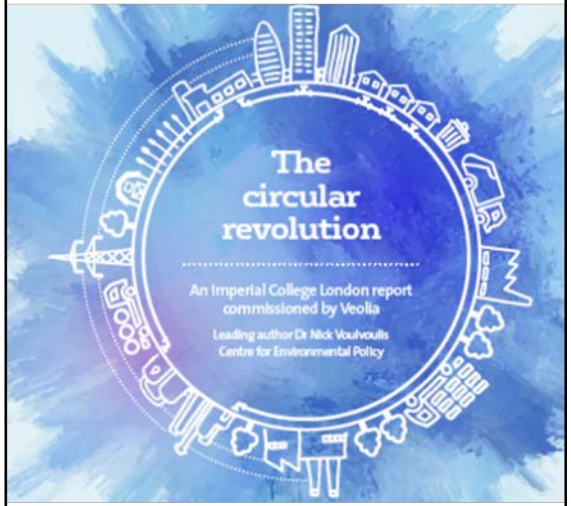
Task 6: Contribution to achieving the environmental acquis

Contract No: 2009CE16CAT050

EU and Countries Final Report

October 2011

- *How the circular economy will boost UK GDP*



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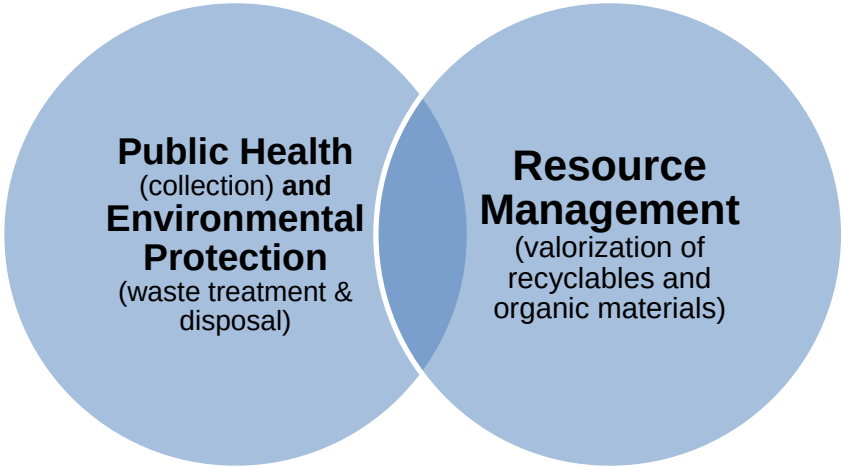
The role of infrastructure in waste / resources management



Waste Management Objectives

The Purpose of the Waste Framework Directive

WFD08 lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use.

Regulatory drivers

- Member states of the European Union (EU) are bound a number of Directives to not only **reduce the amount of waste going to landfill** but also **to increase the recoverability of this waste** through recycling:

    - the **EC Landfill Directive** (99/31/EC) requires member states to reduce the amount of biodegradable municipal waste (BMW) sent to landfill to 35% of 1995 levels, whereas

    - the **revised Waste Framework Directive** (2008/98/EC) requires a 50% recycling rate for household waste and waste of similar nature to household by 2020.

EU Investment

The EU budget, mainly through the Structural Funds and the Cohesion Fund, has been providing considerable funding for infrastructure projects:

- During the 2000–06 programming period, 4.6 billion euro was set aside from these funds for urban and industrial waste infrastructure.

- For the 2007–13 period, the EU contribution to waste infrastructure increased to 6.2 billion euro, of which around 70 % was in in the EU-12 Member States (ECA, 2012).

Waste infrastructure needs in the UK

- In the UK, the need for investment in waste infrastructure driven also by regulatory and legislative requirements.

- Evidence shows that most local authorities (LAs) seek for the most cost-effective treatment option over to investing in innovation and change that delivers environmentally sustainable treatment options, materials and energy recovery while at the same time reduction of waste.

- This mind-set is mainly a result of the imposed regulations that have become the ultimate goal of LAs in terms of waste management pushing for a strategy that provides a cost- effective way of getting there.

