FORD ENERGY RECOVERY FACILITY AND WASTE SORTING AND TRANSFER FACILITY, FORD CIRCULAR TECHNOLOGY PARK

ENVIRONMENTAL STATEMENT

CHAPTER 7

CARBON AND GREENHOUSE GAS EMISSIONS

7

7 Carbon and greenhouse gas emissions

Introduction

7.1 Fichtner Consulting Engineers was appointed to undertake an assessment of the carbon impact of processing waste at the proposed development. The assessment takes into account the following factors when determining the carbon impact of the development:

- Carbon dioxide emissions released from the combustion of fossil-derived carbon in the waste processed in the ERF;
- Emissions of other greenhouse gases from the combustion of waste in the ERF;
- Emissions from the combustion of auxiliary fuel in the auxiliary burners at the ERF;
- Emissions from the transport of waste and reagents to the site and residues from the site associated with the operation of the ERF;
- Emissions offset from the export of electricity from the development; and
- Emissions arising from the operation of and transport to / from the WSTF.

7.2 The findings of the assessment are summarised in this ES chapter and the full report is included as Technical Appendix D. The data sources and references used in the assessment are shown in tables 7.1 and 7.2.

Source	Factor
IPCC Guidelines for Greenhouse Gas Inventories, Vol 2, Table 2.2 Default Emissions Factors for Stationary Combustion in the Energy Industries, Municipal Wastes (non-biomass) and Other Primary Solid Biomass	N_2O default emissions factor: 0.04 kg N_2O/tonne waste
	CH_4 default emissions factor: 0.3 kg CH_4/tonne waste
United Nations Framework for Climate Change Global Warming Potentials	GWP – N_2O to CO_2: 310 kg CO_2e/kg N_2O
	GWP – CH_4 to CO_2: 25 CO_2e/kg CH_4
DEFRA, 2019, "Greenhouse gas reporting: Conversion factors 2019"	Emissions from gasoil: 0.25 tCO_2e/MWh
DEFRA, 2019, "Fuel Mix Disclosure Table – 01/04/2018 – 31/03/2019"	Natural gas CO_2 emissions: 349 g/KWh
DEFRA, 2014, "Review of Landfill Methane Emissions Modelling (WR1908)"	Degradable decomposable organic carbon content (DDOC): 50%
	CO_2 percentage of landfill gas: 43%
	CH_4 percentage of landfill gas: 57%
	Landfill gas (LFG) recovery efficiency: 68%
	Methane captured used in gas engines: 90.9%
	Methane leakage through gas engines: 1.5%
	Landfill gas engine efficiency: 36%
Resource Futures, 2013, "Defra EV0801 National Compositional estimates for local authority collected waste and recycling in England, 2010/11" (Kerbside Residual)	Waste composition
Environment Agency Wales/SLR, 2007, "Determination of the Biodegradability of	

Source	Factor
Mixed Industrial and Commercial Waste Landfilled in Wales"	
Where: • ***CO_2e = carbon dioxide equivalent*** • ***CO_2 = carbon dioxide*** • ***N_2O = nitrous oxide*** • ***CH_4 = methane***	

Table 7.1: Data sources

DEFRA, 2014, "Energy from waste: A guide to the debate"
DEFRA 2014, "Energy recovery for residual waste – a carbon based modelling approach"
IEMA, 2017, "Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance"

Table 7.2: General references

Legislation and policy

Legislation

7.3 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) introduced a requirement to consider climate and greenhouse gas emissions. Schedule 4 of the regulations states:

> *"A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: …. climate (for example greenhouse gas emissions, impacts relevant to adaptation)"* and *"A description of the likely significant effects of the development on the environment resulting from, inter alia: ….(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions)…"*

7.4 Due to its nature and scale, the proposed development has the potential to either produce significant greenhouse gas emissions or significantly reduce greenhouse gas emissions compared to the baseline scenario. Therefore, the EIA includes a carbon assessment.

7.5 The UK government set a commitment to reduce greenhouse gas emissions in the UK to 50% of 1990 levels by 2025, and to 80% by 2050 through the implementation of the Climate Change Act 2008, the framework for UK climate change policy. More recent legislation has introduced a new binding target of "net zero by 2050".

National policy

7.6 The National Planning Policy Framework (NPPF; 2019) sets out the government's planning policies for England and how they are expected to be applied. In relation to carbon and greenhouse gas emissions, section 14 of the NPPF states that:

> *"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in*

greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure."

