DEVELOPMENT OF A SUSTAINABLE ENERGY PLANT.

KEMSLEY PAPER MILL, SITTINGBOURNE, KENT

ST REGIS PAPER COMPANY LIMITED & E.ON ENERGY FROM WASTE UK LIMITED

ENVIRONMENTAL STATEMENT

Chapter 5:

NEED AND ALTERNATIVES

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5 Need and Alternatives

5.1 Introduction

5.1.1 This chapter identifies, describes and evaluates the process and decisions underpinning the choice of location, technology and design, which define the proposal. Need and Alternatives have been considered in detail in the preparation of this Environmental Statement (ES) and the formulation of the proposals. In summary, need for the proposed Sustainable Energy Plant (SEP) is demonstrated in terms of:

- Securing a sufficient and reliable energy source for a high intensive energy user
- Significant Contribution to Renewable Energy Targets
- Diversification from fossil to low carbon energy source
- Utilising waste that would otherwise be land filled and managing waste through recovery in the waste hierarchy.

5.1.2 The energy requirements at Kemsley paper mill are currently met by the on site Combined Heat and Power (CHP) plant which is fuelled by natural gas, a fossil fuel based energy source and by a Waste to Energy from Waste plant which burns rejects from the paper making process. Both plants are owned and operated by E.ON. The mill is an intensive user of energy, consuming 55 MWe per hour of electricity and 150 MWth per hour of steam. The mill's energy cost is circa £50m per annum which represents around 25% of its turnover. The pricing of natural gas has been extremely volatile in the UK in recent years which, with the European market less de-regulated than the UK, has put Kemsley mill at a disadvantage to its European competitors. The UK paper industry as a whole has suffered of late from high and volatile energy prices and 22 paper mills have closed in the UK over the last 5 years, including three in Kent. Further, with the UK becoming more reliant upon imported natural gas, there is concern about the future security of supply of natural gas. Consequently, the price of natural gas is forecast to increase over the long term and will continue to be volatile.

5.1.3 Although natural gas will remain as a significant source of energy for the mill through the CHP, there is a clear strategic need for Kemsley mill to diversify its fuel source and to thereby reduce its reliance on natural gas. The proposed SEP will reduce its dependence on fossil fuel, improve the carbon footprint of Kemsley mill, ensure a greater degree of energy supply security and improve the competitive position of the mill.

5.1.4 The SEP will have generation capability of 48.5 MWe per hour of electricity. Under the anticipated electricity and gas pricing outlook, the SEP will usually be set up to generate 36 MWe per hour of electricity and provide in excess of 50 MWth per hour of steam to the

mill. However, if required, the SEP will be able to increase its steam provision to fulfil the mill's entire steam demand, with its electricity requirements being met from the national grid.

5.1.5 The fuel source of the SEP will be approximately 500,000 to 550,000 tonnes per annum of pre treated waste comprising Solid Recovered Fuel waste, Commercial & Industrial waste and pre treated Municipal Solid Waste, together with some of the paper making process rejects from the mill which are currently sent to landfill. The plant may accept up to approximately 25,000 tonnes of waste plastics from the paper mill which would otherwise be landfilled (included within the above).

5.1.6 The SEP therefore has the dual role of an energy generating station and a waste management facility.

5.1.7 The source of those pre treated wastes has yet to be determined. Subject to appropriate fuel supply agreements, It is anticipated that pre treated waste will be sourced from Kent with the balance from London, the South East and elsewhere in the UK subject to commercial viability. The SEP will use Energy from Waste Technology to recover energy from waste which would otherwise be landfilled. The process is by definition waste recovery rather than disposal, and the bio-degradable fraction would be regarded as a renewable energy source.

5.1.8 In this context, the need for the development is demonstrated in the context of the need for energy security, diversification of fuel supply and low carbon energy sources, renewable energy targets and diverting waste from landfill.

5.1.9 In the context of the need for the proposed development, the alternative site appraisal focuses its considerations to sites that could meet this need.

5.2 Need for the Development

5.2.1 Whilst Planning Policy Statement 23: Planning and Pollution Control, at Annex 1 paragraph 1.54, states:

"applicants do not normally have to prove a need for their proposed development, or discuss the merits of alternative sites," Paragraph 1.54 provides that the nature of polluting or potentially polluting developments and the national or regional need for them, or the location of a proposal in an environmentally designated or sensitive area may make the availability, or lack of availability, of suitable alternative sites material to the planning decision.

5.2.2 Paragraph 1.55 provides:

"Environmental Statements, which must accompany applications where EIA is considered necessary, should identify matters that will be relevant to the determination of the application. Where alternatives are considered, they must include an outline of the main options examined by the applicant and an indication of the most important reasons for the choice, taking into account the respective environmental effects and other relevant matters".

5.2.3 Planning Policy Statement 10: Delivering Sustainable Waste Management, in respect to the demonstration of need states: (paragraph 22), "*Development plans form the framework within which decisions on proposals for development are taken. It is important that plans are kept up to date and properly reflect national policy. When proposals are consistent with an up to date development plan, waste planning authorities should not require applicants for new or enhanced waste management facilities to demonstrate a quantative or market need for their proposal*".

Energy

5.2.4 In terms of energy, PPS: Planning and Climate Change (paragraph 20) provides that applicants are not required to demonstrate overall need for renewable energy, nor the need to locate renewable energy in a particular location. That said, there is a clear demonstrable need for the proposed Sustainable Energy Plant, in terms of renewable energy, diversification from fossil fuels, and the needs of the Paper Mill in terms of securing a sufficient and reliable energy supply.

Renewable Energy

5.2.5 EU Directive 2009/28/EC (the Renewable Energy Directive) sets out a mandatory target for the EU to achieve 20% of all its energy from renewable energy sources. In order for the EU to achieve this overall mandatory target the UK must ensure that its own binding target of 15% of its own energy supply comes from renewable energy. The Renewable Energy Strategy puts the enormity of this challenge into context by confirming this represents "almost a seven fold increase in scarcely more than a decade."

5.2.6 In response to meeting this binding target the Renewable Energy Strategy sets out to achieve 30% of all electricity and 12% of all heat to be sourced from renewable energy sources and confirms that there is sufficient biomass resource potential in the UK to meet its 2020 EU renewable energy target.

5.2.7 In respect to meeting the target, the Renewable Energy Strategy sets out the need to use more sustainable bioenergy, and at paragraph 4 of the Executive Summary states "*We will*

ramp up the supply and use of biomass for heat power, and transport….through increasing supply…and making better use of biomass waste". It goes on to state that around 30% of the UK's renewable energy target could come from bioenergy for heat and power.

