Greenhouse Gas Emissions Performance Standard for London's Local Authority Collected Waste – 2015/16 Update

The Greater London Authority

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Report for Adam Batchelor

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1.0 Background and Introduction

The greenhouse gas (GHG) emissions performance standard (EPS) forms a core element of the Mayor of London's Municipal Waste Management Strategy (MWMS).

Following an initial draft released for public consultation in 2010, the EPS in its final form was published along with the Mayor of London's MWMS in July 2011. In addition to setting the EPS for the years 2015, 2020 and 2031, the report presented the performance of London's local authorities against the EPS for the years 2008/9 and 2009/10. This update presents information on London's performance against the EPS during and builds on the previous updates undertaken in the years 2010/11 through to 2014/15.

Two of the key principles within the MWMS can be summarised as:

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 developed both a 'whole waste system' EPS and a carbon intensity 'floor' (CIF), which applies solely to energy generation from waste.[1] It should be noted that this update report relates to the former only.

For clarity, the GHGs falling within the scope of the EPS include carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) emitted during waste management activities including recycling, treatment, transport and landfill. For simplicity, and in line with global GHG accounting protocols, all non-CO_2 emissions are converted to CO_2 equivalents (CO_2e) for measurement against the EPS.

At present, the scope of the EPS provides for the inclusion of only a limited amount of reuse activity. This is primarily the carbon benefit associated with textiles recycling as a certain amount of re-use is assumed and incorporated the figure. It has not, thus far, been possible to incorporate waste prevention. This subject was discussed in detail in the 2011/12 report.

[1] The GLA has developed a tool for London boroughs to model their performance against the EPS and CIF, which can be downloaded at www.london.gov.uk/priorities/environment/putting-waste-good-use/making-the-most-of-waste

2.0 Assessment of Performance in 2015/16

2.1 Net Emissions from Waste Management

This update on London's performance against the EPS was undertaken by incorporating data from Waste Data Flow (WDF) for 2015/16 into the existing EPS model for London.[2]

In order to accommodate the changed format of WDF's reporting of waste management and disposal routes (for 2015/16, through the new Q100), a revised WDF interface was built and the waste flow outputs of this model were input into the existing EPS model. As a result, data on recycled material is sourced from amounts recorded in WDF Q100 as having reached a 'final destination' recycling or reuse processor, and this marks a change from the previous approach of identifying recycling via materials 'sent for recycling' in Q19.

The results of this modelling exercise confirm that London's performance in 2015/16 against the EPS has improved slightly in comparison to that of 2014/15. Emissions have decreased slightly over this time period from -123 thousand tonnes of carbon dioxide equivalent emissions per annum (ktpaCO_2e) to -131 ktpaCO_2e.[3] These results mean that since the EPS was implemented in 2011, London's CO_2e emissions from local waste management activities have fallen from 135 kt CO_2eq in 2008 (the first year the EPS results were developed) to -131 ktCO_2e in 2015/16.

A breakdown of the emissions from local authority collected (LAC) waste management in London is set out in Table 2-1. This data shows how emissions reductions provided by recycling activities in 2015/16 offset emissions from residual treatment and landfill to give an overall *net* figure – as has been the case for the past four years.

The information in Table 2-1 shows that the change in emissions for 2015/16 compared with 2014/15 is the result of the following factors:

- An increase in the overall quantity of waste managed, back to levels slightly below that seen in 2013/14;
- An increase in residual waste managed, with a continued increase in waste sent to incineration as well as a smaller rise in waste landfilled. The amount of waste sent to MBT has reached the highest levels seen since the EPS began in 2008/9, although levels remain low in comparison to that of the other treatment methods.
- As a result landfill emissions have risen slightly from decreased from 172 kt CO_2eq in 2014/15 to 175 kt CO_2eq in 2015/16, whilst emissions from incineration have risen

[2] Environmental impacts were calculated using the Environment Agency's life-cycle assessment tool, WRATE

[3] This is a net reduction in climate change impacts, brought about by the 'displacement' effects of material recycling and generation of energy from waste. These activities result in lower emissions than would have otherwise taken place in manufacturing from raw materials and in energy generation from other sources

from 86 kt CO_2eq to 98 kt CO_2eq. MBT emissions remain the same, the increase in tonnage still being insufficient to effect a change in emission levels

- There has been an increase in the quantities of all materials sent for dry recycling in the period from 2014/15 to 2015/16, partly reversing the previous year's decline. Paper, though higher than in 2014/15, remains below 2013/14 levels and on a longer term downward trajectory which has been discussed in previous EPS update reports. Non-ferrous metals continue to decrease a little year on year, whereas recycling of textiles has increased in the past year, as has plastics recycling. The net increase in the benefit from recycling was -24 kt CO_2eq.