Local policy

7.7 The West Sussex Plan 2017 – 2022 states that in order to achieve their outcome of a sustainable environment, measures for success include renewable energy generated by West Sussex County Council (WSCC), carbon reduction achieved by WSCC and a reduction in household waste sent to landfill.

7.8 The Waste Local Plan (2014) sets out the waste management strategy in West Sussex until 2031. A key element of the plan is to become a 'zero waste to landfill county', and Strategic Objective 14 is:

"To minimise carbon emissions and to adapt to, and to mitigate the potential adverse impacts of, climate change".

7.9 The Joint Materials Resource Management Strategy for West Sussex (2005 – 2035) identifies a number of key themes and principles, of which the following are relevant:

- Theme 1 relates to waste awareness and encourages a drive in cultural change to consider waste as a resource.
- Theme 6 relates to ensuring the safe management, handling and disposal of municipal waste in the local area. The strategy also identifies a requirement for new waste management capacity to deal with residual waste and meet landfill diversion targets, and indicates that energy-from-waste has an important role to play in the diversion of biodegradable waste from landfill and generates less residues than other options.

7.10 The WSCC Energy Strategy contains four priority areas, of which priorities 2 and 4 are relevant:

- Priority 2 is to integrate low-carbon energy generation and infrastructure into the development of WSCC assets.
- Priority 4 is to develop the commercial provision of low-carbon energy and energy-related services in West Sussex and ensure the creation and retention of jobs in the area.

7.11 The proposed development will assist with WSCC's aims to reduce household waste sent to landfill and to implement the policy for 'zero waste to landfill'; to reduce and minimise carbon emissions by the provision of low carbon energy; and recognise waste as a resource.

Guidance

7.12 The Committee on Climate Change, the UK's independent advisory body to the government, recently published a technical report which sets out recommendations to the UK government on how to achieve the target of net zero carbon emissions by 2050. The report sets out how key biodegradable waste streams should be diverted from landfill within the UK alongside an increase in recycling. To achieve this and deliver deep emission reductions in the waste sector, it is advised that key investment is required in alternative waste disposal facilities (such as anaerobic digestion, mechanical-biological treatment and incineration). A lack of investment in these areas may encourage offshoring of waste.

7.13 The report envisages a future generation mix where renewables dominate, which includes generation from both hydro and energy from waste plants. The continued development and investment in low carbon technologies will be key in achieving a net-zero future. The intermittency of renewables is recognised and there is support for base-load low-carbon plants. Consequently, energy from waste would play a key role in UK power generation and achieving a net zero future.

7.14 The Waste Management Hierarchy ranks waste management options in order of sustainability. The more sustainable waste management options are higher in the waste hierarchy. The thermal treatment of waste in an efficient energy-from-waste plant is a recovery operation, meaning it should be favoured over the disposal of waste in a landfill.

Methodology

7.15 The standard EIA methodology described earlier in the ES does not apply to this chapter. As the receptor for greenhouse gas emissions will be the worldwide climate, it is not feasible to assess the sensitivity of individual receptors. In addition, the magnitude of the impact of greenhouse gas emissions cannot be determined. For the purposes of this chapter, an alternative methodology has been applied as described in the following sections.

WSTF

7.16 The emissions associated with the existing waste transfer station (WTS) are considered to be the baseline for assessing the impact of the new WSTF against. Waste from the surrounding area is currently transferred to the existing WTS, where it is then bulked and transferred off-site, mostly to either the Lakeside Energy from Waste facility in Slough or the Brockhurst Wood Landfill in Horsham. A number of other facilities also receive waste from the existing WTS (albeit less frequently), including the Bishop’s Cleeve landfill in Cheltenham, Sutton Courtenay Landfill near Didcot, the Riverside EfW facility and the Redhill Landfill in Surrey. The transport of waste to the existing WTS and the subsequent transfer of waste off-site will have associated greenhouse gas emissions. A qualitative analysis of the carbon impact associated with the operation of the proposed WSTF against the baseline has been undertaken.

ERF

Baseline

7.17 The Institute of Environmental Management and Assessment’s (IEMA) guidance ‘*Environmental Impact Assessment Guide to: Assessing Greenhouse Gas*

Emissions and Evaluating their Significance' (2017) defines the baseline as a reference point against which the impact of a new development can be compared (sometimes referred to as 'business as usual', where assumptions are made on current and future greenhouse gas emissions). The baseline can be in the form of:

- Greenhouse gas emissions within the agreed physical and temporal boundary of a project but without the proposed project; or
- Greenhouse gas emissions arising from an alternative project design and assumptions.