5.2.8 With respect to this national target PPS22 paragraphs 2 and 3 set out that regional renewable energy targets should be expressed in Regional Spatial Strategy, but that these target should be regularly reviewed and revised upwards if met so long as there is renewable energy resource and environmental capacity.

5.2.9 The South East Plan policy NRM13 sets out that the minimum of installed capacity of renewable energy should be 620MW by 2010 or 5.5% the Regions Electricity Generation Supply, and 1,130MW by 2020 or 10% of the Regions Electricity Generation Supply. The South East Plan policy NRM14 sets out a Renewable Energy Target for Kent of 111MW by 2010 and 154MW by 2016.

Table 5.1 Regional Renewable Energy Targets and Capacity

	SEP 2010 Target (MW)	Predicted 2010 Installed Capacity (MW)	SEP 2016 Target (MW)	SEP 2020 Target (MW)	Overall shortfall in Installed Capacity (MW)
Kent	111	119.57	154	N/A	34.43
South East	620	767.40	895	1,130	362.6

5.2.10 According to South East Energy Statistics in August 2009, the installed capacity for the South East was 767.40 MW and for Kent was 119.57MW. The statistics also show that although the 2010 targets for both the Region and sub Region will be exceeded should all the committed sites (those with planning permission but not built) be installed, the installed capacity will remain significantly short of the respective 2016 (895MW) and 2020 (1,130MW) South East Region target, or the 2016 (154MW) Kent Sub- Region target.

5.2.11 PPS22 confirms at paragraph 3 that reaching the targets is not in itself a reason for refusing planning permission. However, there remains a deficit in renewable energy capacity at both the Regional and Sub-Regional level. The proposed development would therefore make a significant contribution to the National, Regional and Sub-Regional renewable energy requirements. There is therefore a quantifiable need for renewable energy generated by proposed Sustainable Energy Plant.

Diversification from Fossil Fuels

5.2.12 The Climate Change Act 2008 (CCA) sets out a binding target to reduce greenhouse gas emissions to 80% below those of the 1990 levels, by 2050. In order to ensure that the target is achieved the CCA, requires the UK Government to set 5 year carbon budgets which set out binding targets for reduction in green house gas. The first three carbon budgets have been set and require a 34% reduction in green house gas relative to the 1990 level by 2022.

5.2.13 EU Directive 2009/29/EC requires at least a 20% reduction in the EU's greenhouse gas emissions relative to the 1990 level, by 2020.

5.2.14 The UK Biomass Strategy identifies that Biomass is a renewable energy source that has the potential to make a valuable contribution to heat and electricity generation as a low carbon, sustainable replacement for fossil fuels. It also identifies that at present 90% of the UK's energy needs are met by fossil fuels. As such, it sets out the UK Government intends a major expansion in the supply and use of Biomass so as to contribute to the delivery of the UK's climate change and energy policy goals.

5.2.15 The UK Low Carbon Transition Plan sets out to ensure that 40% of all electricity to come from low carbon sources such as Biomass by 2020. It sets out that without intervention by 2020 the UK would need to import 60% of the gas it uses, but that its planned to decarbonise the UK economy through measures including meeting its renewable energy targets, this would reduce the predicted gas imports to 45%; therefore, amongst other measures, renewable energy sources such as biomass would lead to a 15% decline in gas requirements

5.2.16 PPS1: Planning and Climate Change confirms tackling climate change is a key Government policy for the planning system, and that planning authorities should ensure that the Government's Climate Change Programme and energy policy is delivered through spatial strategies.

5.2.17 The proposed Sustainable Energy Plant would ensure that the Paper Mills reliance on fossil fuels is reduced, and therefore, help to reduce the production of greenhouse gas emissions, and in so doing make a significant contribution to the government's targets.

Security of Energy Supply and the Needs of St. Regis.

5.2.18 The UK Low Carbon Transition Plan forecast (page 28) advises that the global energy demand is forecast to increase by 45% between 2006 and 2030, with almost 80% of the increase coming from fossil fuels. In this respect, at present 90% of the UK's energy needs

are met by fossil fuels. In terms of gas, in 2008 the UK imported 25% of that it used. This is predicted to rise to 60% by 2020 owing to increase demand and decreased domestic reserves.

5.2.19 The Renewable Energy Strategy (RES) therefore proposes a radical increase in the use of renewable energy in a move towards energy efficiency and a security of energy supplies, without which the cost of energy would increase or the supply may decrease. The RES (Paragraph 1.7) aims to reduce reliance on imports and reduce the overall fossil fuel demand by 10% and gas imports by 20-30% what they would been in 2020. The UK Low Carbon Transition plan identifies that the increased use of renewable energy could help to reduce the reliance on imported gas from 60% to 45%.

5.2.20 The process at the Kemsley Paper Mill is highly energy intensive currently consuming approximately 55MWh of electricity and 150MWh of heat. The source of this energy is currently a gas-fired Combined Heat and Power plant together with heat provided by an Energy from Waste plant consuming the rejects from the paper making process. At present there is no other source of energy to the plant. The purpose of the proposed SEP is therefore to reduce the Kemsley Paper Mill's plants reliance on the gas-fired CHP plant, and replace some of the heat energy from it with a renewable energy source in the form of biomass fuelled by pre treated waste.

5.2.21 In this context, given the energy intensive nature of the Paper Mill operation, and its current reliance on gas, the proposed SEP is needed to reduce the dependence on a non-renewable energy source the supply of which may not be secure in the long term.

Waste

5.2.22 The proposed SEP would be fuelled through the combustion of pre- treated waste comprising a mixture of Commercial and Industrial, Municipal Solid Waste and Solid Recovered Waste.The power generation capability of the SEP will supply in excess of 50MWth per hour of steam to the paper mill. Dependent upon its calorific value, the SEP will import as its feed stock approximately 500,000 to 550,000 tonnes per annum of pre treated waste comprising Solid Recovered Fuel waste, Commercial & Industrial waste and Municipal Solid Waste, may and may include up to approximately 25,000 tonnes of paper making process rejects from the mill which are currently sent to landfill. The source of those pre treated wastes has yet to be determined. It is anticipated that pre treated waste will be sourced from Kent with the balance from London, the South East and elsewhere in the UK subject to commercial viability.

5.2.23 Planning Policy Statement 10: Delivering Sustainable Waste Management, in respect to the demonstration of need states: (paragraph 22):

"*Development plans form the framework within which decisions on proposals for development are taken. It is important that plans are kept up to date and properly reflect national policy. When proposals are consistent with an up to date development plan, waste planning authorities should not require applicants for new or enhanced waste management facilities to demonstrate a quantitative or market need for their proposal*".

5.2.24 Draft National Policy Statement for Renewable Energy Infrastructure sets out that an assessment of the waste combustions plants conformity with the waste hierarchy and the effect on the relevant regional waste plan should be made.

