RBB | Economics

Tradebe/Sita:

Quantification of the High Temperature Treatment Cost Savings Arising from the Transaction

RBB Economics, 23 December 2013

1. Introduction and summary

This report, prepared at the request of Tradebe Environmental Services Ltd ("Tradebe"), sets out the cost modelling work we have undertaken with Tradebe to estimate the impact of the joint venture between Tradebe and Sita (the "Transaction") on their combined High Temperature ("HT") treatment costs of processing healthcare risk waste ("HRW").

As outlined in the initial submission, Tradebe considers that the most substantial cost efficiencies from the Transaction arise from the reduction in the costs of processing HT waste: these include in particular savings arising from the ability to rely on Sita incinerators to process Tradebe HT waste in-house, as well as the ability to reduce the costs of processing HT waste more generally (either for waste transported from AT plants to HT plants, or between HT plants in the events of maintenance shutdowns), through the combination of the merging firms'

complementary geographic facilities.[1] The quantitative analysis we set out in this report is focused on this important source of efficiency savings, but this should not be taken to suggest that there are no other material efficiencies arising from the Transaction, or indeed that the benefits of the Transaction are limited to the efficiencies it brings.

To estimate the likely cost savings from the Transaction in this regard, we have compared the Parties' estimated costs of processing HT waste (including inter-plant transport costs) post-Transaction – based on Tradebe's best information and current plans for waste processing – relative to the counterfactual scenario in which the Transaction does not take place. While for the most part, it is possible to use pre-Transaction data on waste flows between plants and HT costs to inform this counterfactual, we have also considered whether, going forward, Fawley might have represented alternative HT capacity for Tradebe had the Transaction not gone ahead, as well as for the JV post-merger. We have done so using a range of assumptions regarding the ability of Fawley to take on additional HRW waste and any opportunity costs associated with displacing other waste types if necessary.[2]

The predictions of the cost model are that the Transaction will generate efficiencies (in the form of HT treatment cost savings) in the region of **£[✂]**.

If processing HRW HT waste at Fawley requires the displacement of waste which yields a margin greater than £[✂], our model indicates that absent the Transaction it would not be cost effective for Tradebe to process HT volumes at Fawley, but (given the relative geographic locations of the Parties' AT plants) post-Transaction it would be cost effective to treat at least some Sita HT waste at Fawley: in this scenario, the HT treatment cost savings arising from the Transaction would be in the range £[✂] - £[✂].

If, alternatively, it is possible to treat HRW HT waste at Fawley with only limited or no displacement of other waste types, the results suggest that absent the Transaction it would be cost effective for Tradebe to use Fawley to process HT waste, but that transport cost savings would nonetheless make it effective to switch Tradebe's waste to Sita's HT plants post-transaction. Similarly, the JV could reduce costs by reallocating some of Sita's HT waste to Fawley. As a result, even if Fawley could represent a source of HRW HT treatment for Tradebe absent the Transaction, our analysis indicates that the HT treatment cost savings arising from the Transaction would nevertheless be upwards of £[✂].

We note that this estimation is necessarily entirely reliant on the information which we have received from Tradebe, both with regard to its costs and its expected plans post-Transaction. However, we understand that Tradebe itself is only able to provide its best estimates of Sita's costs and post-Transaction planning. Therefore, the estimates set out in this paper may be subject to further refinement, and represent only the best available estimates of the likely impact of the Transaction on HT costs.

This paper is structured as follows:

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[1] See Tradebe/Sita – Initial Submission to the Competition Commission, paragraph 1.12.
[2] [✂].

- In Section 2 we outline the methodology used to quantify the HT disposal cost savings arising from the Transaction and highlight the key features of the cost model we have developed.

- In Section 3 we provide the results of our efficiencies estimation on the assumption that it is necessary to displace waste to process HT volumes at Fawley. We then summarise the results of our sensitivity analysis, providing the estimated HT treatment cost savings for a range of displacement possibilities at Fawley.

- In Annex 1 we provide a detailed description of the cost model we have used and the inputs which this model is constructed on. The accompanying model is provided at Annex 2.

2. Methodology

In quantifying the HT treatment cost changes arising from the Transaction, we start with the assumption that the total AT and HT volumes delivered by/collected from customers at each plant will be in line with Tradebe's best current estimates of expected volumes in 2014 and will be the same irrespective of whether or not the Transaction takes place.[3] We then first, identify the best allocation of HT volumes for the Parties both post-Transaction and in the counterfactual scenario according to the allocation which minimises the variable HT treatment costs at each site; and subsequently calculate the difference in the HT disposal costs between these two scenarios.