7.18 The proposed ERF development is a 'new project', therefore a current baseline cannot be established in relation to emissions from the site boundary of the proposed development prior to commencement of development. In this instance, there are zero greenhouse gas emissions to report. Furthermore, as the impact of greenhouse gas emissions from the development will be worldwide, a physical and temporal boundary to their impact cannot be defined. Therefore, option b) has been chosen to establish the baseline. For this assessment, the 'alternative project design and assumptions' for the ERF will be sending the waste to landfill as this is the most likely alternative destination for the waste, and generating electricity via gas-fired power stations, as this is the 'most likely' technology if you wanted to build a new power station today (i.e. the 'marginal' technology). The goal of the assessment is therefore to assess the carbon impact of greenhouse gas emissions associated with the proposed ERF against the baseline scenario of disposing the waste in a landfill and generating electricity using the 'marginal' technology.

7.19 Full details on the methodology for the baseline comparator (i.e. the landfill) and the assumptions used for the assessment are set out in detail in Technical Appendix D. The elements included in the calculations for the landfill comparator are presented in table 7.3 and the assumptions used within the calculations are referenced in table 7.1.

Comparator	Element included

Landfill	Emissions of methane (CO_2e) released to atmosphere in the fraction of landfill gas that is not captured. This is calculated taking into account the following elements:
	• Biogenic carbon
	• Total degradable decompostable organic carbon content (biogenic carbon not sequestered)
	• Methane in landfill gas of which:
	  o Methane captured
	  o Methane oxidised in landfill cap
	  o Methane released to atmosphere directly
	  o Methane leakage through gas engines

	Emissions offset from the generation of electricity from landfill gas, taking into account the following elements: • Methane captured • Methane flared • Methane leakage through gas engines • Methane used in gas engines • Fuel input to gas engines • Power generated

Table 7.3: Elements of the landfill comparator to be included in the assessment

Assessment scope

7.20 The proposed development is expected to have an operational lifetime of approximately 25 years. Therefore, this has been chosen as the study period for the assessment.

7.21 The elements of the proposed ERF development scoped into the carbon and greenhouse gas assessment are identified in table 7.4.

Development phase	Element of the proposed development
Operation	Emissions released from the combustion of fossil carbon in the waste
	Emissions of other greenhouse gases from the combustion of waste
	Emissions from the combustion of auxiliary fuel in the auxiliary burners
	Emissions from the transport of waste, reagents and residues to and from the site
	Emissions offset from the export of electricity from the proposed development

Table 7.4: Elements of the proposed ERF development to be included in the assessment

7.22 The boundary of greenhouse gas emissions should consider the physical boundary, geographical location and temporal boundary. Although a physical and temporal boundary cannot be defined, as stated previously, the geographical location of the proposed development has been taken into consideration via the assessment of transport emissions.

7.23 A fully comprehensive greenhouse gas assessment will typically cover all life cycle stages including construction, operation and end-of-life stage. The IEMA guidance states that certain life cycle stages can be excluded as long as this approach is justified; it is expected, however, that direct greenhouse gas emissions from operations are covered as a minimum within the boundaries of the study. The emissions associated with construction and end-of-life stages will be relatively minor when compared to the carbon impact over the operational lifetime of the proposed development. As such, construction emissions and end-of-life emissions (e.g. decommissioning and site closure) have been scoped out of the assessment.

7.24 The detailed methodology and assumptions used within the assessment are presented in Technical Appendix D. The assumptions data covers both the activities to occur as part of the proposed development (i.e. project-specific data such as transport distances) and the emissions factors for these activities. Emissions factors have been carefully selected, with multiple emissions factors considered when calculating the carbon benefit of grid displacement. The possible change in UK grid mix over time and how this affects the net impact of the proposed development has also been examined within a sensitivity analysis.

7.25 It is noted that within WSCC's scoping opinion, under the carbon and greenhouse gas emissions section, is a reference to the inclusion of an R1 assessment (i.e. an assessment that enables an incineration plant to be classified as a recovery operation rather than a disposal operation). An R1 assessment has been included within the Heat and Power Plan that is submitted as a supporting report to the planning application. The R1 assessment has concluded that the ERF will meet the definition of a 'recovery' operation in accordance with the requirements of the European Commission Waste Framework Directive.