Waste arisings – including collected recyclate as well as residual waste– have increased, partly reversing recent declines in waste arisings. However, the results for 2015/16 nonetheless indicate a fall in emissions of 198% when compared to the initial baseline figures in 2008/9.

The amount of source segregated organic material treated has remained broadly static with only a slight decrease from 322 kilotonnes in 2014/15 to 320 in the following year. There has been a further shift towards separate food and garden waste collections being seen alongside a decrease in the amount of mixed organic material being collected through in-vessel composting facilities. These materials have a relatively low impact on the EPS score in comparison to the dry recyclables.

It is noted that there are some discrepancies between the data on arisings derived from WDF from that published by Defra.[4] An attempt was made previously to reconcile the differences between these datasets during the development of Eunomia's Carbon Index. Ultimately, it was not possible to completely reconcile the two sources, as Defra undertakes some additional calculations and it was not always clear how these had been done. However, contact made with Defra during this process has confirmed that differences exist between, for example, the way that the various MBT streams are tackled in the Defra dataset and the way some LAs have reported the same data in WDF. This is most likely to be the reason as to why the sources are different with regard to residual waste arisings.

Table 2-2 compares - in percentage terms – London's performance in 2015/16 to that of 2008/9. This shows that the biggest changes over the period are associated with residual waste treatment – a decrease in landfill alongside an increase in incineration and (to a lesser extent) MBT treatment, the amount of food waste treated at AD plant, and the proportion of plastics and wood collected for recycling.

[4] See https://www.gov.uk/government/statistical-data-sets/env18-local-authority-collected-waste-annual-results-tables

Table 2-1: London's 2008/09 Baseline EPS, and Performance for 2009/10 to 2015/16

Waste Management Activity	Waste Managed (ktpa) in 2008/09	Associat-ed Emissions ($ktCO_2e$) in 2008/09	Waste Managed (ktpa) in 2009/10	Associat-ed Emissions ($ktCO_2e$) in 2009/10	Waste Managed (ktpa) in 2010/11	Associat-ed Emissions ($ktCO_2e$) in 2010/11	Waste Managed (ktpa) in 2011/12	Associat-ed Emissions ($ktCO_2e$) in 2011/12	Waste Managed (ktpa) in 2012/13	Associat-ed Emissions ($ktCO_2e$) in 2012/13	Waste Managed (ktpa) in 2013/14	Associat-ed Emissions (ktCO2e) in 2013/14	Waste Managed (ktpa) in 2014/15	Associat-ed Emissions (ktCO2e) in 2014/15	Waste Managed (ktpa) in 2015/16	Associat-ed Emissions (ktCO2e) in 2015/16
Residual Waste																
Landfill	1,720	447	1,523	396	1,391	362	872	227	740	192	756	197	662	172	674	175
Incineration [5]	912	52	802	45	896	51	1,303	74	1,462	83	1,525	86	1,523	86	1,727	98
MBT [1, 4]	278	-3	296	-4	308	-4	319	-4	341	-4	336	-4	324	-4	365	-4
Organic waste																
Anaerobic Digestion	0	0	23	-2	28	-2	31	-3	45	-4	51	-4	48	-4	62	-5
In-vessel Composting	130	-6	133	-6	125	-6	154	-7	132	-6	141	-7	133	-6	109	-5
Open Air Windrow	148	-6	144	-6	150	-6	147	-6	144	-6	143	-6	141	-6	150	-6
Materials Recycling																
Paper / Card	355	-106	327	-98	344	-103	364	-109	369	-110	355	-106	319	-95	330	-99
Glass	130	-12	128	-12	125	-12	121	-11	125	-12	121	-11	119	-11	131	-12
Metals (ferrous)	34	-56	37	-59	32	-52	32	-52	32	-52	31	-51	29	-47	29	-47
Metals (non-ferrous)	15	-160	16	-168	14	-152	14	-150	14	-149	14	-147	13	-138	12	-131
Plastics	35	-42	44	-52	49	-58	52	-61	55	-65	57	-67	59	-69	65	-77
Textiles	10.8	-47	11	-48	8.4	-37	7.9	-34	8.6	-37	10.4	-45	11	-49	16	-68
Wood	34	0.03	64	0.06	73	0.07	69	0.07	68	0.07	72	0.07	55	0.05	57	0.06

