



global environmental solutions

Greenhouse Gas Calculator for Municipal Waste (GLA80061)

User Manual

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1.0 BACKGROUND

The Mayor is preparing a new Municipal Waste Management Strategy which will include policies to contribute to the reduction of greenhouse gas emissions. Policies will also seek to exceed landfill directive and recycling targets set out in the UK Waste Strategy 2007. The GLA, through earlier consultancy services, has developed a lifecycle assessment of the current greenhouse gases emissions associated with waste management activities in London and subsequently developed a projected lifecycle greenhouse gas emissions performance standard (EPS) for London to work towards. In meeting the EPS, waste authorities will need to ensure their municipal waste management activities (all stages from collection to final disposal) collectively meet the agreed lifecycle greenhouse gas performance standard, or that there are steps in place to meet the standard in the near future.

The Mayor wishes to avoid placing additional financial burden on the waste authorities through a requirement to procure the WRATE tool, thus the current project has resulted in development of a GHG Calculator which will be made available online for free to the waste authorities. This approach will minimise costs for the waste authorities and ensure consistency in greenhouse gas emission reporting in London.

2.0 PURPOSE AND USE OF THE GHG CALCULATOR

The Greenhouse Gas Calculator has been commissioned by the GLA to assist Local Authorities in assessing the greenhouse gas emissions associated with the procurement of new waste services. The tool is designed to allow Authorities to test different waste management options. The GLA will complete its own EPS review on an annual basis to assess whether activities are in conformity with the Mayor's Municipal Waste Strategy.

The GHG Calculator has been designed to be a flexible tool which can be used in a number of situations, and assess a number of different elements of the waste stream. In summary, there are 3 options for data inputting:

- **Option A - Quick Estimator.** To use the calculator to develop a quick estimate of greenhouse gas emissions associated with a waste management system. Enter tonnage data only, no transport distances or vehicles required, utilise the available default technology types;
- **Option B – Intermediate Model.** As above, but include the vehicles and distance data (can use default distances or user entered distance figures);
- **Option C – Detailed Model.** As above, but include User Entered technology parameters for the residual treatment technologies. You will need to have a good understanding of the technology mass and energy balances to create the user entered technology parameters.

Mode of Operation	Tonnage data	Vehicles and Distances	User entered technology parameters	Table numbers to complete
A) Quick Estimator	✓			1. Input_MSW: 1.1 Modelled MSW Compositions 2. Input_Recycling 2.1 Kerbside recycling collection 2.1a Kerbside co-mingled recycling collection 2.1b MRF Reject Rate 2.2* Kerbside recyclables to first destination 2.3* Kerbside recyclables onward movements 2.4 HWRC recyclable materials 2.6 Bring site recyclables 3. Input_Organics 3.1 Kerbside collected organics 3.2* Kerbside organics first destination 3.3* Kerbside organics final destination 3.4 HWRC organics 3.5 HWRC organics onward movement 3.6 Gardens and Parks Organics 3.7* Gardens and parks organics first destination 3.8 Gardens and parks organics onward movement

Mode of Operation	Tonnage data	Vehicles and Distances	User entered technology parameters	Table numbers to complete
				<p>4. Input_Residual</p> <p>4.1 Residual Waste Qunatity and Composition (check)</p> <p>4.2 Source and Quantity of Residual Waste</p> <p>4.3* Kerbside residual collection</p> <p>4.4* Kerbside residual onward movement</p> <p>4.6* HWRC residual services onward movement</p> <p>4.8* Other residual waste first destination</p> <p>4.9* Other residual waste onward movement</p>
B) Intermediate Model	✓	✓		All tables included in 'Quick Estimator' above, with the addition of vehicle and distance details.
C) Detailed Model	✓	✓	✓	All tables including Residual Technology Parameters as appropriate to give a more accurate estimation.
Optional				The ability to assess the impact of waste reduction and waste re-use is factored into worksheet 6. Output_Results. These options are currently for Authority information only, these activities will be counted towards the EPS performance when approved emission factors are available.

* – enter quantity and destination details only.

The GHG Calculator is available for Authorities to utilise in Option A, B or C. The GHG Calculator is a resource for Authorities to determine whether a waste disposal contract meets the Mayor of London's carbon intensity floor or as an alternative to WRATE to determine how waste activities perform against the Mayor's emissions performance standard.