5.2.25 Article 4 of the Waste Framework Directive 08/98/EC sets out that the following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy:

- Prevention
- Preparing for re-use
- Recycling
- Other recover e.g. energy recovery; and
- Disposal

5.2.26 The Waste Framework Directive (at Annex II, R1) defines waste recovery operations as those which principally use waste as a fuel or other means to generate energy including incineration facilities using MSW where the facility has an efficiency rating of 65% and over. The proposed development is therefore classified as an energy recovery facility.

5.2.27 The National Waste Strategy is part of the implementation for England of the requirements within the Framework Directive on Waste, and associated Directives to produce waste management plans. The European Landfill Directive (Council Directive 1999/31/EC) sets targets for the reduction of biodegradable municipal waste sent to landfill. These targets were firstly incorporated into the National Waste Strategy (Waste Strategy 2000). Since that time the National Waste Strategy has been taken forwards to the Waste Strategy for England 2007 issued in June 2007.

5.2.28 The Waste Strategy 2007 (WS2007) sets out the Government's key objectives:

- *Decouple waste growth (in all sectors) from economic growth and put more emphasis on waste prevention and re use;*

- *Meet and exceed the Landfill Directive diversion targets for biodegradable municipal waste in 2010, 2013 and 2020;*

- *Increase diversion from landfill of non municipal waste and secure better integration of treatment for municipal and non municipal waste;*

- *Secure the investment in infrastructure needed to divert waste from landfill and for the management of hazardous waste; and,*

- *Get the most environmental benefit from that investment through increased recycling of resources and energy recovery from residual waste using a mix of technologies.*

5.2.29 The WS2007 reinforces the importance of the waste hierarchy whereby landfill is treated as the option of last resort, with an emphasis upon reduction in waste generation followed by reuse and recycling and recovery of value. Despite the hierarchy, the majority of UK waste is still being disposed of through landfill. The WS2007 establishes the following Waste Hierarchy:

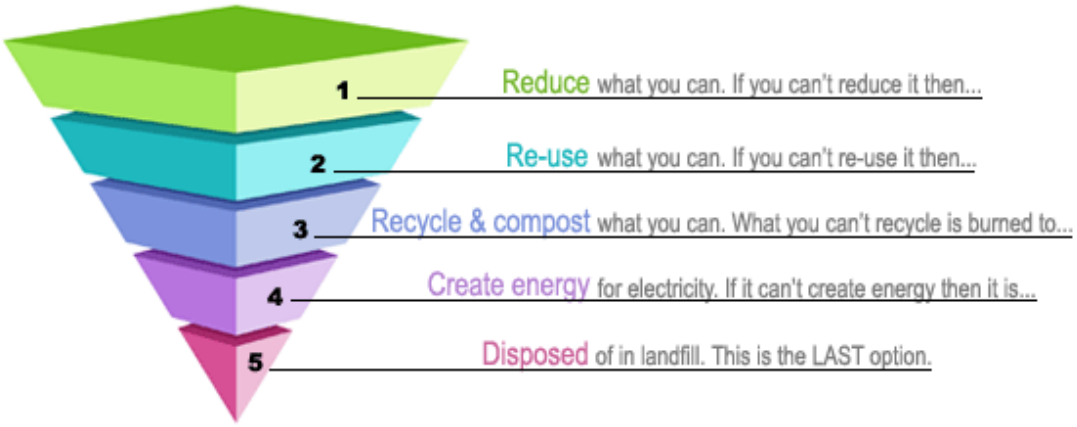


Fig.5.1: Waste Hierarchy

5.2.30 The key landfill targets in WS2007 are:

- *To reduce the amount of industrial and commercial waste land filled to 85% of 1998 levels by 2005,*
- *Commercial and waste land filled falling by 20% by 2010 compared to 2004*
- *To reduce the amount of biodegradable municipal waste that is land filled to 75%, 50% and 35% of 1995 levels by 2010, 2013 and 2020 respectively.*

5.2.31 A key lever is the Landfill Allowance Trading Scheme (LATS). Introduced as part of the Waste and Emissions Trading Act in 2003, a statutory limit on the amount of Biodegradable Municipal Waste (BMW) that can be sent to landfill by waste authorities in each year between 2005 and 2020 has now been imposed. The Landfill Allowances Trading Scheme (LATS) requires all Waste Disposal Authorities to reduce the materials sent to landfill, trade

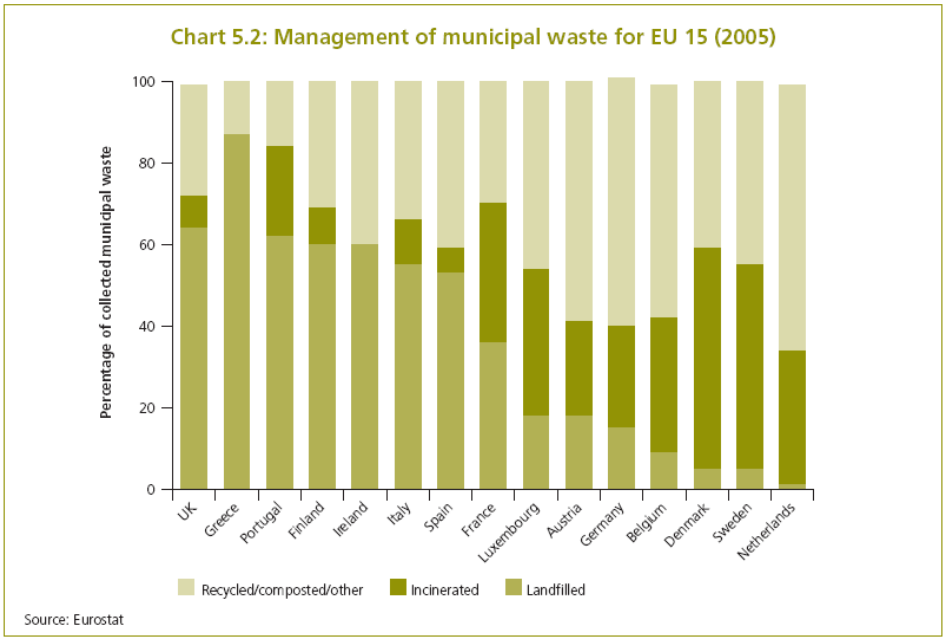
permits with other better performing authorities, or risk a fine of £150 per tonne for any biodegradable municipal waste sent to landfill over the set limit.

5.2.32 Increased national targets were set in WS2007, compared to that of the Waste Strategy 2000:

- *To recover value from 53% of municipal waste by 2010, 67% by 2015, and 75% by 2020;*
- To recycle or compost at least 40% of household waste by 2010, 45% by 2015, and 50% by 2020.