Rejects [3]	244	22	366	44	320	30	271	23	182	13	145	13	100	6	94	6
Transport	N/A	52	N/A	50	N/A	51	N/A	45	N/A	44	N/A	44	N/A	42	N/A	45
TOTAL	3,984[2]	135	3,822[2]	80	3,773[2]	62	3,649[2]	-69	3,583[2]	-114	3,618[2]	-109	3,419	-123	3,602	-131

Notes:

1. Within the information presented in WDF, it is unclear as to where the solid recovered fuel (SRF) from Mechanical-biological treatment (MBT) facilities in London is currently sent, although it is understood that some tonnage is sent to cement kilns outside London
2. The total waste managed is not the sum of its constituents within the table. Some waste going through MBT will also end up in landfill or incineration. Summing up will result in double counting of waste
3. The reject stream comprises materials rejected from MRFs and 'On-the-Go' recycling, incinerator bottom ash, and rejected material from MBT facilities. All material from these streams is assumed to be sent to landfill
4. To avoid double-counting, emissions from MBT rejects have been excluded as these are already included within the total emissions modelled from the MBT process itself
5. These reject streams are also assumed to be sent to landfill, and should be added to the figure for landfilled waste
6. It should be noted that there are some small variations in the headline results with those presented in previous reports for years 2008-12. These minor variations are the result of the need to undertake consistent historical and comparative analysis using WDF across other areas of England, as described within Appendix 1.0

Table 2-2: Performance Comparisons – 2008/9 to 2015/16

	Change in arisings 2008/9 to 2015/16	Change in emissions 2008/9 to 2015/16
Residual waste		
Landfill	-61%	-61%
Incineration	89%	89%
MBT	31%	31%
Organic waste		
Anaerobic Digestion		
In-vessel Composting	-17%	-17%
Open Air Windrow	1%	1%
Dry Recyclables		
Paper / Card	-7%	-7%
Glass	1%	1%
Metals (ferrous)	-16%	-16%
Metals (non-ferrous)	-18%	-18%
Plastics	86%	86%
Textiles	45%	45%
Wood	69%	69%
Rejects	-61%	-73%

2.2 Performance of London against the EPS

The whole waste system EPS considers the CO_2 equivalent emissions *per tonne* of waste managed (CO_2e/t). As shown in Figure 2-1, London's total performance against the EPS has improved further from -0.036 to -0.0039 CO_2e/t.[5] However, the improvement in performance is too slight to change the longer term trajectory shown Figure 2-2.

[5] The approach taken here differs from that of Eunomia's Recycling Carbon Index (see http://www.eunomia.co.uk/recyclingcarbonindex). At present this other index focuses solely on the carbon impacts of recycling (including organics), whereas the EPS seeks to quantify the 'whole waste system' which also includes residual treatment and transport. Boroughs can determine their performance against the EPS using the tool available from: https://www.london.gov.uk/priorities/environment/publications/the-mayors-waste-management-strategies

It is worth noting that the targets are being updated in 2017. The updated EPS will include new composition data – better reflecting the current quantities of paper and card in the waste stream – as well as revised predictions of household collection system performance and updated carbon emissions factors for waste treatment facilities.

The results for each Borough against the EPS are shown in Figure 2-3. The graph represents the elements that make up the EPS in the same manner as the graph of London performance in the main report (Figure 2-1). For the Borough model, however, results are shown for the year 2015/16 only in this report (results for 2014/15 can be seen in last year's EPS update report). The lower performing Boroughs against the EPS are on the left and the better performers are on the right, with the overall London performance highlighted for comparison.

There are some changes in the ranking of some boroughs when this year's results are compared to those of last year. Bexley remains the top performer by a considerable margin. Greenwich has significantly improved its performance in the past year, as has Southwark.