3.0 THE GHG CALCULATOR

3.1 The EPS and Carbon Intensity Floor

The output from the GHG Calculator is the estimated emissions of greenhouse gases (measured in tonnes of carbon dioxide equivalent) based on the waste management system and processes defined by the user.

The tool also determines whether the scenario meets the EPS and Carbon Intensity Floor; these two metrics are briefly summarised below:

Metric	Purpose and inclusions	Target value(s)
Emissions Performance Standard (EPS)	Measures the impacts of the waste management system (excluding containers) and divides the greenhouse gas emissions by the tonnage of waste managed.	-0.13 tCO ₂ e / t waste in 2015 reducing to -0.24 tCO ₂ e / t waste in 2031
Carbon Intensity Floor	Measures the direct burden emissions associated with generating energy from residual and organic waste. The carbon intensity floor assesses the emissions created from the combustion and anaerobic digestion of waste to produce a kWh of energy.	≤ 400 gCO ₂ e / kWh

During the consultation of the draft Mayor's Waste Strategy the GLA published a report explaining the EPS and Carbon Intensity Floor and how they have been derived; copies of these reports are available at the following links:

<http://www.london.gov.uk/sites/default/files/GLA001MWS%20APPENDIX%204b.pdf>

<http://www.london.gov.uk/sites/default/files/GLA001MWS%20APPENDIX%204b%20cont%207d.pdf>

The above reports have recently been updated, and will be accessible from the GLA website. All figures utilised in this guidance document and the GHG Calculator are derived from the revised EPS reports.

The GHG Calculator has been designed to allow the GLA to update the EPS and Carbon Intensity Floor values should the current figures be revised in the future. The current EPS figures are presented below:

Year	EPS (t CO ₂ e / t waste)
2015	-0.13
2020	-0.19
2031	-0.24

The Carbon Intensity Floor is currently set at 400 gCO₂e / kWh.

A new version of the GHG Calculator will be uploaded to the GLA website should the EPS, Carbon Intensity Floor or other parameters be updated. Users should check the GLA website and download the latest version of the GHG Calculator prior to undertaking any assessments.

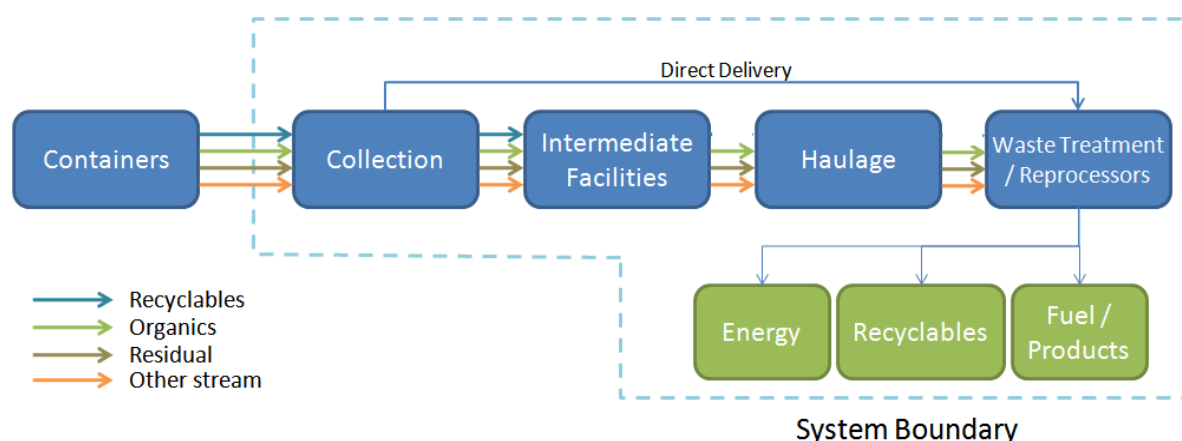
3.2 LCA and System Boundary of the GHG Calculator

Life cycle assessment techniques measure the environmental and economic costs and benefits of products and activities (in this case waste) at every stage of its existence, from production to final disposal. Such techniques can provide a basis for making strategic decisions on the ways in which particular waste in a given set of circumstances can be most effectively managed, for example to reduce costs or greenhouse gas emissions from waste activities (definition from the Mayor's Waste Strategy).