5.2.33 The WS2007 further emphasises:' [Chapter 5 paragraphs 5, 17]:
'*recovering energy from waste which cannot sensibly be reused or recycled is an essential component of a well balanced energy policy*"

5.2.34 However, WS2007 also makes it clear that it is important that energy recovery does not crowd out recycling and the Government points out [Chapter 5 paragraph 23]. It states:
'*evidence from neighbouring countries, where very high rates of recycling and energy from waste are able to coexist, demonstrates that a vigorous energy from waste policy is compatible with high recycling rates*'.(see chart below)



5.2.35 The Regional Spatial Strategy (South East Plan) derives its targets from the Regional Waste Strategy and sets the most stringent targets with respect to the waste hierarchy. As part of the statutory development plan the extent to which development comply with the targets carries considerable weight.

5.2.36 RSS policy W5 sets out the relevant recovery targets (which include the recycling and composting targets), sets out a regional variation of the waste hierarchy, and sets the landfill disposal target for the South East. It states:

"A substantial increase in recovery of waste and a commensurate reduction in landfill is required in the region. Accordingly, the following targets for diversion from landfill of all waste need to be achieved in the region (Policy W6 targets are a component of these):

Year	*MSW*	*C&I*	*C&D*	*All Waste*	
	Mt/yr	*Mt/yr*	*Mt/yr*	*Mt/Yr*	*%*
2008	*2.0*	*5.2*	*10.0*	*17.2*	*68*
2010	*2.5*	*5.8*	*10.1*	*18.4*	*71*
2015	*3.9*	*7.4*	*10.4*	*21.7*	*79*
2020	*4.7*	*8.7*	*10.7*	*24.0*	*84*
2025	*5.1*	*9.4*	*10.9*	*25.5*	*86*

Regional Targets for Diversion from Landfill.

Source: Regional Waste Management Capacity: Survey, Methodology and Monitoring, Updated Final Report, 2008 (modelled Scenario 1)

Note: Percentage targets for diversion from landfill in the year 2008 have been interpolated.

Waste planning authorities (WPAs) should ensure that policies and proposals are in place to contribute to the delivery of these targets, and waste management companies should take them into account in their commercial decisions. The optimal management solution will vary according to the individual material resource streams and local circumstances and will usually involve one or more of the following processes:

- *re-use*
- *recycling*
- *mechanical and/or biological processing (to recover materials and produce compost,*
- *soil conditioner or inert residue)*
- *thermal treatment (to recover energy)*
- *priority will be given to processes higher up this waste hierarchy.*

WPAs should continue to provide sufficient landfill capacity to process residues and waste that cannot practicably be recovered."

5.2.37 RSS policy W6 sets out the Recycling and Composting target for the South East. It states:

"The following targets for recycling and composting should be achieved in the region:

Year	Municipal Solid Waste		Commercial and Industrial		Construction and Demolition		All Waste	
	mt/yr	%	mt/yr	%	mt/yr	%	mt/yr	%
2008	1.6	36	3.9	46	5.8	48	11.3	45
2010	1.9	40	4.5	50	6.1	50	12.9	50
2015	2.6	50	5.5	55	6.1	50	15.0	55
2020	3.1	55	6.4	60	7.3	60	17.1	60
2025	3.6	60	7.3	65	7.3	60	19.1	65

Regional Recycling and Composting Targets

Source: Regional Waste Management Capacity: Survey, Methodology and Monitoring, Updated Final Report, 2008 (modelled Scenario 1)

Note: Percentage targets for diversion from landfill in the year 2008 have been interpolated. Waste authorities should adopt policies and proposals to assist delivery of these targets and waste management companies should take them into account in their commercial decisions."

5.2.38 Tables 5.2 and 5.3 below (derived from *Regional Waste Management Capacity: Survey, Methodology and Monitoring, (modelled Scenario 1 as Updated in February 2009 by ERM Consulting on behalf of SEERA)* show the quantities of C&I and MSW waste that would otherwise have to be disposed of by landfill in both Kent and the South East assuming that there is sufficient recycling and composting capacity to deliver the respective RSS targets. At the present time there is insufficient recycling and composting capacity to deliver the respective RSS targets within both Kent and the South East Region (with the exception of 2010 where a Regional surplus of capacity of approximately 638,700 tonnes per annum is predicted). Accordingly, until the level of capacity is increased there will further waste available than shown in the tables.

Year	MSW Arising (kTPA)	RSS Recycling and Composting Target (%)	Remaining Post-RSS Target MSW (kTPA)	C&I Arising (kTPA)	RSS Recycling and Composting Target (%)	Remaining Post-RSS Target C&I (kTPA)	Total Combined Remaining Post-RSS Target MSW + C&I (kTPA)
2010	839	40	503.4	2,067	50	1,033.5	1,536.9
2015	927	50	463.5	2,282	55	1,026.9	1,490.4
2020	998	55	449.1	2,458	60	983.2	1,432.3
2025	1,076	60	430.4	2,583	65	904	1,334.4

Table 5.2: Potential Landfill Waste Kent

Year	MSW Arising (kTPA)	RSS Recycling and Composting Target (%)	Remaining Post-RSS Target MSW (kTPA)	C&I Arising (kTPA)	RSS Recycling and Composting Target (%)	Remaining Post-RSS Target C&I (kTPA)	Total Combined Remaining Post-RSS Target MSW + C&I (kTPA)
2010	4,737	40	2,842.2	8,983	50	4,491.5	7,333.7
2015	5,230	50	2,615	9,918	55	4,463.1	7,078.1
2020	5,634	55	2,535.3	10,685	60	4,274	6,809.3
2025	6,070	60	2,428	11,230	65	3,930.5	6,358.5

Table 5.3: Potential Landfill Waste South East

5.2.39 Table 5.2 shows that in Kent the amount of waste that would otherwise be landfilled is predicted to be between 1,536,000 (tonnes per annum) in 2010 and 1,334,400 (tonnes per annum) in 2025. Table 5.2 shows that in the South East Region the amount of waste that would otherwise be landfilled is predicted be between 7,333,700 (tonnes per annum) in 2010 and 6,358,500 (tonnes per annum). It is, therefore, considered that there is significant quantity of waste available within Kent and the South East to provide fuel to the proposed SEP, without adversely affecting the waste hierarchy. In accordance with the waste hierarchy the Sustainable Energy Plant is needed to ensure the waste is recovered rather than disposed of to landfill.

5.2.40 The Kent Joint Municipal Waste Management Strategy issued in 2007 notes that in 2005/2006 Kent residents produced approximately 812.830 tonnes of Municipal Solid Waste

(paragraph 2.1). In respect to energy recovery, the Strategy (paragraph 2.4) notes that recovery is the capture of value from residual waste, usually in the form of energy and the Allington Waste management Facility incorporates an energy from waste plant. Kent County Council has agreed a long term contract with the operators Kent Enviropower. Policy 8 states "In conjunction with the management of municipal waste the Kent waste partnership will achieve a minimum level of 40% recycling and composting of household waste by 2012/13 and will seek to exceed this target".