A detailed description of the data and the approach relied on to quantify the cost savings associated with the Transaction is provided at Annexes 1 and 2. We emphasise that for ease of exposition we have adopted a basic model of the costs the Parties incur to treat HT waste and that the modelling exercise has necessarily required the adoption of a number of simplifying assumptions. In particular, we note three key features of the model in this regard.

First, the model does not conduct an exhaustive analysis of the optimal allocation of HT waste.

In particular, we do not consider *all* of the possible allocations of HT volumes that the Parties could theoretically adopt. Indeed, the model abstracts from many of the technical considerations that might affect the Parties' ultimate choice of which HT plant to use for processing any given shipment, including factors such as the impact on capacity of the mix of waste that is treated at a plant at a given point in time, or within-year variations in the relative costs of processing waste at different HT plants. Rather, we select the optimum allocation in each scenario from a range of options Tradebe has told us it would realistically have available. Specifically, we model the choices the Parties face in each scenario as follows:

[3] As set out in the Initial Submission however, Tradebe considers that the merger may well enable it to win more customers, by improving each party's pre-Transaction offering, in particular to larger national customers.

- **Counterfactual:** in this scenario we model Tradebe's allocation of HT volumes as a choice between allocating volumes to the same third party plants as it used pre-Transaction [✂], or sending these volumes to Fawley. For Sita, we assume that the pre-merger scenario represents the most appropriate counterfactual: that is, we assume that each of Sita's HT sites will treat its own HT waste, and that waste from Sita's AT sites will be treated at [✂], and to a third party plant [✂] in the event of Sita plant breakdowns.[4]

- **Post-Transaction:** in this scenario we model Tradebe's allocation of HT volumes as a choice between (i) allocating volumes to the same third party plants as pre-Transaction, (ii) allocating these volumes to Fawley and (iii) allocating these volumes to Sita's plants. As in the counterfactual scenario, we assume that each of Sita's HT sites treat the HT waste they receive from customers in-house and we model Sita's allocation of HT volumes from each of its AT sites as a choice between (i) allocating volumes in the same way as in the counterfactual, (ii) allocating HT waste which was previously sent to [✂] to Fawley or (iii) sending all HT waste collected at Sita's AT plants to Fawley.

Second, the model quantifies the savings from the Transaction based on an assessment of the change in the <u>variable costs</u> associated with HT waste disposal only.

We consider that this approach is appropriate because the optimal allocation of waste volumes would indeed only be affected by variable costs. For example, say an HRW treatment provider has spare capacity at two of its HT plants, Plant 1 which has a variable disposal cost of £50 per tonne and Plant 2 which has a variable cost of disposal of £100 per tonne: then it would necessarily be preferable for the supplier to fill its capacity at Plant 1 prior to using Plant 2 regardless of the size of the fixed costs associated with either plant since these costs will be incurred in either case. Moreover, since the fixed costs of the Parties' HT plants can be expected to be unchanged with the volume of waste processed, they can therefore be expected to be broadly the same before or after the merger. We do, however, check that under the options we consider, and assuming AT and offensive waste volumes are in line with Tradebe's best current estimates of expected volumes in 2014, no plant is permitted to exceed its operational capacity.

Third, the model assumes that HRW HT waste can be processed at Fawley, provided that other waste can be displaced at a sufficiently low opportunity cost.

Given that Fawley is licenced to incinerate many different types of waste, it is to be expected that it would only be profitable for Tradebe to process HRW HT waste at Fawley if any savings obtained from treating HRW at this site would outweigh the associated opportunity cost of using the treatment facility for other waste types (i.e. the loss of the margin obtained for any waste which is displaced). Accordingly for each plant, we model the choice as to whether to send volumes to Fawley as dependent on whether the total of the transport costs to Fawley, the variable disposal cost of HRW at Fawley and of the margin that can be earned by incinerating

[4] [✂].

other products at Fawley instead, is lower than the total transport and variable disposal costs incurred by sending volumes to an alternative site.

3. Results: estimated cost savings from the transaction

The cost modelling work we have undertaken suggests that considerable cost savings might be expected to arise from the Transaction as a result of both Tradebe obtaining the option to treat the HT volumes it receives in Sita plants, and Sita obtaining the option to treat the HT volumes it receives at Fawley.

However, the results of our analysis are sensitive to the assumption as to whether, and at what opportunity cost, other waste volumes must be displaced at Fawley in order to process HT volumes there, since this will affect both the counterfactual allocation of Tradebe HT waste (i.e. whether Tradebe would treat its HT waste at Fawley or at third party plants) and the most cost effective allocation of the Parties' HT processing post-Transaction.