The GHG Calculator measures the environmental benefits and impacts associated with the so-called greenhouse gasses which are known to contribute to global warming. In waste management, the main greenhouse gasses of concern are carbon dioxide, methane and nitrous oxides. A system boundary diagram is presented in Figure 3-1 below.

Figure 3-1

System Boundary Diagram for GHG Calculator



The GHG Calculator includes the following elements:

- Transportation from route end points to facilities or intermediate facilities (optional);
- Activities at intermediate facilities;
- Transportation from intermediate facilities to treatment facility/reprocessor (optional);
- Activities at the reprocessor or treatment facility;
- Benefits associated with the avoidance of primary material extraction;
- Benefits associated with avoided fossil fuel use to generate electricity and heat;
- Onward transportation movement of SRF outputs and rejects from treatment facilities for final management (optional)
- Benefits associated with waste reduction and re-use (note: currently optional and advisory only. Will be included as part of EPS once approved emissions factors are available.).

A number of transportation elements of the data input are optional depending on how the user intends to use the model and its results (see those elements noted as optional above). Where transportation is included in the calculator the following transport system boundaries apply; these transport inclusions are consistent with the revised EPS and latest version of the London Plan¹:

Waste Stream	Included	Excluded
Recyclables	<ul style="list-style-type: none"> • Transportation up to the last step before material sent for reprocessing. • The calculator allows kerbside recyclables to be transported to two intermediate facilities and HWRC/Bring Site recyclables to be transported to one intermediate facility before reprocessing. 	<ul style="list-style-type: none"> • Transportation from final intermediate facility to reprocessing. • Onward transportation of rejects from intermediate facilities/MRFs.
Organics	<ul style="list-style-type: none"> • All transportation to the gate of the treatment facility, including to any intermediate facilities. 	<ul style="list-style-type: none"> • Onward transportation of compost/digestate output from treatment facility.
Residual	<ul style="list-style-type: none"> • All transportation to gate of treatment facility, including to any intermediate facilities. • Transportation of SRF and rejects from pre-treatment (MHT/MBT/ Dirty MRF) to secondary thermal treatment and landfill. 	<ul style="list-style-type: none"> • Onward transportation of recyclables from pre-treatment to reprocessing.

The carbon impacts of containers (bins, bags and boxes) utilised to store waste and recyclables prior to collection are outside the scope of the GHG calculator.

3.3 Model Design

The GHG Calculator is designed to give flexibility to users, as well as giving flexibility to the GLA by allowing changes to background assumptions to be made. This means that as new information becomes available (e.g. new carbon data, updated waste composition studies) the tool can be updated, enabling output results to reflect the most up to date information available.

Although the GHG Calculator is designed to be flexible for the user to allow data input for a range of services, there are certain assumptions which must be fixed to ensure consistency. It is proposed that if issuing a request to Authorities' for completed GHG Calculator scenarios that a list of fixed assumptions be issued and that these assumptions are adhered to by all parties. Further information on this issue is provided in Section 3.7.

¹ Mayor of London (2011) The London Plan: Spatial Development Strategy for Greater London – Consultation Draft Replacement Plan, October 2009

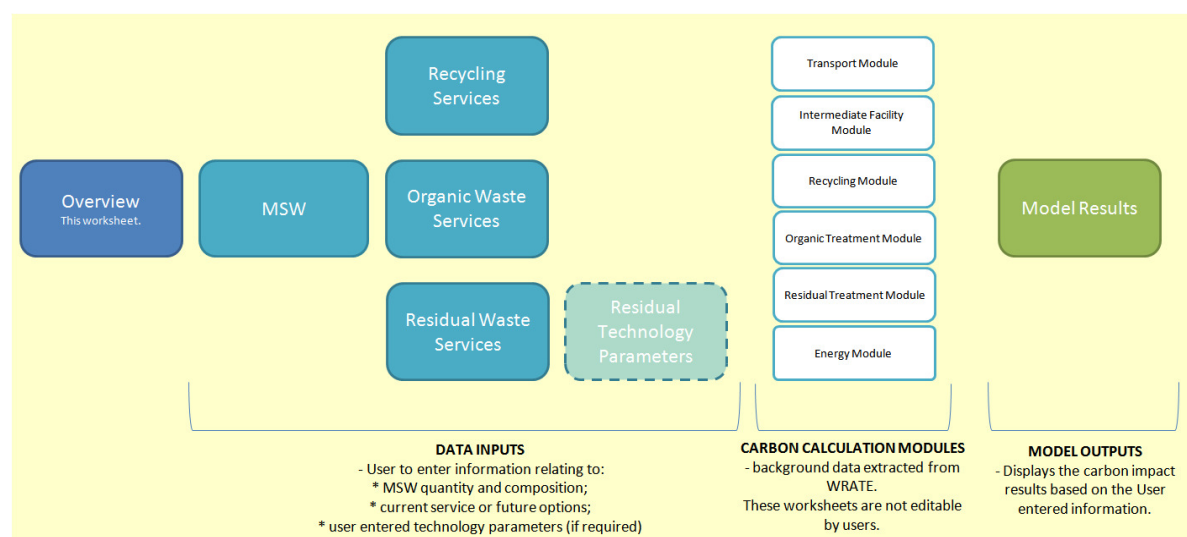
The GHG Calculator has been designed with ease of use in mind. As the GHG Calculator may be used infrequently during procurement exercises, it has been designed to be clear, easy to complete, with comprehensive in-model instructions and hints to assist the user in completing the model.

