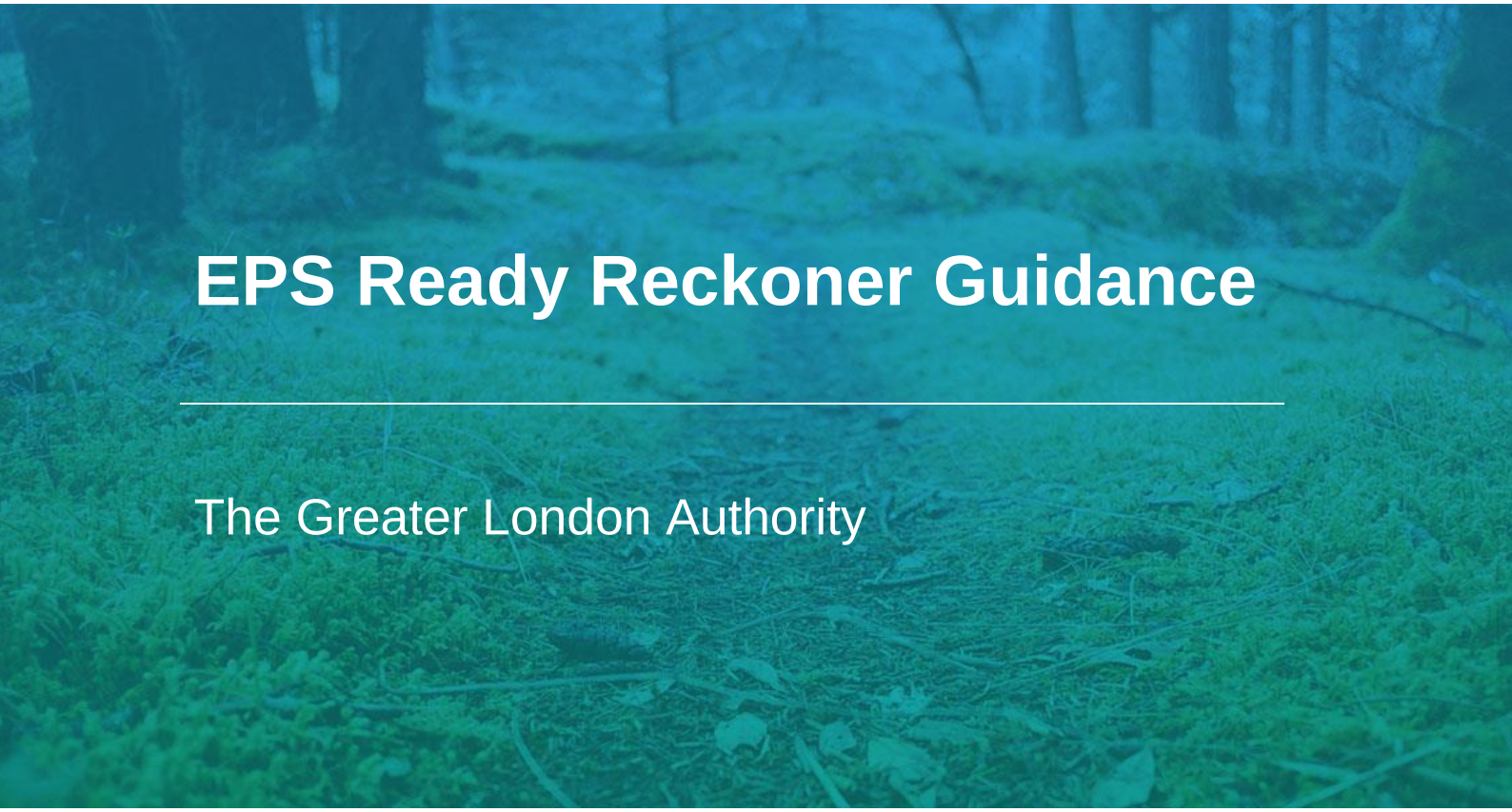

EPS Ready Reckoner Guidance

The Greater London Authority

Mark Cordle
Olly Jamieson

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Report for Greater London Authority

Prepared by Mark Cordle and Olly Jamieson

Approved by

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Ann Ballinger, Principal Consultant

Eunomia Research & Consulting Ltd
37 Queen Square
Bristol
BS1 4QS

United Kingdom

Tel: +44 (0)117 9172250
Fax: +44 (0)8717 142942

Web: www.eunomia.co.uk

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1.0 Introduction

This is a guidance document accompanying the Ready Reckoner, a simple way to model London boroughs performance against greenhouse gas performance targets.