We note that the exact opportunity cost associated with treating HT waste at Fawley will depend on the mix of waste types which must be displaced to accommodate the HT volumes – a choice which might be dependent on a range of technical and commercial considerations (e.g. contract length). [✂].[5] Accordingly, we first estimate the cost savings arising from the Transaction on the basis of the assumption that HRW waste will be treated at Fawley if it is profitable to substitute it (tonne per tonne) for [✂]: we present the corresponding results in Section 3.1 below.

[✂].

3.1. Base case results

As noted above, it would only be profitable for Tradebe to process HT waste at Fawley if any savings obtained from treating HRW at this site would outweigh the associated opportunity cost of using the treatment facility and the exact opportunity cost associated with treating HT waste at Fawley will depend on the mix of waste types which must be displaced to accommodate the HT volumes.

We understand however that the type of waste currently treated at Fawley which is most suitable for one-for-one displacement is [✂] as this is the type of waste which is most directly substitutable for HT volumes. In 2013, Fawley earned a margin of price over the variable cost of disposal of £[✂] per tonne on this waste type: Tradebe also considers this to be a reasonable estimate of ongoing margins for shredder waste going forward.

Assuming the opportunity cost of displacement at Fawley is £[✂] per tonne the model predicts that the allocation of HT waste from the Parties' AT sites to HT disposal sites would be chosen as follows (and as displayed in Table 1 below):

[5] [✂].

- **The counterfactual** is in line with the pre-merger scenario: HT waste received at Tradebe sites is treated at third party plants, while HT waste received at Sita AT sites is treated in-house at Redditch and Wrexham and sent to a third party site [✂] in the event of Sita plant breakdowns;

- **Post-Transaction** HT waste received at Tradebe sites is now treated at Sita plants, while HT waste received at Sita AT sites continues to be treated in-house at Redditch and Wrexham but is sent to Fawley in the event of Sita plant breakdowns.

Table 1: Location of HT waste disposal in the counterfactual and post-Transaction, base case model

Origination Site	Birmingham	Doncaster	Avonmouth	Rochester	Chase Farm	Redditch	Salford	Wrexham
Disposal site in the counterfactual	[✂]	[✂]	[✂]	Redditch/ Wrexham/ [✂]	Sent to [✂]	In house	In house	In house
Disposal site post-Transaction	[✂]	[✂]	[✂]	Redditch/ Wrexham/ Fawley	Sent to [✂]	In house	In house	In house

Source: RBB cost model

[✂].

Comparing the costs associated with treating HT waste post-Transaction and in the counterfactual, the cost savings arising from the re-allocation of HT waste post-Transaction are estimated to be £[✂] in total. These savings are distributed as follows:

- **Reduction in variable HT disposal costs**: the model indicates that post-Transaction there would be a reduction in the costs associated with HT disposal both at Tradebe's sites and at Sita's Rochester site. For the former, these cost savings arise as a result of treating HT waste in-house at Sita's plants rather than at [✂] at commercial rates. For the latter, this cost saving arises largely as a result of treating waste previously sent to [✂] in-house at Fawley.[6]

- **Increase in HT transport costs**: the model indicates that [✂]. The net effect of these changes is an increase in transport costs associated with HT waste disposal.

In the context where the total variable costs associated with HT treatment post-Transaction are approximately £[✂] and the fixed costs associated with operating the Parties' HT plants are estimated to be in the region of £[✂][7] a saving of £[✂] constitutes a substantial reduction in annual HT treatment costs.

[6] [✂].
[7] [✂].

3.2. Sensitivity analysis

As noted above, the results of the model are sensitive to the assumption as to whether, and at what opportunity cost, other waste volumes must be displaced at Fawley in order to process HT waste. Accordingly, since (i) we acknowledge that in practice the opportunity cost of displacement may not exactly equal the margin obtained on [✂], and (ii) we also understand that there may be a possibility to treat some HT waste at Fawley with no displacement, we also considered how the results of our analysis would be affected by changes to this key assumption.

We identified three key scenarios for the displacement of waste at Fawley as follows:

(i) Displacement of waste which obtains a margin of £[✂]

Assuming the opportunity cost of displacement at Fawley is £[✂] per tonne the model predicts that the allocation of HT waste from the Parties' AT sites to HT disposal sites would be identical to that described in Section 3.1 above. [✂].