The model is split into a number of data input sheets, and one output results sheet. Hyperlinks are used throughout the model to help navigate between different input sheets and locate key parameter options. Further details are provided in Section 3.4.

3.4 GHG Calculator Overview

The overview diagram below (Figure 3-2), which can be found in the 'Overview' worksheet of the GHG Calculator, shows the layout of the tool. Each box represents a worksheet within the calculator; the boxes are colour coded for ease of reference and navigation as follows:

Figure 3-2
Overview of GHG Calculator



The blue filled boxes are worksheets which require data inputs from local authority users. These worksheets record data relating to MSW quantity and composition, as well as tracking recycling, organics and residual waste from collection to final disposal.

The boxes which have a white fill and a blue border are the Carbon modules. These worksheets contain the greenhouse gas emission data relating to each element of the waste management process.

Greenhouse gas emission data has largely been obtained from the WRATE software, with other sources of information and calculations supplementing the WRATE data to enable an accurate GHG Calculator. A number of the Carbon module worksheets contain options to utilise greenhouse gas data from different sources; in these cases a default data set has been entered and there is provision of a space for an additional data set which can be entered by the GLA. Where appropriate there is also a space allocated for a user entered data set. As mentioned previously (and discussed in Section 3.7), a list of fixed assumptions will be issued by the GLA as required.

The GHG Calculator combines the input data entered by the local authority user, through a number of intermediate calculations and the carbon module data to generate estimates of the greenhouse gas emissions of each stage of the waste management process.

Calculation methods in the tool are fixed and cannot be changed by the user. This ensures that all scenario tests produce accurate and consistent results.

The following table provides a brief overview of the contents of each worksheet contained within the GHG Calculator.

Table 3-1
Summary Contents of each Worksheet

Worksheet name	Brief description of contents
Overview	Graphical summary of the worksheets contained within the GHG Calculator. All boxes are hyperlinked to aid navigation. This worksheet provides a space to list the project title, assumptions, date and name/organisation of the model creator. Users must select whether they will include or exclude transportation in the scenario.
MSW	Contains information relating to composition, calorific value and carbon contents (fossil and biogenic) of the material components. Users must enter the assessment year, quantity and composition of the MSW stream.
Recycling Services	Input data sheet for all recycling related waste services. Worksheet is split into separate areas for kerbside, HWRC and Bring site services.
Organics Services	Waste Input data sheet for all organic related waste services. Worksheet is split into separate areas for kerbside, HWRC and Parks and Gardens services.
Residual Services	Waste Input data sheet for all residual related waste services. Worksheet is split into separate areas for kerbside, HWRC and Other residual waste services.
Residual Technology Parameters	A number of technology types are available in the Residual Waste Services worksheet to manage the residual waste stream. Users can choose to manage the waste via the default technology parameters, or if they have technology specific data available they can complete a user defined technology choice (refer Section 2).
Transport Module	Contains greenhouse gas emission data for the transportation of waste materials.
Intermediate Facility Module	Contains greenhouse gas emission data for the intermediate management of waste materials (e.g. HWRCs, waste transfer stations, MRFs).
Recycling Module	Contains greenhouse gas emission data and options for the recycling of waste materials.
Organic Treatment	Contains greenhouse gas emission data for the treatment of organic waste materials.