The greenhouse gas (GHG) emissions performance standard (EPS) forms a core element under the waste chapter of the Mayor of London's new London Environment Strategy (LES).

Two of the key principles in the waste chapter are:

1) Encouraging a focus on recovering materials and reprocessing routes which deliver greater CO_2e reductions; and
2) Providing support for decentralised energy generation from waste that is no more carbon intensive than the alternative form of new base-load energy generation.

To deliver upon these two principles, Eunomia has developed a 'whole waste system' EPS, as well as a carbon intensity 'floor' (CIF) which applies solely to generating energy from waste.

The GLA has also developed a tool for London boroughs to model their performance against the EPS and CIF, called the Ready Reckoner, which acts as a greenhouse gas calculator.[1] This allows you to:

- compare the current carbon impact of waste management against targets set in the EPS;
- compare current residual treatment against the CIF target; and
- test and model the impact of different interventions which will help you to meet the EPS and CIF and develop recycling plans and waste strategies.

For reference, EPS performance is measured as:

- **kgCO2e/t**: Kilograms of carbon dioxide (and equivalents) emitted per tonne of waste managed
- **CIF:** Carbon intensity of electricity generated from waste

[1] The tool can be downloaded at www.london.gov.uk/priorities/environment/putting-waste-good-use/making-the-most-of-waste

2.0 The EPS Performance Calculation

The calculation of the carbon intensity of waste management is the same as that for calculating the EPS targets. This methodology was first published in 2011, and some methodological updates together with full assumption data tables are provided in the 2017 update report.[2,3] The key calculation methodology outlined in brief here to demonstrate how changes in inputs in the Ready Reckoner relate to EPS performance changes.

The model calculates tonnages of specific material streams that are:

- Reused;
- Recycled; and
- Disposed of via residual treatment.

It calculates carbon impacts by multiplies these tonnages by per-tonne carbon factors associated with:

- Reuse of each tonne
- Recycling of each tonne of material stream
- Residual treatment of each tonne of material (MBT/EfW/Landfill)

Residual treatment tonnages include tonnes collected for recycling but not finally recycled (excluding any mass or moisture loss through sorting).

A slightly separate set of carbon factors are associated with recycling extracted from residual waste (through a residual MRF, for instance), in particular to account for higher ratios of plastic film.

Also included are:

- transport emissions, covering collection & transport to treatment/disposal; and
- sorting emissions from material processed via a MRF.

The EPS performance (in terms of **kgCO2e/t**) is then calculated by adding up all carbon impacts (from multiplying tonnages recycled/treated by carbon impacts of that recycling/treatment), and dividing this total carbon impact by the total amount of waste managed.

The carbon impact of residual waste treatment routes are dynamic, and impacted by:

- the composition of waste into the facility (amount of recycling particularly plastics extracted in pre-sorting)

[2] Eunomia Research & Consulting (2011) Development of a Greenhouse Gas Emissions Performance Standard for London's Municipal Waste – Revised Report, Final Report for the GLA, June 2011
[3] Eunomia Research & Consulting (2018) Greenhouse Gas Emissions Performance Standard for London's Local Authority Collected Waste – 2017 Update, March 2018

- the heat and electrical efficiency of the facility

Therefore key ways to improve carbon performance include:

- increasing capture of materials with high carbon impact from recycling; and
- capturing materials with high carbon content before incineration (particularly plastics).