For this range of displacement possibilities the results suggest that the higher is the opportunity cost of displacement the lower is the potential saving from the Transaction. [✂].

(ii) No displacement at Fawley or displacement of waste which obtains a margin of less than £[✂]

If it is assumed that there is no displacement at Fawley or that the opportunity cost of displacement is lower than £[✂] per tonne the model predicts that in the counterfactual, it would now be optimal for [✂].

Furthermore, the model would predict that post-Transaction, [✂].

Specifically, the model predicts that if there is no displacement [✂].

[✂].

(iii) Displacement of waste which obtains a margin in excess of £[✂]

Conversely, if it is assumed that processing HT waste at Fawley requires the displacement of other waste volumes which obtain a margin which is higher than £[✂] the model suggests that the allocation of HT waste would be chosen as follows:

- In the counterfactual HT waste received at Tradebe sites is treated at third party plants, while HT waste received at Sita AT sites is treated in-house at Redditch and Wrexham and sent to a third party site [✂] in the event of Sita plant breakdowns;

- Post-Transaction HT waste received at Tradebe sites is treated in-house at Sita plants, while HT waste received at Sita AT sites continues to be treated at Redditch, Wrexham and [✂].

In this scenario it is not cost-effective to use Fawley either in the counterfactual or post-Transaction to process HT waste.

The implications for the predicted cost savings of each of the scenarios outlined above are summarised in the table below. As can be seen from this table, in all scenarios the cost savings arising from the Transaction are predicted to exceed £[✂].

Table 2: Tradebe/Sita efficiencies analysis – preliminary results

[✂]	**[✂]**	**[✂]**	**[✂]**	**[✂]**
[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]	[✂]

A.1 Annex 1: The Operation of the Cost Model

The cost modelling work we have undertaken is supplied in Annex 2, **"RBB Economics – Tradebe Sita Cost Model"**. This annex provides a step-by-step guide to the calculations and data employed in that model.

The model calculates the savings arising from the Transaction according to a two-step process: first, it identifies the best allocation of HT volumes for the Parties post-Transaction and in the counterfactual scenario; and subsequently it calculates the difference in variable HT disposal costs between these two scenarios.[8] We discuss each of these steps in turn in sections A.1.1 and A.1.2 below. Section A.1.3 then provides an overview of the inputs that have been used for the analysis.

We note that the predictions of the model are dependent on the chosen assumption regarding the opportunity cost of waste displacement at Fawley. Accordingly, the model provides for the assumption regarding the margin obtained for the waste displaced by HT volumes at Fawley to be adjusted in the worksheet **"Summary – Efficiency Savings"** in the table labelled "Fawley opportunity cost".

A.1.1 Step 1: Allocation of HT volumes

The allocation of HT volumes is assessed in the worksheets highlighted in yellow. We note that the model does not consider all the possible allocations of HT volumes the Parties could theoretically adopt. Rather, it selects the optimum allocation from a range of options the Parties have told us they would consider.

We discuss the allocation of HT volumes in the counterfactual scenario and post-Transaction for each of Tradebe and Sita in turn below.

A.1.1.1 Allocation of HT volumes in the counterfactual

(i) Tradebe

As noted in Section 2 above, we model Tradebe's allocation of HT volumes as a choice between allocating HT waste to third party plants or sending these volumes to Fawley. The relative costs associated with each of these options are outlined in the tab **"Tradebe Optimisation"** under the headings "Send to third party site" and "Send to Fawley".

We assume that each site has the option to send the HT waste they receive to the same third party site they used prior to the Transaction (and on the same terms as they were able to obtain

[8] Note that we assume total AT and HT volumes delivered by/collected from customers at each plant are in accordance with Tradebe's run rate assumptions and are the same irrespective of whether or not the Transaction takes place.

pre-Transaction). Hence we assume that Birmingham and Doncaster have the option to send their HT volumes to [✂], and Avonmouth has the option to send its HT volumes to [✂].[9],[10]

The option that would have been chosen in the counterfactual scenario in which the Transaction did not take place is selected in the **"Tradebe Counterfactual"** worksheet on the basis of the information provided in the **"Tradebe Optimisation"** worksheet. The option selected at each site is the alternative which offers the lowest total variable cost for the treatment of the site's HT volumes. That is, the combined variable transport cost and variable disposal cost, or - in the case of treatment at Fawley - the combined variable transport cost, variable disposal cost and opportunity cost of displacement.