Worksheet name Brief description of contents

Module

Residual Treatment Module

Contains greenhouse gas emission data for the treatment of residual waste materials.

Energy Module

Contains the DECC forecasted energy mix, and the carbon emission factors for different energy generation technologies (e.g. coal, gas, renewable etc) to give 'standard' energy offset values. Also allows selection of GLA override offset figures for electricity and heat generation. The model currently uses a value of 0.4 kgCO₂e/kWh to offset electricity and heat generated from residual waste treatment and anaerobic digestion.

Model Results

This worksheet presents the results of the scenario based on the user inputted data and the choice of greenhouse gas emission data sets. Absolute results are presented, high level analysis of the results is included, and the worksheet details whether the Emissions Performance Standard and Carbon Intensity Floor have been achieved.

This worksheet also presents the opportunity for the user to assess a number of scenarios side by side and look at the differences in results.

3.5 Data Entry Guidelines

The GHG Calculator Model has been colour coded to assist with data input and to help guide users around the model.

A blue cell indicates a selection is required from a drop-down list of options.

Recyclable material	Vehicle type
Non-ferrous	Roll on-off
Non-ferrous	Intermodal road
Ferrous	Roll on-off
Ferrous	Intermodal road
Paper	Roll on-off
Paper	Intermodal road
Card	Roll on-off

Where drop down cells are highlighted green these menu choices must be set according to GLA instructions. These parameters must be used consistently by users to ensure comparable models are generated.

Grey cells require data input from the user and white cells allow for additional user comments to be made where required.

Light yellow coloured cells contain fixed or calculated values and text. These cells should therefore not be altered by the user.

3.6 Source of Greenhouse Gas Data

As described above, the majority of the greenhouse gas emission data is derived from the WRATE Version 2 software. This information is supported with data from other sources, and details of this data are listed below in Table 3-2.

Table 3-2
Greenhouse Gas Data Sources

Source of Greenhouse Gas Data	
Transportation	Based on per tonne km factors derived from WRATE V2.
Intermediate Facilities	Based on per tonne factors derived from WRATE V2.
Recycling	Based on per tonne factors derived from WRATE V2.
Organics	Based on per tonne factors derived from WRATE V2. Non-WRATE data for output material and related offsets. DECC figures for the energy offset factors (for AD only).
Residual	Based on per tonne factors derived from WRATE V2. Material component calculations for combustion emissions. DECC figures for the energy offset factors.
Avoided Energy Generation	DECC figures for the energy mix and emissions for different energy generation sources.

The GHG Calculator has been developed with flexibility in mind, and as such there are options for inserting and selecting alternative greenhouse gas emission factor data. The GLA will provide users with information on which greenhouse gas data to use for the purposes of GHG Calculator completion.

3.7 Consistency of GHG Models

The background assumptions and data sources selected can have a considerable impact on the output results of the calculator. The GHG Calculator includes the ability to select from multiple data sources; this option was included to ensure the GLA had access to a flexible GHG Calculator for future years. However to avoid users selecting different data sources, the GLA will issue a register of factor settings that must be utilised. This will include assumption settings for:

