

REPORT

Boston Alternative Energy Facility

Climate Change – Comparative Analysis of Greenhouse Gas Emissions from Road and Marine Vessel Transport Options to the Site

Client: Alternative Use Boston Projects Ltd.

Planning Inspectorate EN010095

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Note / Memo

HaskoningDHV UK Ltd.
Industry & Buildings

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From: Alternative Use Boston Projects Limited
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Subject: Boston Alternative Energy Facility Examination Technical Note: Climate Change – Comparative Analysis of Greenhouse Gas Emissions from Road and Marine Vessel Transport Options to the Site

1 Introduction

This Note sets out the outcomes of an assessment to predict greenhouse gas (GHG) emissions arising from the movement of Refuse Derived Fuel (RDF) waste to the proposed Boston Alternative Energy Facility (BAEF), hereby referred to as the 'Facility'.

The project has committed to delivering RDF waste to the Facility by marine vessel, to minimise road vehicle movements, in particular on the local road network in the vicinity of the site. This commitment will result in the avoidance of over 41,000 Heavy Goods Vehicle (HGV) movements associated with the Facility (assuming 29 tonnes is transported per movement). As the project committed to deliver material to the Facility via marine vessel early in the design process, this was included as an 'embedded' mitigation measure in the Environmental Statement (ES). Consequently, the potential GHG emission savings from the adoption of this commitment had not been quantified upon submission of the ES.

This assessment has been undertaken to demonstrate the environmental benefits of adopting the commitment to deliver RDF to the Facility by marine vessel. This commitment is secured by the addition of a requirement to Schedule 2 of the draft DCO (document reference 2.1(1)), which restrict the delivery of waste via the road network save in the event of a wharf outage or in circumstances where, following consultation by the undertaker with the relevant highway authority, the relevant planning authority is satisfied that such delivery of waste by road would not give rise to any materially new or materially different environmental effects in comparison with those reported in the ES.

2 Methodology

2.1 Approach

A GHG assessment was carried out to compare potential GHG emissions from the delivery of RDF waste to the site from HGVs and marine vessels. As the exact locations and sources of RDF to be used in the Facility is unknown and is likely to be variable on an annual basis, the assessment is only intended to provide a high-level overview of GHG emissions arising from both transport options.

For the purposes of this assessment, it was assumed that RDF waste would be supplied equally from 12 ports in the UK, consistent with the approach adopted for the GHG assessment in the ES (see document reference 6.2.21, APP-059). Due to uncertainties regarding the disposal and collection procedures in each region of the UK, emissions from the transport of the RDF waste to each port were not included within the boundary of the GHG assessment. In addition, the onward or return journey of HGVs and marine vessels once the RDF waste is delivered to the Facility was also not included in the assessment.

The Facility will process 1,200,000 tonnes of RDF waste per year, and as the proportion of waste from each port was unknown at the time of assessment, it was assumed that the supply chain would be equally derived (i.e., 100,000 tonnes each) from the following ports¹:

- Belfast;
- Fleetwood;
- Glasgow;
- Grangemouth;
- Great Yarmouth;
- Hartlepool;
- Hull;
- Montrose;
- Port Talbot;
- Ridham;
- Sheerness; and
- Southampton.

GHG emissions were calculated in scenarios where 75%, 50%, 25% and 0% of RDF waste were transported to the Facility by marine vessel, with the remaining contribution in each scenario via HGV. Under these scenarios, it was assumed that the proportions of RDF waste from each port under each transport option were the same. For example, in the 75% scenario, it was assumed that 75,000 tonnes was delivered via marine vessel and 25,000 tonnes via HGV from all ports considered in the assessment. It was assumed that the 100,000 tonnes of RDF waste from Belfast would travel to the Facility by marine vessel under each scenario.

The term 'GHG' in this assessment encompasses three gases, namely carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Emissions of other notable GHGs, as referenced in the Kyoto Protocol are not considered significant in the context of HGV and marine vessel sources, therefore they were excluded from consideration. Where practicable, the results in this assessment were expressed in carbon dioxide equivalent (CO₂e) which recognises that different gases have notably different global warming potential (GWP)².

2.2 Road Vehicle Emissions

The emission factor (in units of kg CO₂e / km) for articulated HGV's (<33 tonne) was obtained from the Department of Business, Energy and Industry Strategy GHG emission factor database (BEIS, 2021).

¹ Consistent with paragraph 5.6.6 of Environmental Statement Chapter 5 (Project Description) (document ref 6.2.5, APP-044).

² GWP of a GHG is a measure of how much heat is trapped by a certain amount of gas in the atmosphere relative to carbon dioxide.