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Waste Infrastructure Requirements for England

This became very clear in February 2013, when Defra published a report indicating that in the next seven years the UK would be **over-equipped with waste infrastructure**

'Mind the Gap: UK residual infrastructure capacity requirements, 2015 to 2025' published by the waste management business, SITA

Report on Commercial and Indu
Chartered Institution of Wastes
concluded that, by 2020, there
capacity in the UK.

WASTE MANAGEMENT WORLD

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Home > Landfill > Industry Letter Confronts UK Government on Waste & Recycling Infrastructure Cuts

INDUSTRY LETTER CONFRONTS UK GOVERNMENT ON WASTE & RECYCLING INFRASTRUCTURE CUTS

7 August 2013
By Ben Messenger
Managing Editor

An open letter signed by five leading trade associations including the CIWM, ESA, and ICE has labelled the UK Government's decision to withdraw funding as short-sighted and has called into question the country's ability to meet 2020 Landfill Diversion Targets without the cancelled waste infrastructure projects.

The letter can be read below.

Dear Sirs,

Our task not a question of underestimating or overestimating capacity but of understanding infrastructure needs in the future.

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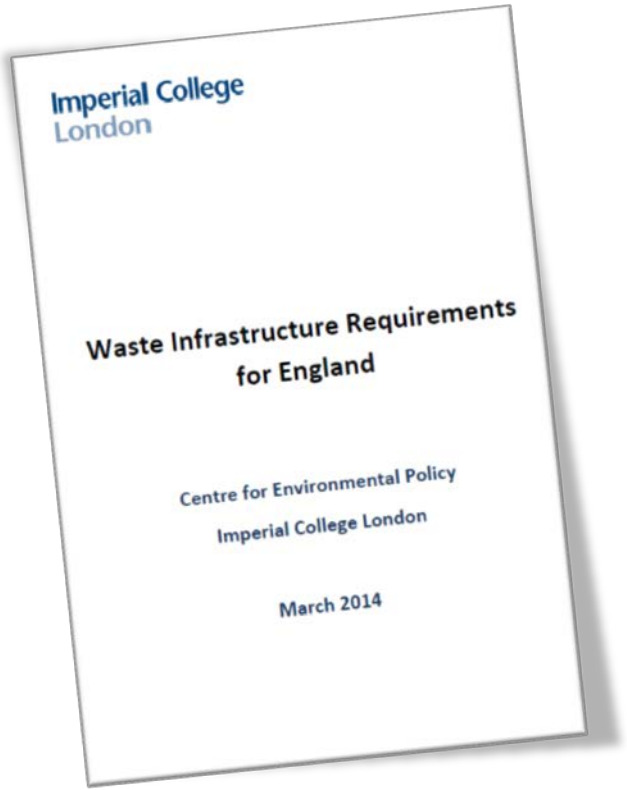
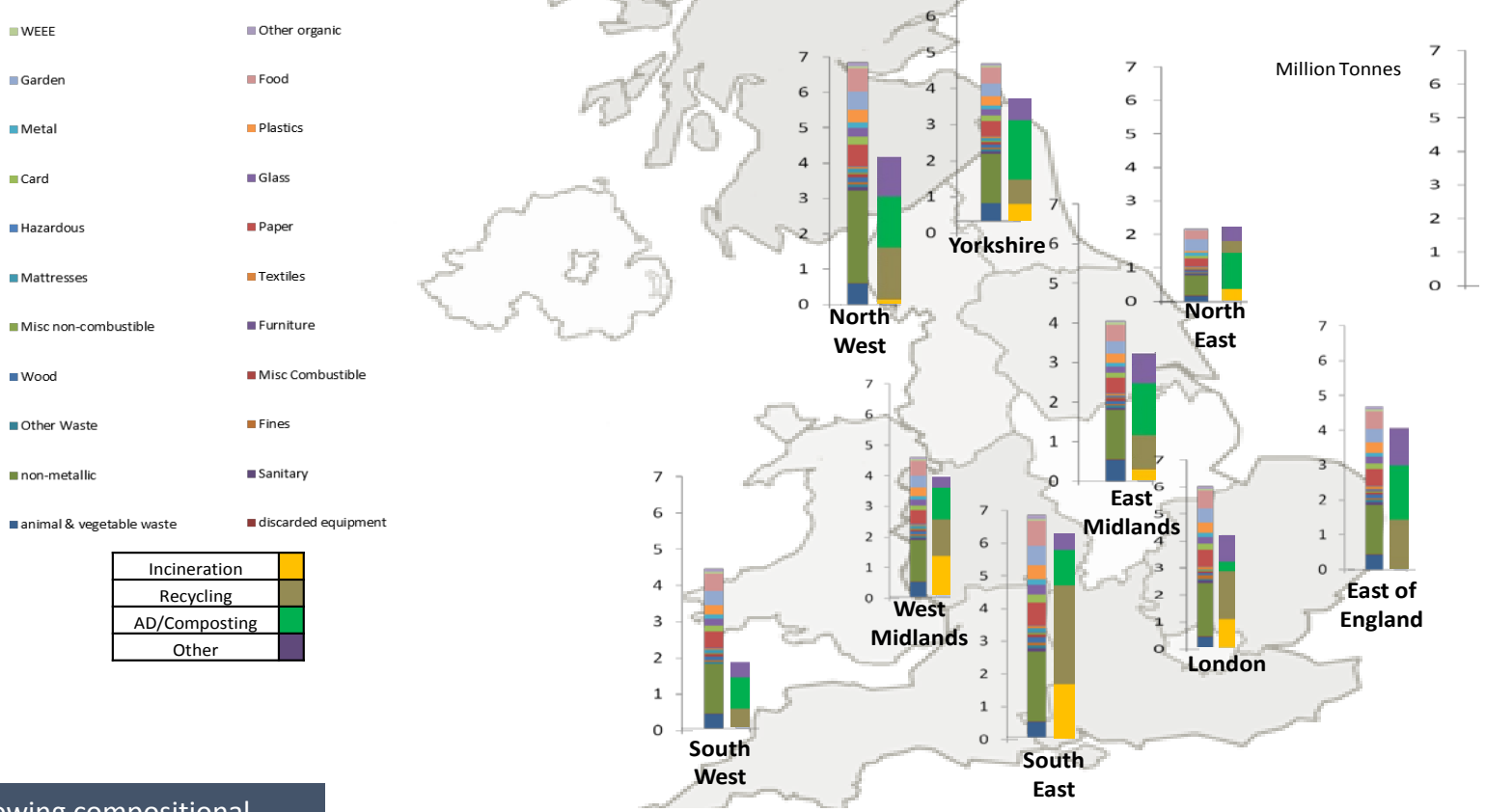
Key findings