(ii) Sita

Sita's allocation of HT volumes in the counterfactual scenario and the associated cost of HT disposal are presented in the worksheet **"Sita Counterfactual"**. We assume that Sita's HT waste will be distributed in the counterfactual as follows:

- Each of Sita's HT sites treat the HT waste they receive from customers in-house;
- Chase Farm sends the HT volumes it receives from customers to [✂];
- Rochester treats approximately [✂] tonnes of the HT waste it receives at a third party plant [✂] in the event of Sita plant breakdowns;[11]
- The remaining HT volumes Rochester receives from customers and [✂] are sent to [✂].

The allocation of the HT volumes received at Rochester and Chase Farm is determined in the worksheet **"Sita Optimisation"**. The table "[✂]" calculates the total volumes to be treated in-house from Rochester and Chase Farm, and allocates these volumes [✂]. The weighted average costs associated with this allocation are then calculated [✂].

A.1.1.2 Allocation of HT volumes post-Transaction

(i) Tradebe

[✂]

(ii) Sita

[✂]

[9] [✂].
[10] [✂].
[11] [✂].

A.1.2 Step 2: Calculation of the savings arising from the transaction

The HT treatment cost savings arising from the Transaction are calculated in the worksheets **"Summary – Cost Savings"** and **"Summary – Site Changes"** which are highlighted in blue.

- The worksheet **"Summary – Cost Savings"** calculates the difference between the variable costs associated with HT treatment post-Transaction and in the counterfactual. It indicates whether in sum the Tradebe and Sita sites experience an increase or decrease in the costs associated with treating the HT waste they receive from customers following the Transaction.

- The worksheet **"Summary – Site Changes"** calculates the difference between the variable costs associated with HT treatment post-Transaction and in the counterfactual for each of Tradebe and Sita's sites and outlines the changes in the location of HT waste disposal and the capacity utilisation of the Parties' sites following the Transaction.

A.1.3 Inputs

The model has been constructed on the basis of the information which has been provided by Tradebe. This information is supplied in the worksheets highlighted in green and comprises data on (i) annual treatment volumes, (ii) variable disposal costs for HT waste, (iii) Fawley opportunity costs, (iv) transport costs and (v) plant capacity.

(i) Annual Treatment Volumes

The annual treatment volumes for each of Tradebe and Sita are provided in the worksheet labelled **"Run Rate Assumptions".** This worksheet sets out Tradebe's estimation of the tonnes of HT, AT and Offensive waste that will be collected by, and delivered to, each of Tradebe and Sita's plants by the Parties' customers. These volumes may subsequently be transferred internally or to third parties. These internal transfers are discussed in section A.1.1 above.

(ii) Variable HT Disposal Costs

The variable costs associated with disposing of HT waste at each of Tradebe and Sita's plants and at third party plants are provided in the worksheet **"HT Disposal Costs"**. For third party plants, the variable cost incurred by Tradebe or Sita is given by the price per tonne charged by the third party provider.[12] The variable disposal costs at each site are provided in the table below.

[12] [✂].

Table 3: Variable disposal cost incurred by Tradebe/Sita to dispose of HT waste by site

HT Plant	Variable disposal cost of HT Waste
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]

Source: Tradebe

(iii) Fawley Opportunity Cost

[✂].[13]

(iv) Transport Costs

The variable cost of transporting waste between HRW sites has been estimated using a transport cost matrix provided by Tradebe.[14] The worksheets "**Artic – Loose**", "**Artic – Bins**", and "**Rigid 18T**" provide the per load cost of a round trip between each of the Parties' sites for various vehicle types. The cost per tonne for a round trip is then obtained dividing the per load cost by the number of tonnes per load in accordance with the figures provided in the table below.

Table 4: Tonnes per load by transport method

Worksheet	Transport Method	Tonnes per load
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]

Source: Tradebe

The appropriate transport method for each inter-site journey has been selected in accordance with the information that has been provided by Tradebe. The transport costs from each of Tradebe and Sita's AT sites to the relevant HT plants are then obtained as follows:

[13] [✂].
[14] [✂].

Table 5: Transportation from Tradebe AT Sites

Origin Tradebe Site	Destination HT Site	Transport Method	Transport Cost £/tonne
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]

Source: Tradebe

Table 6: Transportation from Sita AT Sites

Origin Sita Site	Destination HT Site	Transport Method	Transport Cost £/tonne
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂][15]

Source: Tradebe

(v) Plant Capacity

The annual operational capacity for Tradebe and Sita plants is provided in the worksheet **"Plant Data".**[16]

[15] [✂].
[16] This information was previously submitted to the CC in response to question 36 of the Market Questionnaire.