The results show that some Boroughs, such as Ealing, Harrow, Merton and Sutton – all of which perform better than London's average performance for recycling – perform less well against the overall EPS score as most of their residual waste is sent to landfill, reducing their overall EPS performance. Other Boroughs such as Southwark with a relatively low recycling rate perform better in the EPS as less waste is sent to landfill.

Figure 2-4 shows the recycling performance for 'inner' and 'outer' London Boroughs.[6] Here the pattern is clear, with a few exceptions (including the Greenwich, Barking and Dagenham, and Newham) the outer Boroughs tend to perform well, whilst the inner Boroughs are clustered towards the bottom of the chart.

[6] http://www.londoncouncils.gov.uk/londonfacts/londonlocalgovernment/londonboroughs.htm

Figure 2-1: London's Performance against the EPS (2008-2016)

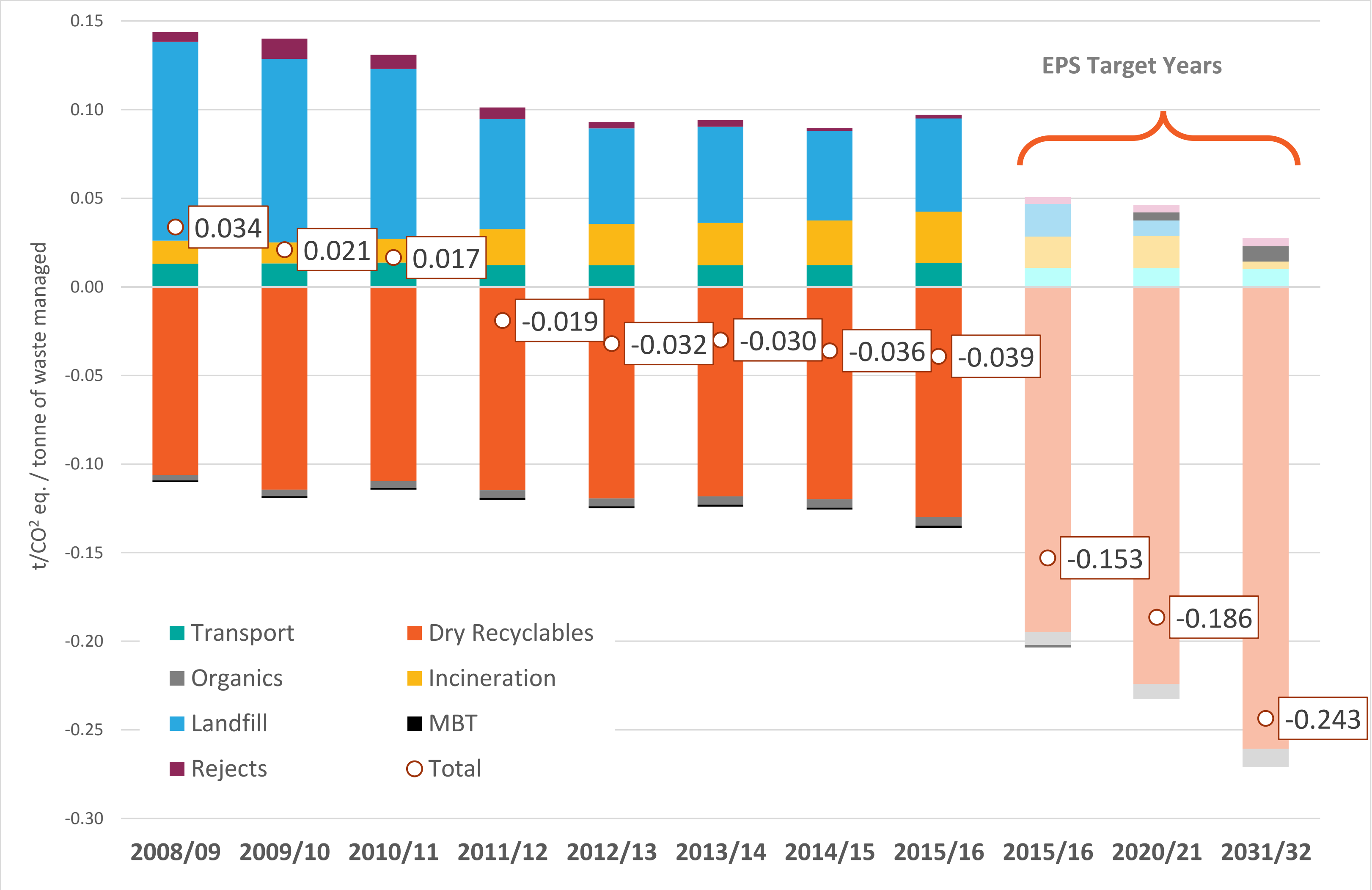

Figure 2-2: Breakdown of Historic and Future Performance against London's EPS Targets