- Findings indicate that variations in technology selection may undermine the reliability of the predictions of waste treatment capacity and therefore overcapacity reported by Defra is misleading.

DEFRA's forecasting methods are a good progress check, but not sufficiently detailed for investment decisions.

- The main question has focused simply on whether there will be theoretical overcapacity or undercapacity of residual waste treatment in the future rather than first understanding what the waste Infrastructure needs are and are going to be in the future.



Map of England showing compositional waste arisings (left bar) and available capacity per technology regionally (right bar) in million tonnes

Aggregated projected capacities
concealing regional differences

Towards a circular economy for Europe: policy context

- **Europe 2020 Strategy for smart, sustainable and inclusive growth**
  - Resource Efficiency Flagship Initiative
  - Mid-term review: pressure on resources and environmental concerns identified as a long-term trend affecting growth
  - Public consultation till 31 Oct.
    http://ec.europa.eu/europe2020/public-consultation/index_en.htm

- **7th Environment Action Programme**
  - Thematic objective to turn the EU into a resource-efficient, green and competitive low-carbon economy

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EU circular economy package

- The EU Circular Economy package was put together by the Barroso Commission, with EU environment ministers' supporting the proposal.
- The package intended to increase recycling levels and tighten rules on incineration and landfill, and consisted of six bills on waste, packaging, landfill, end of life vehicles, batteries and accumulators, and waste electronic equipment. It was expected to deliver €600 billion net savings, two million jobs and 1% GDP growth.
- The setback to the circular economy was down to the EU Circular Economy package perceived as **just another way to describe recycling, when it is actually** much more than that.