Significance

7.26 In the absence of any significance criteria or a defined threshold, it might be considered that all greenhouse gas emissions are significant. Climate change has the potential to lead to significant environmental effects on all topics in the EIA directive (population, fauna, soil etc.) The IEMA guidance states that:

> *"When evaluating significance, all new GHG emissions contribute to a significant negative environmental effect; however; some projects will replace existing development that have higher GHG profiles. The significance of a project's emissions should therefore be based on its net impact, which may be positive or negative."*

7.27 For the purposes of this assessment, the net impact of the proposed ERF has been calculated compared to the baseline landfill scenario.

Assumptions and limitations / uncertainties

7.28 The following conservative assumptions have been used in the assessment:

- There will be 10 start-ups a year at the ERF where the auxiliary burners will be in operation.
- Recent bidding of Energy from Waste plants into the capacity market means they are competing primarily with combined cycle gas turbines (CCGT), gas engines and diesel engines. CCGT has been used as the comparator for displaced electricity and may possibly be conservative compared to the other options providing balancing services.
- A sequestration rate of 50% for biogenic carbon in landfill has been applied to the baseline scenario, in addition to a relatively high landfill gas capture rate of 68%.
- The carbon burden of transporting the waste is determined by calculating the total number of loads required and multiplying it by the transport distance to generate an annual one-way vehicle distance. This is multiplied by the respective empty and full carbon dioxide factor for HGVs to determine the overall burden of transport. This is conservative as it may be possible to coordinate HGV movements to reduce the number of trips. In addition, the transport distances assumed are conservative (i.e. larger values) where possible.
- The ERF will generate approximately 31.2 MWe of electricity, of which approximately 28.1 MWe will be exported to the grid. The operating hours of the ERF are assumed to be 8,000 hours per year. This is conservative, as the development may generate more electricity at the upper-end of the NCV

range and may operate for more than 8,000 hours per annum if there are limited periods of shutdown / outage.

- The assessment has conservatively assumed that the ERF will not export heat. The ERF is designed as a combined heat and power plant (CHP) and if heat is exported this would significantly increase the carbon benefits of the proposed development. As detailed in the Heat and Power Plan, there are, however, a number of potential CHP opportunities available which are being considered.

7.29 The following limitations and uncertainties have been identified in the assessment:

- There is considerable uncertainty in literature surrounding the amount of biogenic carbon that is sequestered in landfill, meaning that any assumption used within the assessment is also uncertain.
- The future of the UK electricity grid mix is uncertain; therefore, the current 'marginal' comparator has been used to assess grid displacement, as described in paragraph 7.18.

Results

Existing WTS and proposed WSTF

7.30 A qualitative assessment has been undertaken in relation to the carbon impacts of the proposed WSTF.

7.31 The existing WTS handles approximately 20,000 – 25,000 tonnes per annum of waste from West Sussex and surrounding counties. However, recently the existing WTS has experienced a significant increase in throughput (up to approximately 50,000 tonnes per annum of waste) due to waste being diverted from Viridor's Westhampnett Waste Transfer Station following a significant fire event at this facility. The Viridor facility is expected to be repaired in Autumn 2020 and as such the throughput at the existing WTS will fall again to 20,000 – 25,000 tonnes per annum of waste. Waste is primarily from commercial and industrial (C&I) sources and is delivered to the existing WTS in RCVs. The waste is then bulked at the WTS before being loaded into articulated vehicles for transport off-site. Currently, there is no treatment of the waste at the WTS; it is simply bulked and then transferred to either the Lakeside EfW plant in Slough or the Bishops Cleeve landfill in Cheltenham.

7.32 The proposed WSTF will have a throughput of approximately 20,000 tonnes per annum of waste. This throughput is slightly lower than the current throughput of the existing WTS, as a significant proportion of the material processed at the existing WTS will be delivered directly to the ERF instead. Furthermore, with the proposed replacement of the WTS with the WSTF, approximately one third of the waste processed in the WSTF will subsequently be treated within the adjacent ERF. The remaining waste will be composed primarily of recyclates such as metals, glass, aggregate material, etc. This waste will be transferred off-site for recovery or recycling at a suitably licensed facility.

7.33 It is anticipated that there will be a carbon benefit associated with the development of the WSTF when compared to the existing WTS due to:

- Reduced transport requirements - the carbon emissions associated with the transport of 100% of the waste to the Lakeside EfW, the Brockhurst Wood Landfill or other alternate facilities (refer to paragraph 7.16) from the existing WTS will result in significantly higher carbon emissions compared to the transport of two thirds of the waste off-site with one third remaining on-site for treatment at the ERF, as would be the case for the proposed WSTF.
- The recovery of recyclates from the incoming waste - the recovery of recyclates from the incoming waste processed at the WSTF will displace extraction of primary resources and the production of materials which would otherwise need to be produced. In addition, as recyclates will be recovered from the incoming waste, the WSTF will reduce the quantities of waste which would otherwise potentially be transferred for disposal.