5.2.41 The subtext to Policy 14 notes that there may be opportunities for achieving economies of scale through the co management of MSW with commercial agricultural and other wastes with similar characteristics to MSW. However the strategy seeks to avoid the import of waste into Kent for recovery and disposal.

5.2.42 The Strategy at 4.6.2 notes that a proportion of Kent's MSW will continue to be land filled. Landfill capacity in Kent is in short supply, and will continue to be required for the disposal of residual wastes in the long term. Constraints on landfill capacity may make other treatment routes more attractive for the proportion of MSW that the County could continue to landfill after meeting its statutory obligations. Policy 19 provides '*that where it is cost effective, Kent will exceed its statutory targets for diversion of biodegradable municipal waste from landfill in order to preserve landfill void space in the County. Kent will procure landfill capacity to meet the need for the disposal of residual waste for which recovery capacity is not contracted* '

5.3 Alternatives

5.3.1 The consideration of alternatives stems primarily from the EIA Regulations. The Regulations identify the information for inclusion within the Environmental Statement. Part 1(2) and 2(4) include:

"An outline of the main alternatives studied and an indication of the main reasons for this choice taking into account the environmental effects".

5.3.2 Paragraph 83 of Circular 2/99 which accompanies the Regulations note that:
"Although the Directive and the Regulations do not expressly required the developer to study alternatives the nature of certain developments and their location may make the consideration of alternatives a material consideration…

5.3.3 The following sections address the consideration of alternative sites.

Alternative Sites

5.3.4 An Alternative Site Report has been prepared and is set out within Appendix 5.1. The following section based upon the reporting sets out the methodology and conclusions of the assessment of alternative sites.

Site Selection Criteria

5.3.5 RPS Planning and Development alternative site assessments methodology has been applied for similar proposed developments undertaken across the UK for a range of clients in the waste and energy industry. This methodology reflects recent national planning guidance on site identification contained within Planning Policy statement 10 (PPS10) and its Companion Guide.

5.3.6 However, whilst it is recognised that consideration of location for waste management facilities is to be viewed in the wider context of considerations including, right place, the right time and right technology and communities taking responsibilities for their own waste, this has in addition also to be seen in the context of the viable generation of sustainable energy for the paper mill which has specific locational requirements. This is especially pertinent given that the proposed SEP would utilise waste that would otherwise be landfilled. In addition the SEP will utilise some on site waste arising from the papermaking process. The proposed SEP therefore promotes self sufficiency.

5.3.7 In selecting a suitable site, it has to be demonstrated that it is able to provide a viable point for the delivery of energy to the paper mill, taking into account its actual availability and the intervening land to accommodate the pipeline infrastructure.

5.3.8 In the light of these requirements, the Alternative Site Report focuses on potential and allocated sites identified within the adopted Kent Waste Local Plan and Swale Borough Local Plan, then undertakes a comparative analysis of potentially alternative sites located within 2km of the St Regis Paper Mill. This distance reflects the developers maximum preferred distance from the paper mill for the transport of steam by pipeline. The appraisal uses a non numeric system of scoring having regard to environmentally based planning criteria which relate to: planning vision, sensitive human receptors, landscape and visual consideration, potential impacts on natural environment, potential impacts on historic environment and built heritage, road access, rail and water transport, energy utilisation, flood risk and ground water vulnerability, Aerodrome Safeguarding Zones, Air Quality Management Areas.

5.3.9 The proposal site, Kemsley Paper Mill East (8) compared as favourably with the assessment criteria as a number of other sites. Overall, no site compared better with the assessment criteria than the proposed site.

5.3.10 Furthermore, The Sequential Approach set out by PPS25 seeks to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate for the type of development proposed. In this respect, the assessment has concluded that 3 sites (including the proposal site) would be appropriate for the development proposed.

5.3.11 Of the three sites that are appropriate in flood terms, the proposal site performs better than the other two against the remaining assessment criteria.

5.3.12 Additionally, there are two other valid considerations that weigh in favour of the site given its proximity to the Paper Mill. These relate to the proximity of the proposed site to the Paper Mill which the SEP will serve.

5.3.13 Firstly, the site as proposed is located within the land owned by the applicant and there is no requirement to acquire third party land. This ensures that not just the site for the SEP is available but the land between SEP and the Paper Mill is available immediately with out the need to assemble ownership consent for the pipe line.

5.3.14 Secondly, given the proposed site is closest to the Paper Mill than any other site, the infrastructure and land assembly cost will compare more favourably than any other site, and therefore, ensure that the SEP can deliver the energy to the Paper Mill as viably as possible.

5.3.15 In summary, the reasons for the choice of the proposed site are therefore summarised as follows:

(a) The development incorporating mitigation measures will not result in likely significant effect upon environmental considerations.
(b) The proposal site is located so as to be integral with the paper mill. This ensures the viability of the proposed development is maximised both in terms of infrastructure costs and minimisation of costs associated with the pipeline.
(c) The site is within the applicants ownership and no third party land or rights are required.
(d) The site is appropriate for the proposed development in respect to Flood Zoning and the provisions of PPS25.

(e) The site is a suitable site for the proposed development in that it has been previously used for storage. It is accessible by existing transportation infrastructure. It is located within an industrial area which is allocated for employment purposes within the Development Plan. The site is appropriate in terms of flood risk, and relates well to waste arisings. The site will enable the delivery of a more secure and renewable energy source to the Paper Mill.

Alternative Technology

5.3.16 The waste material is burned with an excess of air that is continuously drawn from above the waste bunker, providing a source of odour control. Primary air is generally fed through the grate with a secondary air supply above the grate to create turbulence.

5.3.17 Moving grate systems produce two residues, bottom ash and fly ash which is transported to the same silo as the Flue Gas Treatment residues. Bottom ash has the potential to be reused as an aggregate and for the proposed plant a dedicated ash processing plant is included to promote the suitability of the residue for this application.

5.3.18 All moving grate plant burning waste or waste derived fuels will be required to be designed and operated in accordance with the requirements of the Waste Incineration Directive (WID) 2000, including meeting the stringent limits on emissions to air.

Fluidised Bed

5.3.19 Fluidised Bed (FB) technology operates by feeding the waste material onto a bed of 'fluidised' sand particles where combustion is thermally more efficient than conventional technologies such as moving grate. The fluidised bed technology requires a homogenous feedstock. In this respect fluidised bed would be suited to the SRF waste material proposed that would comprise approximately 60% of incoming waste materials since further pre-treatment (sorting, crushing, shredding) prior to combustion taking place would possibly not be required. However, the incoming waste stream proposed for this facility will also comprise a further stream of C&I waste and MSW, both of which would require additional pre-treatment if fluidised bed technology was used.

