Riverside Energy Park

Maximum Throughput Carbon Assessment Note

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CORY RIVERSIDE ENERGY

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1.1 Introduction

1.1.1 The Greater London Authority (GLA), in their comments on Schedule 1, Work No. 1A of the Draft Development Consent Order submitted at Deadline 7a (REP7A-005) stated that the maximum throughput of the Energy Recovery Facility (ERF) element of Riverside Energy Park (REP) should be limited to 655,000 tonnes per annum (tpa). The GLA gives two reasons for proposing this change.

1.1.2 The first reason is: *"The GLA consider the inclusion of this maximum waste throughput is necessary to ensure that the operation of the development does not exceed the basis of the climate change assessment presented in the Applicant's Carbon Assessment (document 8.02.08 submitted at Deadline 2). The Carbon Assessment does not include the climate change impact of the proposed ERF managing any more than 655,000 tonnes per year."*

1.1.3 This note responds to this point.

1.2 Purpose of this Note

1.2.1 At Deadline 2, the Applicant submitted a **Carbon Assessment** (**8.02.08, REP2-059**) of REP. This assessment was based on the proposed nominal throughput of REP (655,000 tpa).

1.2.2 The purpose of this note is to demonstrate that the carbon benefit of REP operating at the proposed maximum throughput of 805,920 tpa would be higher than the carbon benefit demonstrated in the **Carbon Assessment (REP2-059)** and therefore the **Carbon Assessment** (**8.02.08, REP2-059**) provided a conservative assessment through assessing the proposed nominal throughput (655,000 tpa).

1.3 Explanation

1.3.1 The derivation of the maximum throughput of 805,920 tpa was explained in the response to ExA Written Question Reference Q1.0.2 in **Applicant responses to ExA First Written Questions** (**8.02.04, REP2-055**).

"1.2.2 There are two throughput tonnages referred to in the Environmental Statement (ES): the nominal throughput (655,000 tonnes per annum (tpa)) and an upper throughput (805,920 tpa).

1.2.3 The difference between the two is driven by the assumptions made for the calorific value of the waste fuel and the operational availability of the Energy Recovery Facility (ERF) itself.

1.2.4 The nominal throughput (655,000 tpa) is based on the anticipated throughput of residual waste at an assumed (design) calorific value, with both lines of the ERF operating for 8,000 hours across the year (8760 hours).

1.2.5 The upper throughput (805,920 tpa), referred to within paragraph 3.3.5 of Chapter 3 Project and Site Description of the Environmental Statement (ES) (6.1, Rev 1) is based on the maximum throughput of residual waste which could be processed at the lowest calorific value which the ERF has been designed to accept and with both lines of the REP ERF operating continuously (i.e. 100%) across the year (8,760 hours)."

1.3.2 Hence, there are two potential reasons for changes to the transition from the nominal throughput (655,000 tpa) to the maximum throughput (805,920 tpa). The first change is that the operating hours increase from 8,000 hours to 8,760 hours. This would result in REP processing more waste, diverting it from landfill, and generating more electricity (and heat). Therefore, the carbon benefit of REP would increase in proportion to the increase in operating hours. The **Carbon Assessment** (**8.02.08, REP2-059**) included calculations for four waste compositions. Using the Design Waste composition, which has a Net Calorific Value (NCV) of 9 MJ/kg, gives the nominal throughput of 655,000 tpa. For the Design Waste, the carbon benefit is calculated to be 209,905 tCO_2e/annum, or 0.320 tCO_2e/tonne. (**Table 8** in the **Carbon Assessment** (**8.02.08, REP2-059**)). If REP operated for 8,760 hours with the design waste, it would process about 717,225 tpa of waste and the carbon benefit would increase to 717,225 x 0.320 = 229,512 tCO_2e/annum.

1.3.3 The second change is that the calorific value of the waste is assumed to be lower for the maximum throughput. At maximum continuous rating, the lowest net calorific value of the waste is 8 MJ/kg. This is lower than the NCV of the design waste (9 MJ/kg) and lower than the NCVs of the alternative waste types considered, which ranged from 9.56 MJ/kg to 10.79 MJ/kg. A waste with a lower NCV is likely to have a higher biogenic content, as the biogenic fractions tend to have a lower NCV than the non-biogenic fractions, and so the carbon benefit is likely to increase. However, this will depend on the precise waste composition.