The circular revolution
An Imperial College London report commissioned by Veolia
Leading author Dr Nick Voulvoulis
Centre for Environmental Policy

Calculating GDP value from the circular economy

The contribution to GDP, as a result of a transition to a circular economy, was calculated based on the following six strategies:

1. **Landfill Tax savings**
   savings generated from landfill diversion.

2. **The value of commodities and imports**
   commodity value of materials used again and imports replaced.

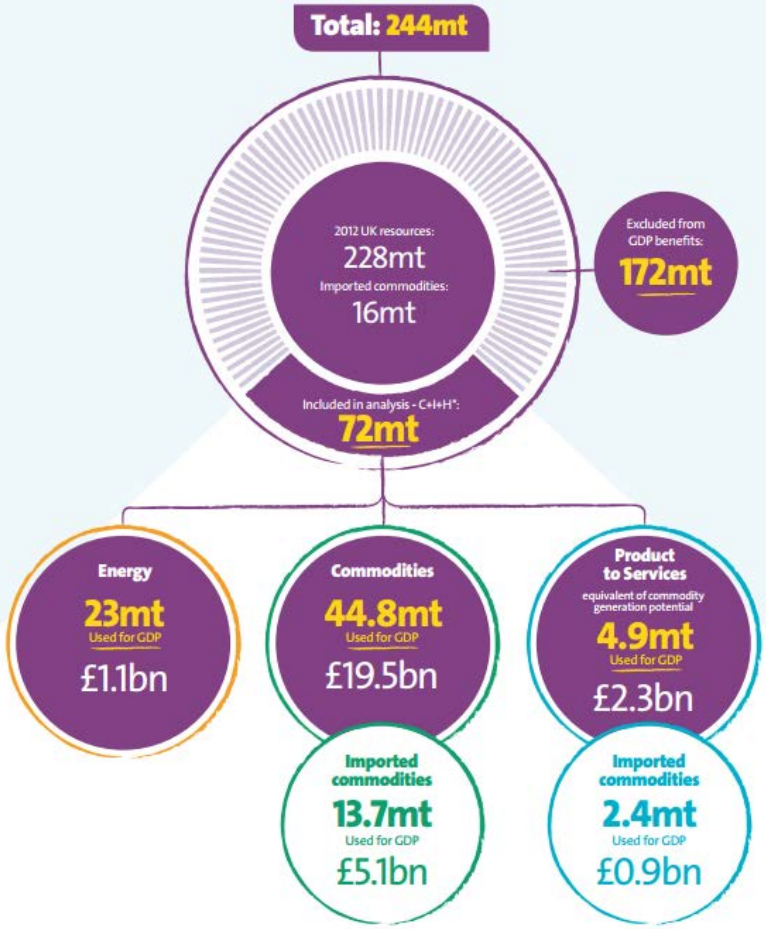
3. **Energy Values**
   Value from materials that cannot be reprocessed into commodities, e.g. food, animal, vegetal and residual waste.