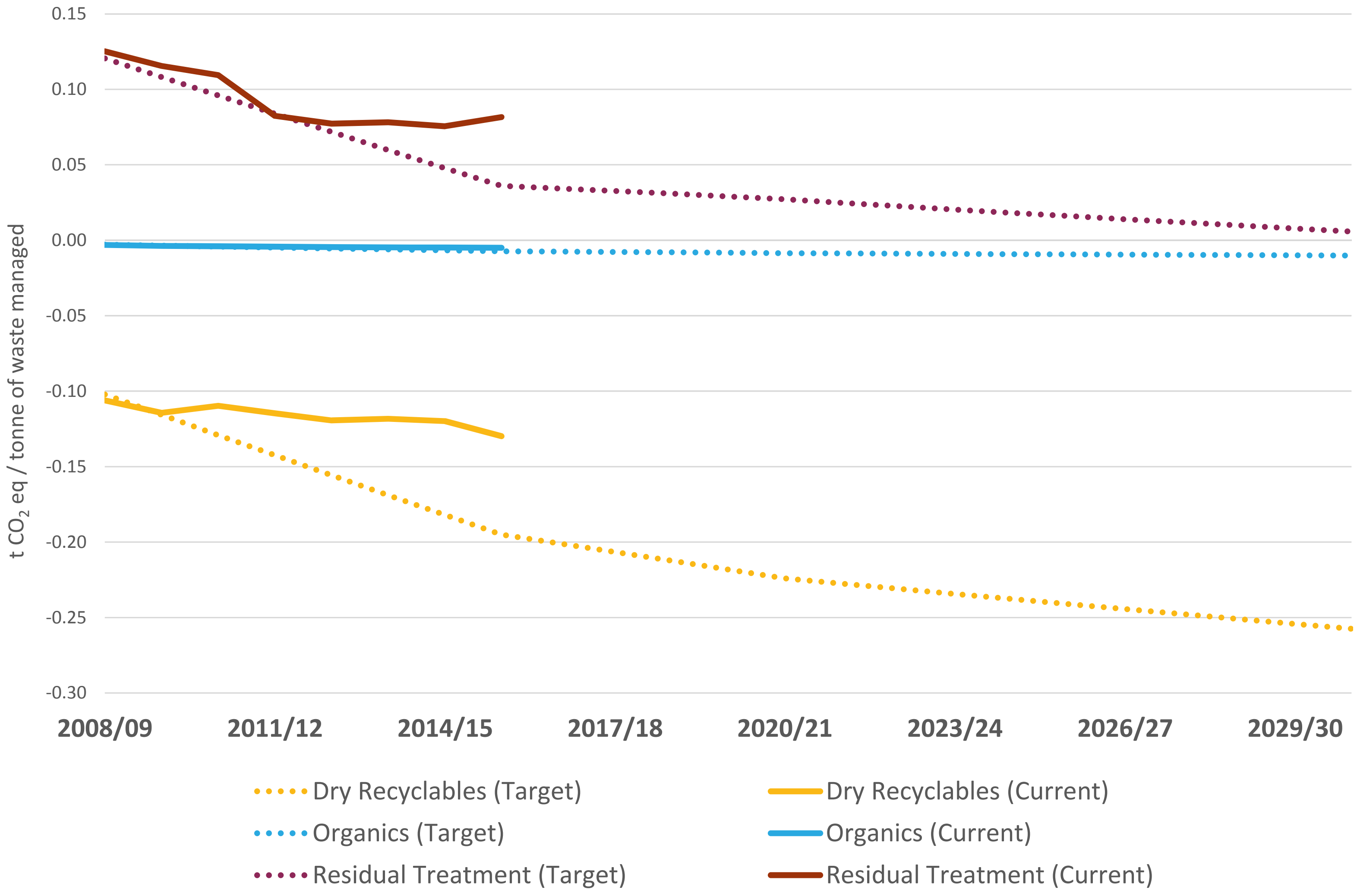

Figure 2-3: Performance against the EPS of London Boroughs for 2015/16