7.34 Aside from transport emissions, the day-to-day operation of both the existing WTS and proposed WSTF will have minor associated operational carbon emissions such as those from power consumption, lighting, etc. It is anticipated that the power consumed by both the existing WTS and the proposed WSTF will be similar in nature. The proposed WSTF may have a reduced operational impact through the use of newer and more efficient lighting, however, these differences will be negligible. In addition, the use of solar PV cells on the roof of the WSTF and the provision of electric charging points in the car parking area associated with the WSTF will also contribute towards reducing the operational carbon impact of the proposed WSTF.

7.35 In conclusion, the operation of the proposed WSTF will have a carbon benefit when compared to the existing WTS and therefore a net positive significant effect when compared to the baseline.

ERF

7.36 The quantity of greenhouse gas emissions associated with the baseline landfill scenario has been assessed in accordance with the methodology set out in detail in Technical Appendix D. The amount of carbon dioxide equivalent (CO_2e) emissions from methane released to atmosphere for the landfill comparator has been calculated and the results are presented in table 7.5.

Item	Value
Biogenic carbon	45,840 tonnes
Total DDOC content (biogenic carbon not sequestered – degradable)	22,921 tonnes
Methane in LFG, of which:	17,420 tonnes
-Methane captured	11,845 tonnes
-Methane oxidised in landfill cap	557 tonnes
-Methane released to atmosphere directly	5,017 tonnes
Methane leakage through gas engines	162 tonnes
Total methane released to atmosphere	5,178 tonnes
CO_2e released to atmosphere	129,461 t CO_2e

Table 7.5: Emissions from landfill gas

7.37 The amount of CO_2e emissions offset through electricity generation for the landfill comparator has been calculated next and the results are presented in table 7.6.

Item	Value
Methane captured, of which:	11,845 tonnes
- Methane flared	1,077 tonnes
- Methane leakage through gas engines	161 tonnes
- Methane used in gas engines	10,607 tonnes
Fuel input to gas engines	498,531 GJ
Power generated	49,853 MWh
Total CO_2e offset through grid displacement	17,449 tCO_2e

Table 7.6: Offset of CO_2e emissions from the export of electricity from landfill gas engines

7.38 The quantity of greenhouse gas emissions associated with the operational phase of the proposed ERF development has been assessed in accordance with the detailed methodology set out in Technical Appendix D. The quantity of fossil-derived carbon dioxide released from the combustion of waste has been calculated and the results are presented in table 7.7.

Item	Emissions
Fossil carbon in input waste	29,344 t C
Fossil derived carbon dioxide emissions	107,593 t CO_2

Table 7.7: Fossil CO_2 emissions from the combustion of waste

7.39 The amount of CO2e emissions from the release of nitrous oxide and methane from the combustion of waste has been calculated and the results are presented in table 7.8.

Item	Emissions
N_2O emissions	11.6 t N_2O
Equivalent CO_2 emissions	3,581 t CO_2e
CH_4 emissions	86.6 t CH_4
Equivalent CO_2 emissions	2,166 t CO_2e

Table 7.8: Emissions of N_2O and CH_4 from the combustion of waste

7.40 The amount of carbon dioxide released from the combustion of gasoil in the auxiliary burners has been calculated and the results are presented in table 7.9.

Item	Emissions
CO_2 emissions	2,707 t CO_2e

Table 7.9: Emissions of CO_2 from the combustion of auxiliary fuel

7.41 The amount of CO2e emissions offset through electricity generation for the proposed development has been calculated and the results are presented in table 7.10.

Item	Value
Net electricity export	28.08 MW
Net electricity exported	224,640 MWh
Total CO_2 offset through export of electricity	78,624 tCO_2e

Table 7.10: Offset of CO2e emissions from the export of electricity from the proposed development

7.42 The amount of indirect CO_2e emissions associated with the transport of waste and reagents to, and the transport of residues from the proposed ERF and the transport of waste to landfill, has been calculated and the results are presented in table 7.11.