1.3.4 In order to demonstrate the effect, the carbon assessment has been repeated with a lower CV waste. This was produced by taking the Riverside Resource Recovery Facility (RRRF) Waste from the **Carbon Assessment** (**8.02.08, REP2-059**) and removing 60% of the plastic and 49% of the paper/card in order to achieve a NCV of 8 MJ/kg. While it would be possible to create a waste with this NCV by just removing 74% of the plastics, it was felt that this would be unrealistic and unduly favour REP over landfill. As an alternative case, Low CV Waste 2 was created by removing 68.5% of the paper/card and 54.5% of the plastic, in order to give waste which has the same biocarbon content as the original RRRF waste and a NCV of 8 MJ/kg. The resulting waste characteristics are shown in **Table 1** below and the results of the **Carbon Assessment** (**8.02.08, REP2-059**) are shown in **Table 2.** For ease of reference, the figures for RRRF Waste and Design Waste are also included.

Parameter	Unit	RRRF Waste	Design Waste	Low CV Waste 1	Low CV Waste 2
Waste Fraction:					
Paper/Card	%	27.83%	29.58%	18.53%	12.16%
Plastic Film	%	8.51%	5.75%	4.44%	5.37%
Dense Plastic	%	7.77%	5.25%	4.06%	4.91%
Textiles	%	3.43%	3.65%	4.48%	4.76%
Combustibles	%	9.55%	10.15%	12.47%	13.25%
Non-combustibles	%	5.39%	5.73%	7.04%	7.48%
Glass	%	4.52%	4.81%	5.90%	6.27%
Putrescibles	%	26.44%	28.11%	34.52%	36.69%
Ferrous Metal	%	1.58%	1.68%	2.06%	2.19%
Non-Ferrous Metal	%	1.00%	1.06%	1.31%	1.39%
Fines	%	2.77%	2.94%	3.62%	3.84%
Hazardous	%	1.21%	1.29%	1.58%	1.68%
Net Calorific Value	**MJ/kg**	**9.85**	**9.00**	**8.00**	**8.00**
Throughput	**tpa**	**598,491**	**655,000**	**736,875**	**736,875**
Carbon Content	**% waste**	**26.72%**	**25.18%**	**22.69%**	**22.36%**
Biocarbon content	**% carbon**	**57.25%**	**64.58%**	**63.0%**	**57.25%**

Table 1: Low CV Waste Characteristics.

Parameter	Unit	RRRF Waste	Design Waste	Low CV Waste 1	Low CV Waste 2
Releases from landfill gas	t CO_2e	258,675	300,949	297,293	266,438
Transport of waste and outputs to landfill	t CO_2e	3,388	3,708	4,172	4,172
Offset of grid electricity from landfill gas engines	t CO_2e	-38,271	-44,525	-43,984	-39,419
Total landfill emissions	**t CO_2e**	**223,792**	**260,132**	**257,480**	**231,191**
Transport of waste to and outputs from ERF	t CO_2e	3,056	3,391	3,876	3,876
Offset of grid electricity with ERF generation	t CO_2e	-182,498	-182,498	-182,498	-182,498
Emissions from ERF	t CO_2e	265,831	229,335	242,110	273,320
Total ERF Emissions	**t CO_2e**	**86,389**	**50,227**	**63,488**	**94,697**
Net Benefit of ERF	**t CO_2e**	**137,403**	**209,905**	**193,993**	**136,493**
	t CO_2e/t waste	**0.230**	**0.320**	**0.263**	**0.185**

Table 2: Low CV Waste Carbon Benefit.

1.3.5 It can be seen that there is still a carbon benefit in both cases, as expected. With Low CV waste 1 and operating for 8,000 hours, REP would process about 736,875 tpa of waste with a carbon benefit of 193,993 tCO_2/annum or 0.263 tCO_2/te. If REP operated for 8,760 hours with this waste, it would process 805,920 tpa of waste, with a carbon benefit of 805,920 x 0.263 = 211,957 tCO_2e/annum.

1.3.6 It can also be seen that the carbon benefit for Low CV Waste 2 is very similar to the carbon benefit for the RRRF Waste.

1.3.7 Therefore, it can be seen that REP continues to have a carbon benefit when operating at the proposed maximum throughput.

1.4 Conclusion

1.4.1 This note has demonstrated that that the carbon benefit of REP operating at the proposed maximum throughput of 805,920 tpa would be higher than the carbon benefit demonstrated in the **Carbon Assessment** (**8.02.08, REP2-059**).

1.4.2 There is no justification, therefore, for the GLA to cite the assessment of the nominal throughput of REP within the **Carbon Assessment** (**8.02.08, REP2-059**) as a reason for limiting the throughput of REP to 655,000 tpa. In fact, this note demonstrates that the carbon benefits increase as more waste is diverted from landfill and more power is generated.