5.3.20 Similar to a moving grate plant the requirements of the WID will apply fluidised bed plant burning waste or waste derived fuels and consequently the plant will need to be designed and operated to meet the WID.

5.3.21 Fluidised bed technology is capable of achieving somewhat lower NOx emissions in the raw gas than are typically achievable in moving grate systems. This is achieved through lower bed temperatures thus reducing thermal NOx formation. However, additional abatement using either Selective Catalytic Reduction (SCR) or Selective Non Catalytic Reduction (SNCR) will still be required to guarantee WID compliance.

5.3.22 Additional raw materials are required in the form of sand within the fluidised bed system.

5.3.23 Solid waste streams from the process typically include bottom ash, cyclone ash (usually mixed with the bottom ash), and APC residues. Due to the addition of sand for fluidisation, waste residues may be higher for FB systems. As for moving grate plant, the bottom ash can be reused as an aggregate.

5.3.24 Fluidised Bed technology is employed in Europe and elsewhere, including in the UK, where it is operational both at Allington in Kent and in Scotland at Baldovie, Dundee. The larger Allington plant has three lines with a combined capacity of approximately 500,000 tpa. UK experience with fluidised bed plant experience is reported as problematic with both Dundee and Allington having experienced significant downtime.

Gasification

5.3.25 Gasification is the partial thermal degradation of a substance in the presence of oxygen but with insufficient oxygen to oxidise the waste material completely. This process produces gaseous fractions known as ‘synthesis gas’ or ‘syngas’, primarily a combination of carbon monoxide, hydrogen and methane. The synthesis gas offers the potential to be utilised in a number of ways, including combustion in engines, steam raising boilers or other energy conversion processes, subject to gas quality and legislative requirements.

5.3.26 Gasification is reported by some as offering the opportunity for higher efficiency electrical generation compared to conventional combustion technologies. However, to achieve this, the syngas needs to be burnt in a turbine specifically designed to burn low calorific value syngas and in practice it will be necessary to provide clean up of the syngas and these processes both consume and lose energy. The overall efficiency achieved is therefore lower than for conventional combustion of waste materials [1].

5.3.27 Operationally to obtain consistent gas quality a homogeneous incoming waste stream with a high organic content is required and therefore this technology is better suited to applications where the incoming waste material has been pre-treated and therefore the proposed waste

material could be suited to this application, subject to pre-treatment of all the incoming waste streams.

5.3.28 The process requires energy input from supplementary combustion, likely to be using either natural gas or low sulphur oil, to achieve the temperature required for thermal treatment. Typical temperatures for gasification would be above 750°C.

5.3.29 Ash and char are also produced from the gasification process. The ash from some gasification plant is suitable for re-use as an aggregate material. Residues from exhaust gas cleaning, similar to those from conventional combustion plant would be disposed of as hazardous waste.

5.3.30 Combustion of the fuels from the gasification stage will be subject to the requirements of the WID. To ensure compliance with emission limits these emissions will require treatment and generally similar abatement to that applied to conventional plant will be required [2].

5.3.31 Currently there is limited experience of gasification technology employed for the treatment of waste materials, with only a few applications in Europe, where experience has proven mixed or is limited. There are a number of planned facilities in the UK, for industrial/commercial waste streams, or pre-treated waste such as the proposed Novera plant in East London (now owned by Biossence) that will treat just over 100,000 tonnes per annum of solid recovered fuel (SRF) in a single line facility. It may be cost effective at small scale and it may scale on a modular basis, although its presence in the market is not well established.

5.3.32 Although there are plans for larger scale facilities in the UK, it remains uncertain as to whether these schemes will be successfully financed and ultimately brought into operation. It is also noted that although larger schemes are proposed elsewhere, these plants would not meet the steam requirements of the St Regis Paper Mill.

5.3.33 Proven availability remains an issue for the technology, which raises questions over the fate of the feedstock during periods of downtime. There is limited alternative for feedstock when the plant is unavailable and it can be assumed that the feed material would be diverted to landfill or an alternative thermal treatment facility.

Pyrolysis

5.3.34 Pyrolysis is the thermal degradation of a substance in the absence of added oxygen. Pyrolysis also offers the potential option of more innovative use of the pyrolysis syngas other than immediate combustion to produce heat. The process requires energy input from a

combination of waste heat from the process and supplementary combustion, likely to be using either natural gas or low sulphur oil, to achieve the temperature required for thermal treatment. Typical temperatures for pyrolysis are between 300-800°C [3].

5.3.35 As with gasification combustion of the fuels will be subject to the requirements of the WID and to ensure compliance with emission limits these emissions will require treatment, generally using similar abatement to that applied to conventional plant [2].

5.3.36 Solid residues from pyrolysis plant have a high carbon content. Unlike combustion bottom ash or the residue from some gasification plant this material will require landfilling or further treatment. Residues from exhaust gas cleaning would require disposal to hazardous landfill.

5.3.37 As for gasification there is limited experience of the application of pyrolysis technology for the treatment of MSW materials, its presence in the market is not well established and its commercial application is limited. It is being tested in a size range of up to 30,000 tonnes per annum, with pre-prepared waste material. It therefore cannot be considered to be fully proven at the current time, particularly at the scale proposed for the Kemsley Site.

5.3.38 Proven availability remains an issue for the technology. There is limited alternative for feedstock when the plant is unavailable and it can be assumed that the feed material would be diverted to landfill or an alternative thermal treatment.

5.3.39 To obtain consistent gas quality, a less heterogeneous incoming feed stream is required and some pre-treatment is therefore necessary.

Plasma Arc Gasification

5.3.40 Plasma arc gasification technology transforms high calorific waste streams into synthesis gas and a vitrified slag by means of thermal plasma. The plasma is a mixture of electrons, ions and neutral particles (atoms and molecules).

5.3.41 It is reported by some as achieving a greater level of environmental performance in terms of energy production, emissions and residues. To date the process has been used mainly to treat hazardous wastes including organics, metals, PCBs (including small-scale equipment) and HCB.

5.3.42 Plasma Arc technology produces very high temperatures to destroy waste materials (5,000 to 15,000 °C). It involves passing a large electric current though an inert gas stream. Under these conditions, hazardous contaminants, such as PCBs, dioxins, furans, pesticides, etc, are

broken into their atomic constituents, by injection into the plasma. Care should be taken when cooling the gas stream to avoid reformation of dioxins/furans.

5.3.43 The high temperature and oxygen starved environment is used to decompose the feed material into simple molecules as CO, CO_2, H_2, CH_4, etc., and also ash and slag.