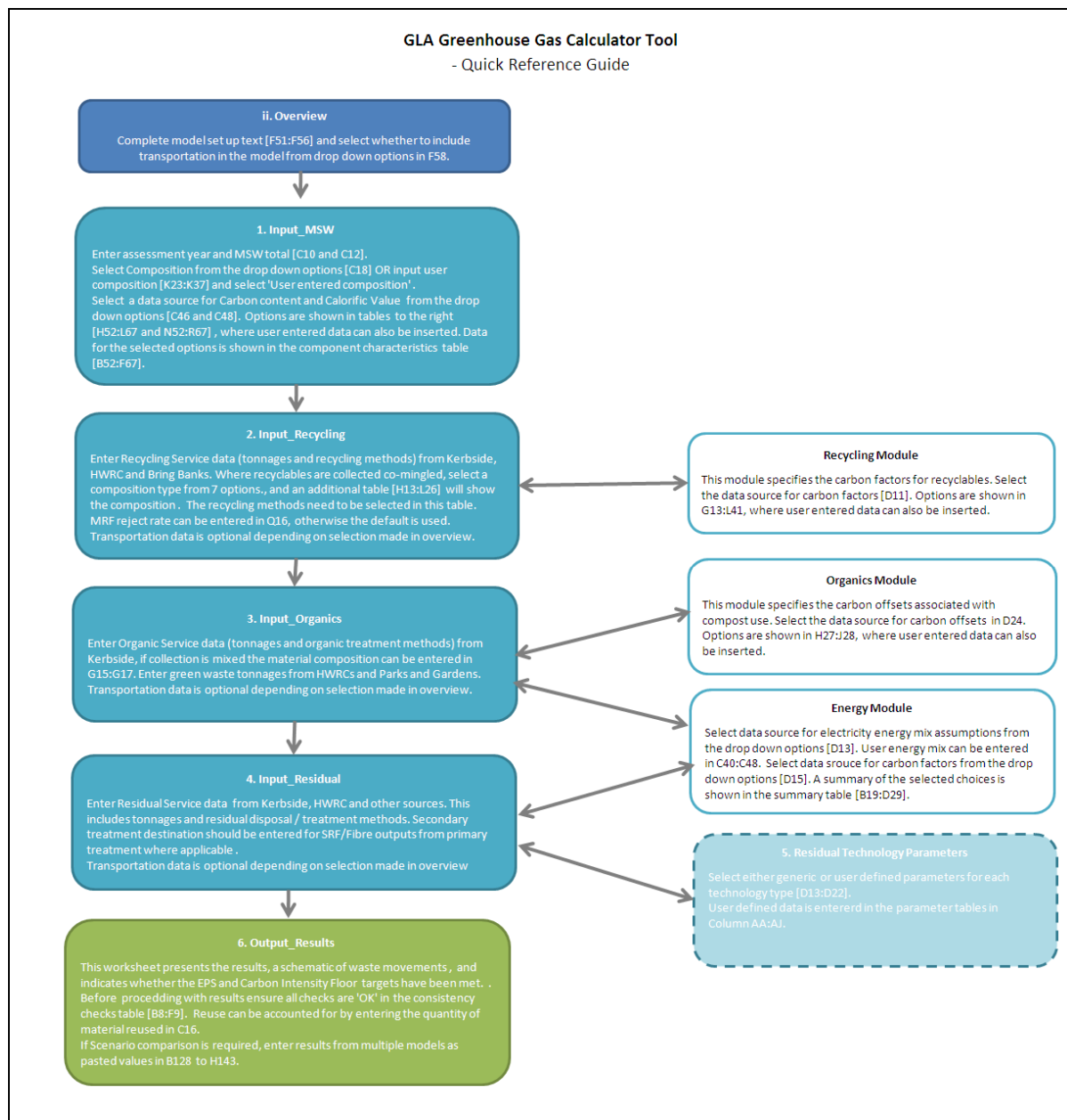
- Waste composition (if requires fixing);
- Source data for Carbon Content of waste;
- Source data for Calorific Value of waste;
- Energy Mix Data;
- Source data for Carbon Emissions from Energy Sources;
- Source data for the Carbon Factors relating to recyclables and organic outputs.

The settings issued by the GLA must be adhered to as requested. The GLA may request a copy of the completed GHG Calculator file in order to review the assumption settings for consistency and compliance.

4.0 QUICK REFERENCE GUIDE

The GHG Calculator has been designed to be easy to use and applicable to a broad range of users. The tool incorporates comprehensive instructions, hints and tips throughout, thus avoiding the requirement for detailed supporting User Manual. To support the users, a Quick Reference Guide has been produced, this is presented below, with a full copy A4 PDF included as Appendix A (which will allow users to print a copy of the Quick Reference Guide). This quick reference guide should be used alongside the details in Section 2 to direct users in the completion of the GHG Calculator.

Figure 4-1
GHG Calculator Quick Reference Guide



5.0 FREQUENTLY ASKED QUESTIONS

A series of frequently asked questions have been prepared to assist users of the GHG Calculator. Please refer to these FAQs, in the first instance, to see if any problems can be overcome before contacting the GLA.

5.1 How do I use my own municipal waste composition?

From the Overview worksheet click on the 'MSW' box coloured blue.

Complete cells K21:K35 with the user specific composition data.

Using the drop down list in cell C17, select User Entered Composition.

5.2 How do I incorporate facility specific technology parameters?

From the Overview worksheet click on the 'Residual Technology Parameters' box shaded blue with a dashed blue border.