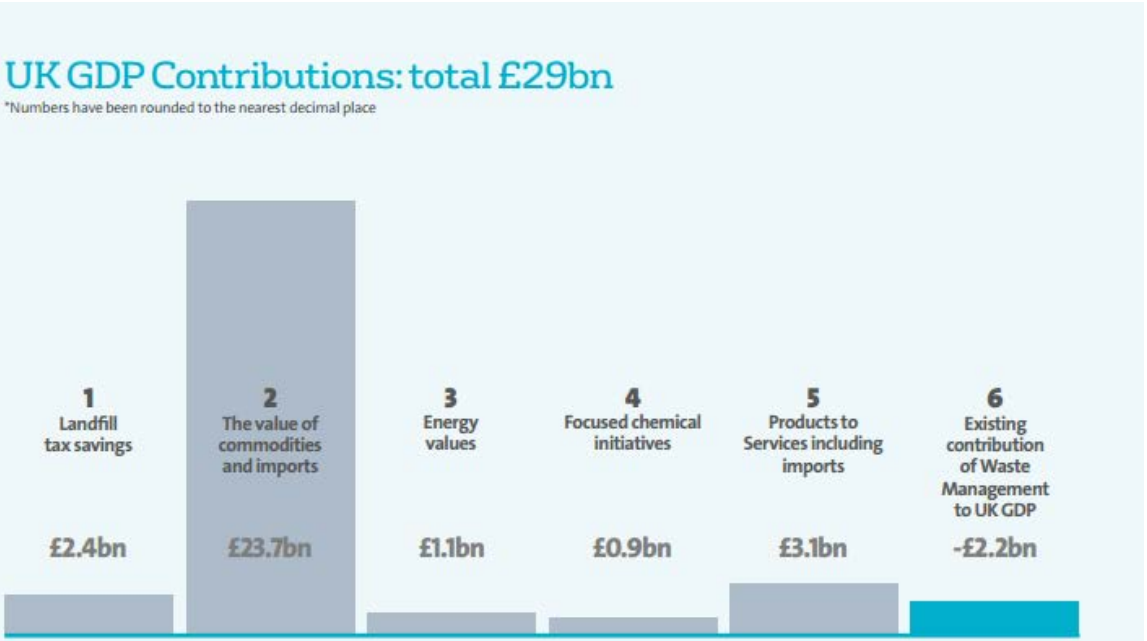
4. **Focused chemical initiatives**
   Initiatives for deriving value from chemical by-products, steam or heat.

5. **Products to Services including imports**
   recovering value by switching from buying and disposing of products to selling them as part of a service.