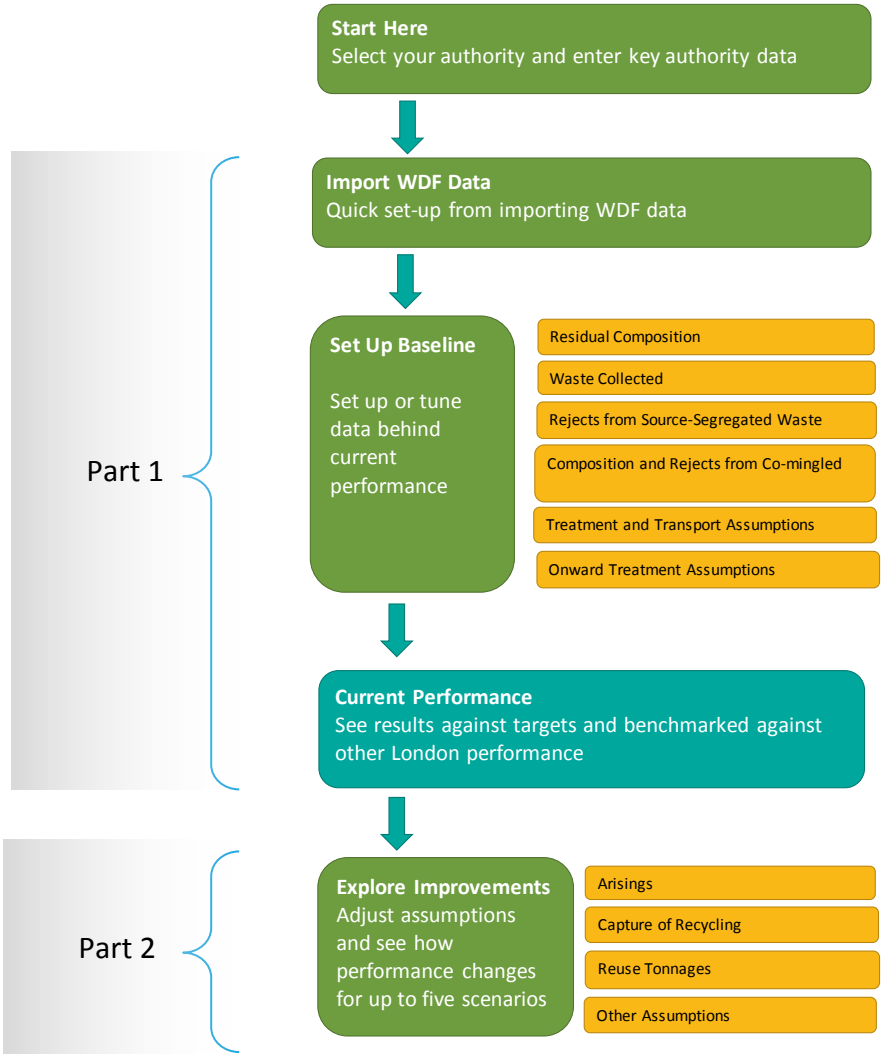
4.0 How to use the tool

The Ready Reckoner tool is divided into two parts:

- **Part 1:** Establish baseline or current performance
- **Part 2:** Explore impact of potential interventions

The sheets are displayed in Figure 4-1.

Figure 4-1: Model Structure



4.1 Part 1: Establishing Current/Baseline Performance

The Ready Reckoner allows you to either rely on Waste Data Flow (WDF) data or use your own data as your baseline. The easiest option is to download data from WDF as the Ready Reckoner is set up to automatically import the data and populate tables throughout the model, whereas your own data will have to be entered manually in each sheet. Instructions for importing WDF data are included in the "Import WDF data" sheet of the model. You can also edit or enter your own data on subsequent sheets if WDF data is not available. The 'Set up Baseline' sheet provides an overview of the data that has been entered. Throughout the model there are green arrows to highlight where you have the opportunity to enter your own data.

4.1.1 Set up Baseline

The sheets in this section are used to select or enter data relating to each part of your waste collection and management. This data subsequently feeds into the calculation of the EPS.

For the data entered for each area of waste management the 'Set up Baseline' sheet displays:

- whether the model has identified potential data errors; and
- which data source is used in the model (i.e. whether it uses data from WDF, data that the user has entered, or an alternative provided assumption)

You can also view a summary of the data that has been loaded into the model.

The subsequent sheets for editing baseline performance data are listed in Table 4-1.