5.3.44 Whilst plasma arc gasification is an established technology, the process can be very complex, expensive and operator intensive. There would be significant challenge in achieving the very high temperature throughout a solid waste mass at large scale and this is a practical constraint for scaling the application. To date, most applications of Plasma Arc technology for wastes or waste derived fuels have only been carried out on an R&D or demonstration basis at small scale and therefore the technology has not been proven on a commercial basis. It is not considered proven for scale up to the size of the proposed facility and is therefore discounted from further consideration.

Biological Treatment (Anaerobic Digestion (AD))

5.3.45 Biological treatment processes are designed to degrade biogenic waste materials and are best suited to waste streams which have undergone segregation to comprise of kitchen wastes, garden wastes, agricultural wastes (including slurries), sewage sludge etc.

5.3.46 The process gives rise to a number of outputs including biogas, digestate and floc. The biogas can be collected and subsequently burned to generate energy either onsite or offsite. Outlets for the other residues include land spreading (although for the digestate fraction this may need pre treatment), incineration or co-mingling with compost.

5.3.47 The proposed facility is being designed to provide heat and power security to the paper mill and consequently any biological solution would also need to provide a means to generate both heat and power.

5.3.48 For the waste streams to be handled at the facility further waste segregation would be required to separate out those fractions suited to biological treatment from those which are unsuitable. The remaining wastes unsuitable for biological treatment would themselves requiring further treatment (separation of recyclables followed by either landfill or incineration of the residual material).

5.3.49 For the SRF element of the waste stream some biological treatment may have already been carried out on the material thereby reducing the benefits from further biological treatment of this material.

5.3.50 In order to meet the required steam demand via an AD solution would necessitate significant additional processing plant to include the required separation and feedstock quality. The volumes of waste handled would also be considerably higher to provide sufficient waste to yield the volume of biogas required to generate the steam demand desired by the Kemsley Paper mill. Further given the waste sorting activities required for the AD solution, residue generation (i.e. recyclables and other wastes unsuited to AD processing and solid residues from the AD plant itself) would be increased compared to that from the proposed combustion solution. The current proposals to satisfy the need from St Regis paper to secure future energy supplies would move from an energy solution based on combustion of waste to the installation of an integrated waste management facility including a more complex range of waste management activities incorporating energy generation as one element. The combined effect of this would be to significantly increase traffic movements and associated environmental impacts and increase the land take requirements.

5.3.51 Overall an AD solution is not considered suitable for the proposed location on the basis traffic effects, land take requirements and need to implement significant addition processing plant against only potentially small atmospheric emission release benefits.

Landfill

5.3.52 Whilst landfill would be an alternative option for the SRF and other waste input materials, this option would not generate energy from the material and therefore would not meet the fundamental requirements for heat and electricity, which is driving the need for the proposed facility. Further, landfill presents a number of environmental issues and for some time has been recognised as an unsustainable option for waste management. Consequently, landfill cannot be considered as a practical alternative to the proposed facility.

Persistent Organic Pollutants (POPs)

5.3.53 As already highlighted, the EU Persistent Organic Pollutants (POPs) Regulations 2004, Article 6(3) require that Member States shall, when considering proposals to construct new facilities or significantly to modify existing facilities using processes that release chemicals

listed in Annex III [1], without prejudice to Council Directive 1996/61/EC, give priority consideration to alternative processes, techniques or practices that have similar usefulness but which avoid the formation and release of substances listed in Annex III. The EU POPs Regulations implement amongst other requirements the obligations agreed under the Stockholm Convention on Persistent Organic Pollutants.

5.3.54 Of the options discussed above only Anaerobic Digestion and landfill can be considered as options which avoid producing POPs. For the other options considered, thermal treatment at high temperatures will achieve destruction of POPs present in the incoming waste stream, however, subsequent cooling of the gases can give rise to reformation and hence abatement is applied to control atmospheric releases. POPs releases are controlled in thermal processes burning waste to the low levels prescribed within the Waste Incineration Directive, 2000. Abatement used to achieve these limits will transfer the majority of POPs from exhaust gases into solid residues (APC Residues), although only low amounts of POPs are released within bottom ash residues. The disposal route for APC residues typically involves treatment or permanent disposal (e.g. to landfill or deep mine storage) and as such they are removed from the environment. Consequently, thermal treatment of wastes effectively removes POPs from the environment pathways where they may have had an impact.

5.3.55 Further, it is important to note that the Stockholm Convention clearly distinguishes between intentional and unintentional production of POPs: POPs arising as a result of thermal treatment process including waste incineration are classified as unintentional releases. Article 5 of the Stockholm Convention outlines the measures to reduce or eliminate releases of unintentionally produced POPs and promotes the application of best available techniques including compliance with release limit values or performance standards to fulfil the requirements for unintentional releases.

5.3.56 In the UK the EU Regulations, and hence the requirements of the Stockholm Convention are implemented through the Persistent Organic Pollutants Regulations 2007. The 2007

[1] Annex III substances include dioxins, furans, polycyclic aromatic hydrocarbons (PAHs), hexachlorobenzene (HCB), polychlorinated biphenyls (PCBs).

Regulations place a requirement on the Environment Agency to comply with the requirements of Article 6(3) through the environmental permitting process.

5.3.57 In coming to their decision on whether to issue a permit the Environment Agency must be satisfied that Best Available Techniques will be applied, including for the control of POPs; consistent with the Stockholm Convention requirements. On this basis provided that the facility meets BAT the requirements for POPs can be considered to be satisfied.

Summary

5.3.58 It is clear from the above discussion that the various options for generating heat from the proposed combination of waste materials for energy recovery have relative benefits and disadvantages.

5.3.59 Landfill has been identified for completeness but in terms of providing the required heat or a long term sustainable solution it is clear that this is not a realistic alternative and is not discussed further. AD as discussed above is similarly not considered a viable option for providing the heat requirements to the paper mill on the site under consideration and is again not discussed further.

5.3.60 Of the remaining options, pyrolysis, gasification and plasma arc gasification solutions are considered technically unproven at the scale proposed and have therefore been rejected.

5.3.61 Moving grate and fluidised bed plant are proven technologies at the scale proposed at the Kemsley site and both have operational plant within the UK. For these options there are relative advantages and disadvantages, but overall they are considered to have similar environmental performance.

Alternative Design

5.3.62 National planning policy highlights the importance of good design as a key contributor to providing sustainable solution to new development and working practice. The design of the facility including landscaping has drawn upon a number of considerations including the surrounding landscape context, topography, proposed facility requirements and layout. The views of the local community, and statutory consultees have also been taken into consideration.