6. **Contribution of Waste Management and Circular Economy**

Breakdown of circular economy potential



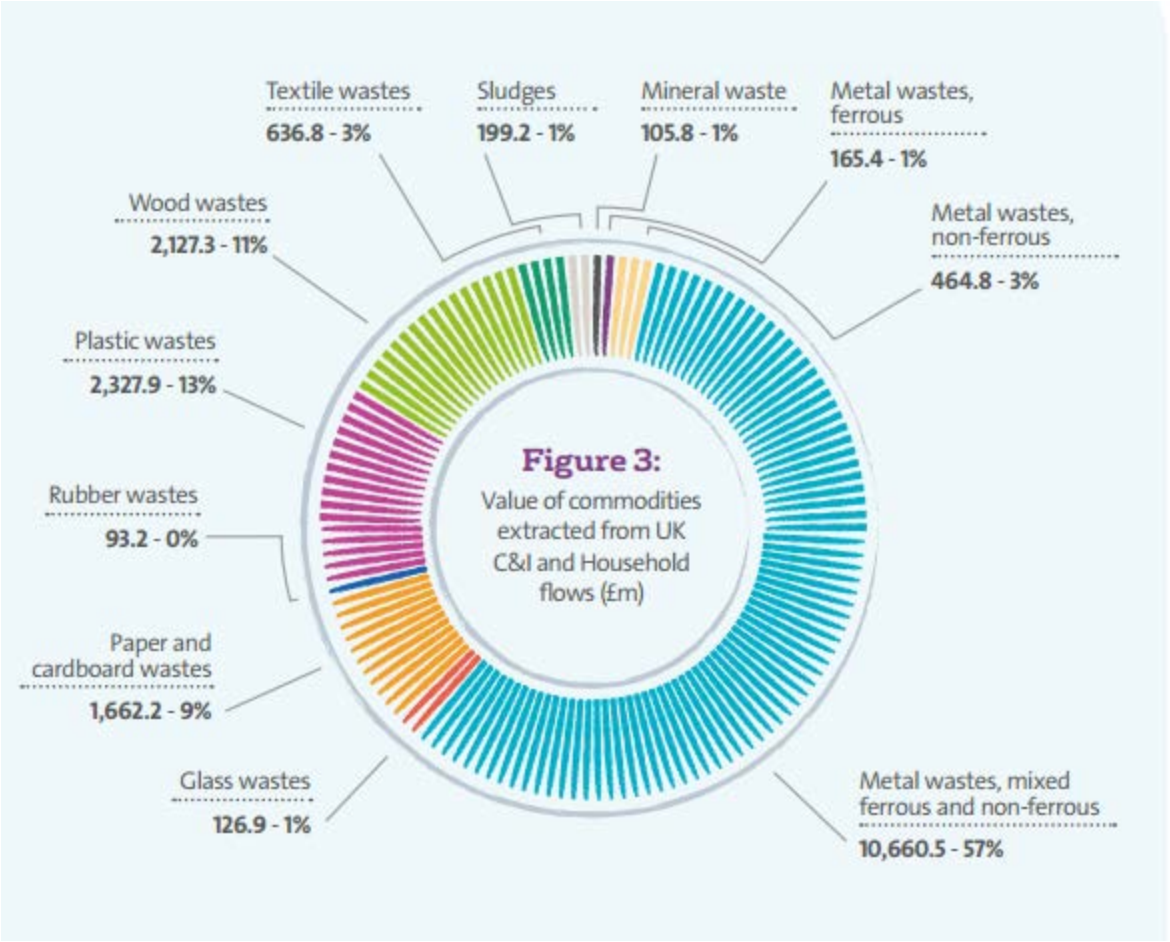


UK GDP Contributions

Which resources were selected?

The report focused on the following household and commercial & industrial resources:

- Manufacture of food products; beverages and tobacco products
- Manufacture of textiles, wearing apparel, leather and related products
- Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
- Manufacture of paper and paper products; printing and reproduction of recorded media
- Manufacture of coke and refined petroleum products
- Manufacture of chemical, pharmaceutical, rubber and plastic products
- Manufacture of other non-metallic mineral products
- Manufacture of basic metals and fabricated metal products, except machinery and equipment
- Manufacture of computer, electronic and optical products, electrical equipment, motor vehicles and other transport equipment
- Services (except wholesale of waste and scrap)
- Electricity, gas, steam and air conditioning supply
- Household waste


Textile wastes
636.8 - 3%
Sludges
199.2 - 1%
Mineral waste
105.8 - 1%
Metal wastes, ferrous
165.4 - 1%
Wood wastes
2,127.3 - 11%
Metal wastes, non-ferrous
464.8 - 3%
Plastic wastes
2,327.9 - 13%
Figure 3:
Value of commodities extracted from UK C&I and Household flows (£m)
Rubber wastes
93.2 - 0%
Paper and cardboard wastes
1,662.2 - 9%
Glass wastes
126.9 - 1%
Metal wastes, mixed ferrous and non-ferrous
10,660.5 - 57%

Total jobs gained: 175,000

	Plastics	Paper	Glass	Garden waste	WEEE	Aluminium	Steel
	89,372	26,816	2,573	6,890	21,200	6,164	21,673
Amount of materials processed	5,729kt	7,662kt	3,430kt	5,300kt	530kt	560kt	4,013kt
	15.6 Jobs gained (per 1000 tonnes)	3.5 Jobs gained (per 1000 tonnes)	0.75 Jobs gained (per 1000 tonnes)	1.3 Jobs gained (per 1000 tonnes)	40 Jobs gained (per 1000 tonnes)	11 Jobs gained (per 1000 tonnes)	5.4 Jobs gained (per 1000 tonnes)

The importance of infrastructure

- Infrastructure is the backbone of well-functioning economies. Unfortunately, that backbone is becoming increasingly brittle in a number of advanced economies.

- In this context, current conditions present a golden opportunity to increase public infrastructure investment in countries with infrastructure needs. In many advanced economies there is still substantial economic slack and interest rates are at historic lows.

- Planning for waste infrastructure, however, requires an in-depth understanding of waste arisings and composition in current- as well as in the long-term, for delivering an investment plan that focuses on the need to recovering resources and delivering sustainability benefits.

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In Summary

Infrastructure needs not just due to regulatory drivers but to provide society with a net benefit in terms of sustainability.

Limited and poor information on waste generation provides an incomplete and scattered picture of waste arisings, and conflicting data on treatment capacity make it difficult to make reliable estimates of infrastructure needs. Municipal waste is a complex stream of many different materials and without information on quantities and treatment needs, forecasting is problematic.

CIRCULAR ECONOMY: The economic rationale is compelling, great potential protecting our depleting natural resources whilst boosting growth, but correct infrastructure, investment opportunities and services locally are necessary to bring about change.


Good morning…
Rawr.
…but then again , who needs to change?
survival is optional…
Thank you