Use the 'Go to table' hyperlinks in column F to take you to the correct row for the specified technology type. Scroll across to column AA to insert the technology parameter data.

Note: if the technology involves combustion or similar processing, only the total figures must be completed. If a non combustion technology the waste distribution parameters must sum to 100% for all material components (this can be checked in Column AK which will show 'TRUE' if 100%).

Return to the table in cells B10:E20 by clicking the 'back to top' hyperlink in column A, locate the technology type and in column D select User defined parameters from the drop down menu.

5.3 Which co-mingled collection type should I use?

If your authority collects co-mingled recycling this should be recorded under co-mingled in the kerbside recycling materials table [Input_Recycling C25]. You should select one of the seven collection scheme types for co-mingled recycling. The options reflect those used in Waste Data Flow, presented in Figure 5-1 below:

Figure 5-1
Co-mingled collection types²

Estimated split for typical co-mingled recycling collections							
Co-mingled collections	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7
Paper/card	88%		67%	85%	70%	65%	
Cans, metal	6%	50%	5%	6%	5%	5%	15%
Plastic	6%	50%	5%	6%		5%	15%
Textiles				3%		2%	
Glass			23%		25%	23%	70%
Total	100%	100%	100%	100%	100%	100%	100%

Use the collection type which best represents your collection service.

² Waste Data Flow Guidance Manual: Entering Data. Available at:
<http://www.wastedataflow.org/Documents/GuidanceManual/WDF-3%20Entering%20Data.pdf>

5.4 Do I have to record transport details if I am not going to include transportation impacts in the results?

If you are not assessing the greenhouse gas impacts of transportation in your model then you do not need to record the transportation detail. The impacts of transportation are currently included in the EPS boundary (as of revisions in May 2011).

Further instructions are located in the model within the 'Hints' boxes, these outline which cells to complete. Please also refer to the transport system boundary table in section 3.2 above.

5.5 My distance data is in miles, how can I quickly convert it to kilometres?

When entering transportation data in to the GHG Calculator, all distances must be entered in kilometres. If you need to convert miles to kilometres there is a conversion calculator at the top of the overview sheet. A hyperlink at the top of each input sheet will take you directly to the conversion calculator.

5.6 How do I record more than 10 destinations for one material stream?

If one material stream has been sent to more than ten destinations it may be necessary to include an average distance to facilities. Where different modes of transportation are used, use the vehicle which transports the largest proportion of your authority's waste.

The estimation or averaging of trip distances is acceptable when completing the GHG Calculator. Users should keep a note of any assumptions in the Overview sheet notes section (F54).

5.7 Do I need to record rejects from residual treatment facilities?

No, you don't need to record rejects when inputting your data. Rejects from facilities are accounted for within the background calculations within the model. Therefore you do not need to account for management of rejected waste from reprocessing/ treatment facilities. Only record inputs to reprocessors and treatment facilities.

5.8 There is an error check in my worksheet, what should I do?

If one of the checks in your worksheet appears in red it indicates there is an error in your data. Your waste arisings should always equal the amount of waste being managed. If a check appears red a short description of the error should be provided; initially check through the data to ensure no errors or double counting of tonnages has been made whilst inputting. By selecting the cell with the check you can see exactly what the check relates to. You may find it useful to use [F2] which identifies the source cells of the check.

5.9 Can I add comments to my data?

The GHG Calculator allows user comments in each input table to assist with ease of use and clarity. You may want to record the name of the reprocessors here, or record whether any estimations or assumptions have been made.

5.10 How do I compare multiple scenario results?

From the Overview worksheet click on the 'Model Results' box coloured green.

Scroll down the worksheet to row 129 onwards, you will see a blank table and further instructions.

Once completed, the results are compared in the charts.

5.11 How is reuse accounted for in the model?

The WRATE tool currently accounts for re-use by removing the waste from the system and assuming no burdens or avoided burdens are applied.

The GHG Calculator differs from the WRATE model by utilising recent data provided by WRAP on the greenhouse gas emissions relating to waste prevention and the preparation of materials for re-use.

It is assumed that re-used tonnages consist of Clothing (textiles), Furniture (assumed as wood) and electrical items (assumed as WEEE – mixed). Users can utilise a default compositional split between these materials or enter a user composition. The benefits are calculated based on the tonnage of reuse and composition of reuse materials.