The travel distances (in km) to deliver RDF waste via HGV in each scenario was determined by multiplying the number of vehicle movements by the road distance to each port. Road distances between each port to the Facility were obtained from Google Maps, and it was assumed that 29 tonnes of RDF waste were transported to site per HGV.

2.3 Marine Vessel Emissions

The approach to calculating GHG emissions is detailed in Chapter 21 of the ES (document reference: PB6934-RHD-01-ZZ-RP-N-3021). The assumptions adopted for the assessment are summarised below:

- Emission factors were obtained from guidance provided by the GloMEEP Project Coordination Unit and the International Association of Ports and Harbors (IAPH) (GloMEEP & IAPH, 2018);
- The cargo vessels were assumed to travel at an average speed of 28.2 km/hr (GloMEEP & IAPH, 2018);
- Emissions were calculated from propulsion and auxiliary engines whilst the vessels are cruising, and in a Reduced Speed Zone (RSZ). The RSZ was assumed to be whilst the vessels are travelling on The Haven, where each vessel would require one hour to travel each way;
- RDF was assumed to be delivered to the Facility on a cargo vessel (>10,000 DWT) with an engine capacity of 1,008 and 193 kW for its propulsion and auxiliary engines respectively; and
- Heavy Fuel Oil (HFO) emission factors for CO₂, CH₄ and N₂O for propulsion and auxiliary engines were obtained from GloMEEP guidance (GloMEEP & IAPH, 2018).

3 Results

GHG emissions from each scenario are provided in **Table 1** and **Figure 1**, and are presented as annual emissions associated with the delivery of 1,200,000 tonnes of RDF waste to the Facility. The results include emissions from delivery of RDF waste by marine vessel from Belfast in all scenarios.

Table 1: GHG Emissions from Road and Marine Vessel Transport Options to the Facility

Percentage of RDF Waste Delivered by Marine Vessel (excluding Belfast)	GHG Emissions (Tonnes CO ₂ e)
0%	9,700
25%	8,970
50%	8,239
75%	7,508
100%	6,777*

* Value is different to that presented for marine vessels in the ES, as GHG emissions from the export of Lightweight Aggregate (LWA) product were not included in this assessment

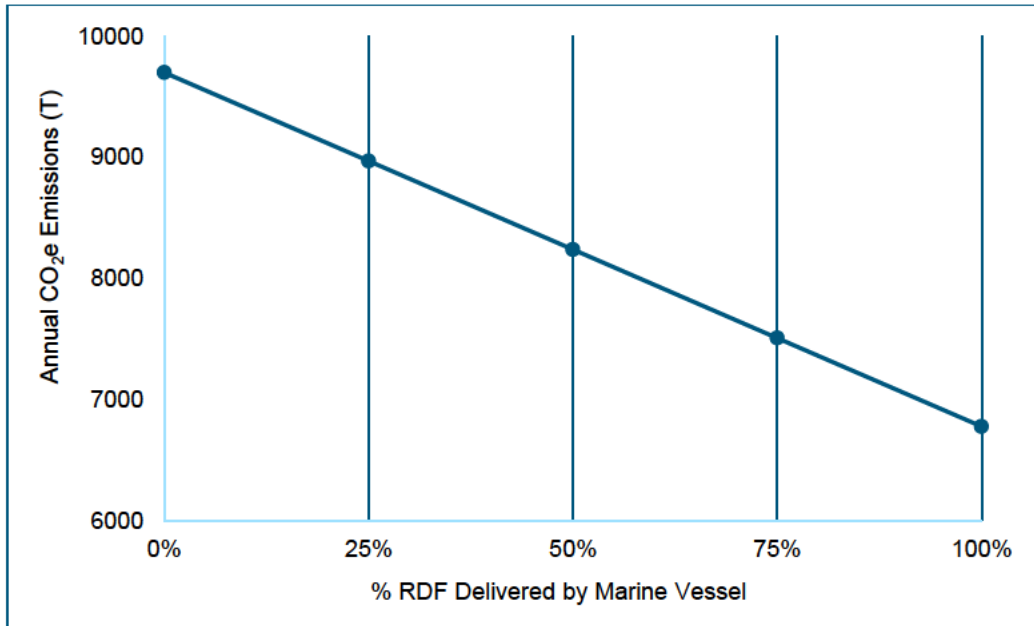


Figure 1: GHG Emissions by the Percentage of RDF Delivered by Marine Vessel

The results show that delivery of RDF waste by marine vessel is the least GHG intensive option, emitting approximately 2,923 fewer tonnes of CO₂e annually when compared to delivery by HGV, a reduction of 30%.