Table 4-1: Data-Input Sheets in Part 1 of the Model

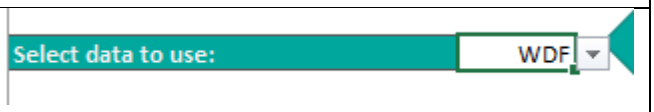
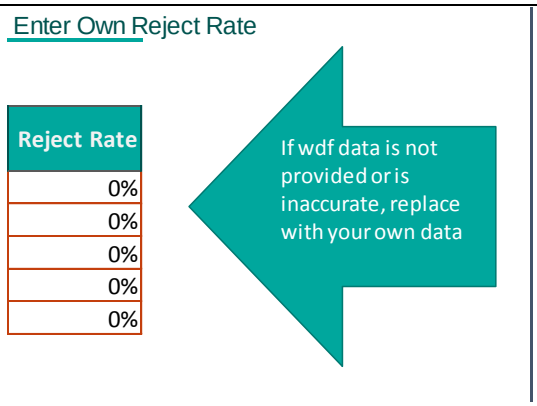
Sheet	Description
Residual Comp	Allows you to enter your own residual waste composition data for kerbside residual waste, commercial residual waste and HWRC residual waste. These compositions are combined using data in the sheet 'Collections' to create an overall residual composition.
Collections	Allows you to view data from WDF or enter your own data on different materials collected for reuse and recycling, and residual waste collected from different sources: • Kerbside, • HWRC, • Other Household (for recycling, this includes bring sites, voluntary/community collections; for residual, this includes other household residual waste categories)

Sheet	Description
	• Streets (for recycling, this is any recycling from litter bins; for residual, this is street sweepings) This data will be automatically pulled from WDF, or you can enter your own data. You can switch between these sources by changing the selection box under the section title (labelled 'select data to use:') This sheet also displays a summary of the data entered in higher level categories (e.g. total dry recycling, total food waste, etc) and in kilograms per household.
Rejects (SS)	You can view the implied reject rates from WDF (calculated as 100% minus the amount of that material reported as recycled in Q100 divided by the amount of that material reported as separately collected). You can also enter your own reject rates applied to material collected separately for recycling if available. ***Note that due to differences in categorisation of waste in WDF in some authorities between the collection questions and the waste management question Q100. This can be due to the disaggregation of mixed organics into food and garden waste.*** ***It is up to you whether to:*** • ***use WDF data, which will ensure performance matches that reported by Q100 and the London-wide EPS; or*** • ***base performance on collected materials, and to set rejects rates matching the material reported as collected.***
Co-mingled Comp	Select or enter a composition for your co-mingled dry recycling to estimate different materials recycled from co-mingled recycling collections. Input cells are also provided for calculating this composition based upon: • the input composition from the MF portal; combined with • the reject rate (amount of material not recycled) as reported by WDF.

Sheet	Description
Treatment and Transport	Allows you to set assumptions on a variety of treatment and transport assumptions as described below. **Residual Treatment Initial Destinations** – select or enter the initial treatment destinations of the residual waste collected, choosing from: • WDF Q100 data (if entered); • WDF data scaled to match tonnages of residual waste collected; • data on the relevant Waste Disposal Authority (WDA) residual treatment routes (if entering data for a waste collection authority); or • your own data. **Energy Efficiency of Incineration** – You can split residual waste sent for incineration between up to three different incinerators with different efficiencies. **Transport distances and methods** to each main residual treatment type **Destination of MRF rejects** (whether to incineration, gasification, MBT, or landfill) **Extraction for recycling or IBA and metals** from incineration
Onward Treatment	For waste sent to Residual MRF, RDF, autoclave, MHT or similar and Other, the calculation of the EPS considers materials extracted for recycling from these facilities. Calculation of the EPS also considers how much waste is then sent to landfill, incineration or MBT. Where WDF includes data on waste sent to these facilities, this information is pulled from WDF, otherwise London default assumptions are used. Alternatively, you can choose to use your own assumptions.

When you have selected or entered data for each of these sheets, return to the 'Set Up Baseline' page to check that there are any errors detected in data entry (this does not guarantee that the right data has been entered, just that the automatic validation is not detecting specific issues relating to a lack of data).

User Tips:

Clicking “See Results” will display your current performance.Quick links at the top of the spreadsheets (see image to the right) allow you to move between sheets.	
Drop-down boxes allow you to switch between data sources	
Green arrows provide further guidance	

4.1.2 Current Performance

The Current Performance sheet displays the carbon impact of waste management, as calculated by the Ready Reckoner, both overall and per tonne of waste managed. This is determined using the same methodology and calculation as are applied in the overall London EPS. See section **Error! Reference source not found.** below for more detail.

The sheet compares results in key areas that typically have a significant impact on the carbon intensity of waste management, and that local authorities are in a position to affect, against London Benchmarks (performance across the range of London's local authorities). Based on this comparison the model highlights target areas that a local authority can examine in order to improve performance.