WRAP are currently completing a study on re-use; the information from this study can be incorporated into the GHG Calculator when the study is published. The impacts of reuse are not currently included in calculating the EPS, however they can be included within the GHG Calculator for Local Authority information only.

5.12 How is waste reduction accounted for in the model?

Accounting for waste reduction is a complex issue; trying to separate the impacts of waste reduction campaigns from other economic and behavioural changes is challenging, and currently WRATE does not include a methodology to predict the benefits of waste reduction.

For the purposes of the GHG Calculator users have an option to enter a percentage waste reduction which provides a revised absolute tonnage of CO₂e for the scenario. This option is located on the results sheet (cell C60), the reduction is applied across all elements of the waste scenario modelled.

The waste reduction percentages and revised results are for information purposes only; the reduction factors do not impact on the output results of the EPS or Carbon Intensity Floor.

This simplistic approach allows users to see the impact of waste reduction against the absolute tonnage emissions of greenhouses gasses emitted.

5.13 How much of the calculator has to be completed?

Three Options (A to C) exist for completing data within the GHG Calculator; Option A requires the bare minimum of data, with Option C requiring full completion of the model. Refer to Section 2.0 of this User Manual to review the Options and data input requirements. Also refer to the Quick Reference Guide in Appendix A.

5.14 I am a WCA, which elements of the GHG Calculator should I complete?

As a Waste Collection Authority, the following elements of the GHG Calculator should be completed, and the model provided to the WDA (as required):

Worksheet	Components to complete
MSW	All
Recycling	Kerbside collection (tonnages collected and transport to intermediate facilities) Bring banks (tonnages collected and transport to intermediate facilities)
Organics	Kerbside collection (tonnages collected and transport) Parks and Gardens (tonnages collected and transport)
Residual	Kerbside collection (tonnages collected and transport) Other residual (tonnages collected and transport)
Results	If the GHG Calculator results are to feed into WDA results then only the transport impacts should be reviewed. This avoids double counting of the benefits associated with reprocessing of recyclables.

5.15 I am a WDA, which elements of the GHG Calculator should I complete?

As a Waste Disposal Authority, you can recreate the total combined WCA tonnage figures (for kerbside, bring sites, parks and gardens and other residual waste) in a WDA model (which includes HWRC wastes) and detail all onward movement / treatment of wastes.

Alternatively you can complete the WDA model (as outlined below) and complete the separate WCA model(s) with the onward destination and treatment information. The addition of the WCA models (excluding transport emissions to disposal points) and the WDA model will provide the total results.

Worksheet	Components to complete
MSW	All
Recycling	HWRC (tonnages and distances to intermediate facilities)
Organics	HWRC (tonnages and distances)
Residual	HWRC (tonnages and distances)
Results	All impacts (ensure impacts from WCA transport and recycling are accounted for).

5.16 What data has been used for energy mix and carbon emissions per kWh?

The GHG Calculator currently includes DECC sourced data for the energy mix forecasts³ and carbon impacts for different energy generation sources.⁴

These data sources and assumptions are included in the Energy Module worksheet (Rows 39 to 49 and Rows 53 to 63 respectively). The GLA can update the GHG Calculator as revisions to the DECC projections or revised carbon emission quantities per kWh of electricity generation are published. The model currently uses the DECC marginal energy mix figures of 400gCO₂/kWh to offset any electricity or heat generated by residual waste treatment and anaerobic digestion.

³http://www.decc.gov.uk/assets/decc/White%20Papers/UK%20Low%20Carbon%20Transition%20Plan%20WP09/1_20090724153238_e_@@_lowcarbontransitionplan.pdf

⁴ http://www.decc.gov.uk/en/content/cms/statistics/fuel_mix/fuel_mix.aspx

6.0 CLOSURE

The GHG Calculator has been designed to give flexibility to users, as well as giving flexibility to the GLA by allowing changes to background assumptions to be made. This means that as new information becomes available (e.g. new carbon data, updated waste composition studies) the model can be updated, enabling output results to reflect the most up to date information available.

Users should consider the information and FAQs contained within this User Manual, in addition to the instructions, hints and tips within the GHG Calculator prior to contacting the GLA for support.

Enquiries regarding this tool should be directed via e-mail to the GLA Project Manager (larissa.bulla@gla.gov.uk).

APPENDIX A

QUICK REFERENCE GUIDE

GLA Greenhouse Gas Calculator Tool
- Quick Reference Guide