Emissions from each transport option are however different according to each origin Port, as presented in Figure 2 (except Belfast).

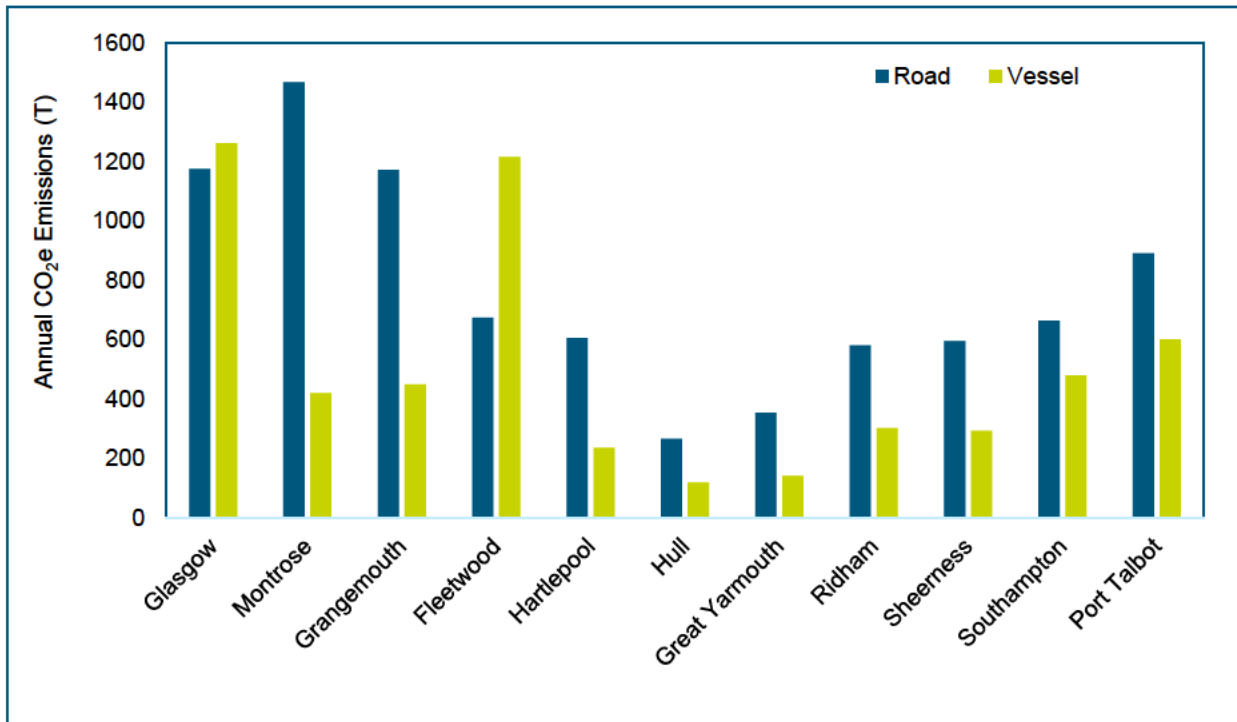


Figure 2: Emissions from Marine Vessel and Road from Each Port

The results show that for the majority of ports, GHG emissions are lower if RDF waste is transported to the Facility via marine vessel, with exception of Fleetwood and Glasgow. Both of these ports are situated on the west coast of Great Britain, and are the furthest distances from the site in the vessel scenario. There are less GHG emissions delivering RDF via vessel compared to road from all ports situated on the east and south coast

4 Summary

The commitment to transport RDF waste to the Facility via marine vessel rather than HGV will result in an overall reduction in GHG emissions compared to delivery by road. This high-level assessment shows that GHG emissions from marine vessels will reduce GHG emissions by approximately 30% when compared to HGVs assuming RDF waste is delivered equally between the 12 ports considered in the study. GHG emissions were predicted to be lower from marine vessels compared to HGVs from the majority of ports considered in the study, with exception of Fleetwood and Glasgow, which are situated on the west coast of Great Britain and the furthest travel distance via vessel from the site (notwithstanding RDF delivered from Belfast for which 100% delivery by vessel was assumed).

5 References

Department for Business, Environment and Industrial Strategy (BEIS), (2021), Greenhouse Gas Reporting, Conversion Factors 2020, available at URL: [REDACTED]

GloMEEP & IAPH (2018), GEF-UNDP-IMO GloMEEP Project and IAPH, 2018: Port Emissions Toolkit, Guide No.1, Assessment of port emissions.