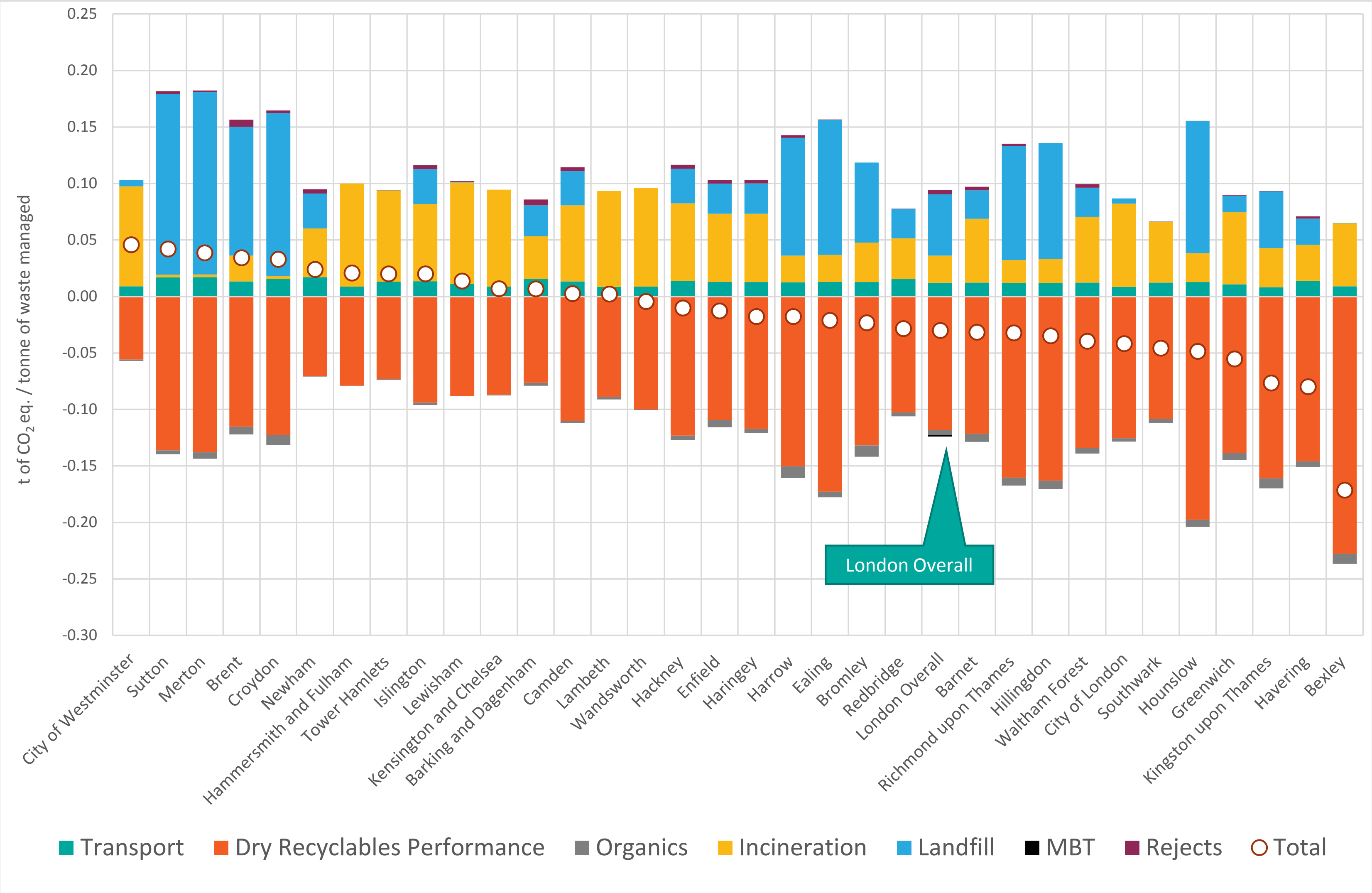

Figure 2-4: Recycling Performance of Inner and Outer London Boroughs