Parameter	Tonnage (tpa)	Number of loads required (pa)	One-way distance (km)	One-way total distance per year (km)	Total emissions (CO_2e)
Waste to landfill	275,000	15,110	80	1,208,800	2,059.6
Total transport emissions – baseline					2,059.6
Waste to site	275,000	15,110	60	906,600	1544.7
IBA to disposal	49,600	1,711	110	188,210	320.7
FGT residues to disposal	10,622	392	259	101,528	173
Lime to site	5,147	188	354	66,552	113.4
Carbon to site	74	4	306	1,224	2.1
Ammonia to site	979	98	259	25,382	43.2
Fuel oil to site	277	9	50	450	0.8
Recovered metals off-site	5,100	300	5	1,500	2.6
Total transport emissions – ERF					2,200.5

Table 7.11: Indirect CO_2e emissions from transport

7.43 As stated previously, a sensitivity analysis which takes into account varying future baseline scenarios relating to landfill gas capture rate and grid displacement factors, is set out in table 7.12. It can be seen that there is a benefit and hence a significant positive effect for all landfill gas capture rate and grid displacement factor combinations.

Grid displacement factor (t CO_2e/MWh)	Landfill gas capture rate			
	75%	**68%**	**60%**	**52%**
0.35	45,633	74,449	107,382	140,316
0.32	40,543	69,206	101,963	134,720
0.28	33,757	62,214	94,737	127,259

Table 7.12: Net benefit of proposed development from sensitivity analysis

7.44 A summary of the assessment results is presented in table 7.13.

Parameter	Emissions (CO2e)
Releases from landfill gas	129,461
Transport of waste and outputs to landfill	2,060
Offset of grid electricity from landfill gas engines	-17,449
Total landfill emissions	**114,072**
Transport of waste to and outputs from the Facility	2,200
Offset of grid electricity with ERF generation	-78,624
Emissions from the ERF	116,046
Total ERF emissions	**39,622**
Net benefit of ERF	**74,449**

Table 7.13: Summary of key results from the assessment

7.45 The assessment shows that there will be a net carbon benefit of approximately 74,449 tCO_2e per annum for the ERF when compared to the baseline.

Therefore, over the lifetime of the development (assumed to be 25 years) the net carbon benefit of the proposed development will be approximately 1,861,225 tCO_2e compared to the baseline. Although a minor contributor to the benefits in comparison with the operation of the ERF, it is also worth noting that the ERF will have solar PV cells and all car parking spaces associated with the ERF will be provided with electric charging points. It can therefore be concluded that the development will have a significant positive contribution to reducing carbon emissions when compared to the baseline.

Mitigation and monitoring

7.46 As the operation of the proposed development will result in a significant positive effect when compared to the baseline, it is considered that no mitigation or monitoring is required in relation to carbon emissions associated with the proposed development.

Residual effects

7.47 The operation of the proposed development will result in a significant residual effect, as a significant positive effect has been identified from the assessment.

Cumulative effects

7.48 Chapter 5 of the ES '*Environmental issues and methodology*' includes a list of proposed or recently consented projects that require consideration as part of an assessment of cumulative impacts.

7.49 The list in Table 5.3 of Chapter 5 includes one waste project (Site 8) that involves the extension of an existing inert waste recycling facility at Burndell Road, Yapton. The proposal comprises a new building, hardstanding, car parking, boundary treatment and re-aligned access to an agricultural unit. It also includes variation to approved site landscaping and use of internal spaces within the existing materials recycling facility. This waste project will result in minor greenhouse gas emissions associated with the transport of waste to and from the site, and operational emissions associated with power consumption, lighting etc. These will be inconsequential in scale when considered in relation to the proposed development and therefore no significant cumulative effects are considered likely to arise.

7.50 Another recently proposed project is the Landings housing development; further detail is provided in Chapter 5 of the ES. If approved, this development will have associated greenhouse gas emissions during the construction phase of the project. However, a review of the planning documentation for this development indicates that greenhouse gases were not specifically considered within the EIA for the project. As the proposed ERF is considered to give rise to significant net carbon benefits and the housing development does not include an assessment of its carbon impact, it is concluded that no significant adverse cumulative effects will arise as a result of the two proposals.

Fall-back position

7.51 With regards the extant consent for a gasification plant at the same site, the EIA for the gasification plant concluded a carbon benefit of approximately 28,560 tonnes of CO_2e per annum compared to landfill. In comparison, the assessment for the proposed development has indicated a carbon benefit of approximately 74,449 tCO_2e per annum compared to landfill. Therefore, the proposed development demonstrates an improvement in carbon benefits, and hence a greater significant positive effect, compared to the previously proposed gasification plant.