This sheet provides three key results tables as per Table 4-2.

Table 4-2: Key results tables in “Current Performance” sheet

Total Carbon Impacts	Performance Against Targets	Potential Target Areas for Improvement
Shows total carbon impact	Shows performance	Shows a range of areas which are known to impact on EPS performance and provides an indication of interventions which might be explored.

Subsequent data tables on this sheet compare performance against London benchmarks in more detail. These comparisons are made on;

- carbon impacts per tonne across the different waste management categories;
- kerbside dry recycling yields (kg/hhld);
- yield of recyclable material (per hhld) from households (note that this includes HWRC and bring site yields);
- estimated percentage of commercial waste arising in the borough that is collected by the local authority provided service (Note that the data on borough-specific commercial waste arisings is highly uncertain), and the recycling rate of collected commercial waste;
- reject rate from the MRF (if one is used);
- percentage of residual waste sent to some form of pre-treatment before incineration or landfill (Note that this doesn't include MBT facilities); and
- percentage of recycling extracted from residual waste by pre-sorting.

4.2 Part 2: Assessing Future Performance

This second section of the Ready Reckoner allows you to explore the impact of changes in collections and waste management on EPS and CIF performance. You can vary assumptions for up to five theoretical scenarios.

The "Explore Improvements" sheet contains;

- a table which allows you to give each scenario a name describing the change you wish to model (e.g. 'New Energy from Waste contract' or 'Increase food waste recycling').
- links to subsequent sheets in which relevant assumptions can be varied;
- a table of results; and
- a graphical representation of the results (with the option to include/exclude each theoretical scenario from the graph).

The subsequent sheets are used to vary key assumptions to reflect the scenarios you choose to model. Table 4-3 details what key assumptions that can be varied in these sheets. Once you have named your scenarios in the "Explore Improvements" sheet navigate to the relevant subsequent sheet and alter the assumptions as desired.

Table 4-3: Data-Input Sheets in Part 2 of the Model

Sheet	Description
Edit Arisings *Use this page to model expected changes in waste arisings by material, or the impact of waste prevention initiatives.*	Edit scenario assumptions relating to waste arisings from households - for instance, estimating impact of waste prevention on carbon performance. Inputs are in tonnes of waste arising by material stream.
Edit Recycling Captures *Use this page to model the impact of improving recycling collections to capture more material.*	Edit scenario assumptions relating to capture for recycling of materials, both household and commercial waste. Inputs are entered as a capture rate for final recycling – so 50% input indicates that 50% of the arisings of that material are being captured for recycling. **The tables below the waste from households capture rate table translate the capture rates inputs into kilograms per household (kg/hhld) captured for recycling.** **If you have an estimate of the impact of a particular change in terms of a kg/hhld increase in food waste or dry recycling, you can therefore tune the capture rate inputs to create the target change in kg/hhld**.
Edit Reuse Tonnages *Use this page to model increases in reuse tonnages collected through specific planned initiatives*	Edit scenario assumptions relating to reuse, both household and commercial waste. Inputs are tonnes reused (not tonnes collected for reuse).
Adjust Assumptions *Use this page to model changes in residual waste management, levels of rejects, or increases in reuse tonnages collected through specific planned initiatives*	Allows you to enter a range of other assumptions that have different impacts on performance. These are all independent variables (none of them have an automatic impact on any other). The assumptions that can be adjusted include: • the amount of material collected co-mingled and processed through a MRF; • the reject rate at the MRF (amount of material collected alongside material that ends up

Sheet	Description
	recycled but rejected at the MRF) and reject rates from source-segregated collections; *Note that changing MRF reject rate inputs here will not increase recycling performance. To model the impact of reducing the reject rate by improving captures (not just reducing contamination), also adjust capture rates on the sheet 'edit recycling capture rates' (this material is in addition to recycling captures)* • destination of rejects from the MRF and source-segregated collection; • initial destinations of residual waste; • the electrical and heat efficiency of up to three different incinerators and the portion of waste for incineration sent to each; and • whether and how much waste goes to a 'higher performance' residual MRF and levels of recycling expected to be extracted from this.

Once you have finished adapting the key assumptions to reflect your scenarios, return to the 'Explore Improvements' sheet to review the table and graph of impacts on EPS and CIF performance which will display the performance under the modelled scenarios relative to the baseline.