5.3.63 The process has necessarily been iterative in nature, responding to technical and environmental impact considerations. The key design aims are summarised as:

- Implementation of high quality and innovative sustainable design;

- Optimisation of the existing ground conditions, topography of the site and surroundings;
- Incorporation of landscape features;
- Provision of new landscape treatment;
- Minimisation of the impacts of the proposed development;
- Achievement of significant environmental improvements.

5.3.64 The design has been guided from the outset by the landscape context, the site configuration, topography and operational needs of the facility rather than by the requirements to satisfy a specific design envelope or criteria.

5.3.65 In particular, the design has evolved through an understanding and appraisal of the landscape context of the site. The subsequent architectural design evolved through an iterative process guided by this, together with consultations with key stakeholders and outputs from the Environmental Impact Assessment work related to the project.

5.3.66 Input from the following key stakeholders has taken place at various stages throughout the evolution of the project and has influenced and shaped the design of the proposals:

- Process Engineers: The RPS architect have worked closely with E.ON, (the process engineers for the facility) and St Regis to ensure that the emerging design would meet technical and operational requirements of the facility.

- Environmental Impact Assessment: Key outputs and findings from the Environmental Impact Assessment work have been fed back to the architect and landscape architect to enable the design to be responsive to the findings of the assessments and to incorporate recommended mitigation measures into the design proposals where appropriate.

- The site is rectangular in shape. The land available within the site has determined the orientation of the proposed facility access point, areas of roadway, drainage and landscape treatment.

5.3.67 The facility infrastructure comprises distinct activities, each having separate and different functions and requirements in terms of space, environment, layout and built-form.

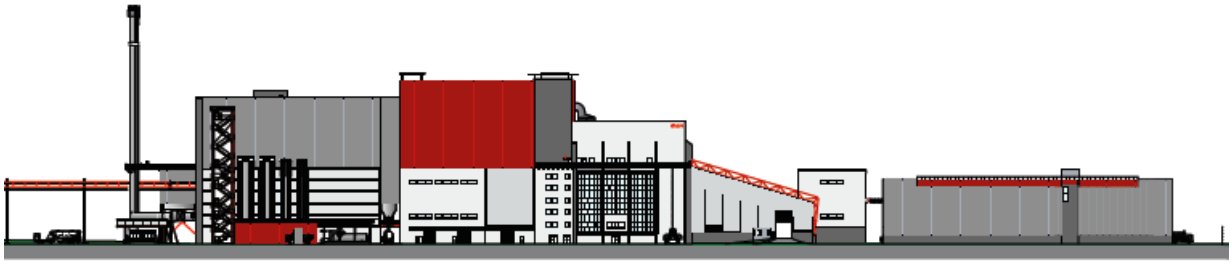
5.3.68 Various plant configurations for the site have been considered to accommodate a fully enclosed operation. Design iterations have been undertaken to arrive at the preferred layout. The proposed layout allows for safe access, rapid turnaround and egress from the site for all vehicles. Buildings have been sited and entrance/ egress routes positioned to maximize the beneficial use of space across the full depth and width of the site. The general arrangement is

orientated to maximize the efficient use of the site in relation to scale, topography and access points.

5.3.69 The site layout is fundamental to the practical and safe working of the facility and following approval of a base layout by the client and process engineer, a number of variations of an initial architectural option was put forward to the local planning office for comment.

5.3.70 There are two distinct approaches to the overall appearance of this type of development. One is to express function in the form of a straightforward building of industrial appearance and the other is to present a different shape so that it appears less angular, more homogenous and thus less industrial in appearance. We appreciate that any attempt to superimpose a different appearance other than to express its bulk and form would result in an increase in its overall height and extent.

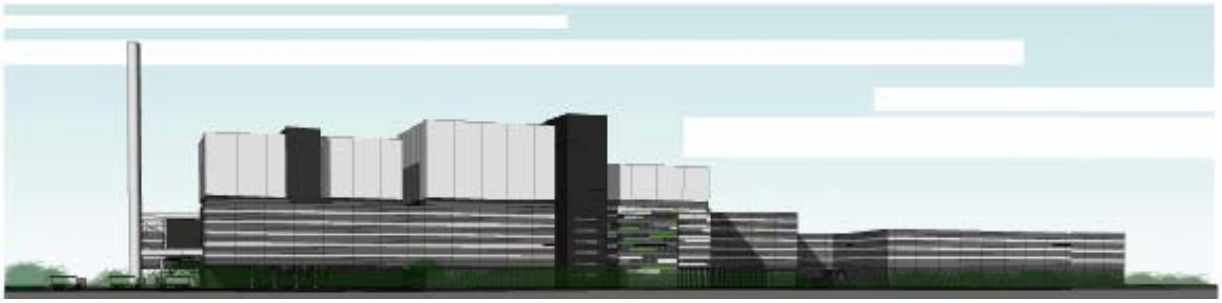
5.3.71 The initial concept proposal introduced additional forms which served to rationalise the building footprint and in turn reduce the amount of irregularity. It was felt that initial proposals where too industrial and a concept above and beyond a utilitarian grey box would be required given the context.



This option shows a more rational building footprint created by the introduction of additional walls. This consequently increases the visual impact of the building particularly the residue storage area.

5.3.72 Additional discussions took place and a decision was made to express the functional forms of the facility rather than conceal them. The design evolved to reduce the visual impact of the ask building as much as possible. Consequently the additional wall elements were removed to reveal the buildings functional form.

5.3.73 The articulation of the elevations would further alter to provide an architectural cohesion throughout the facility and although the client expressed a desire for corporate colours, natural colours were chosen relating to the context. A natural colour scheme was favoured.



The additional walls were removed from the main plant together with the residue storage area creating more functional building forms and a reduction in building height to certain elements.

5.3.74 The choice of colouration has preferred terracotta, albatross, Merlin grey, anthracite and hamlet. This has been used in the surface treatment of the building to minimise potential visual impact.

5.3.75 The finishes have been selected to give variation of texture to reduce the visual impact of the overall mass of the structure. All building materials have been chosen having regard to sustainability considerations. The materials chosen will be of modern, but classic, appearance and will not date. Sustainability has been integral to the design approach and key elements of the development.

5.4 The 'Do Nothing' Scenario

5.4.1 In terms of assessment of environmental impacts it is generally considered best practice to assess impacts against a likely ' Do Nothing' scenario of the proposals not going ahead. In this case, it is not just relating to the continuance of the site being undeveloped. The East of Kemsley Mill site is allocated as a proposed employment site and therefore other employment development is likely to occur. As a worst case, for the purposes of the Environmental Impact Assessment, it is assumed the site would remain as at present.

5.5 Summary and Conclusions

5.5.1 The need appraisal review demonstrates that with respect to need, the proposal conforms to EU Directives, the Government's Energy and Waste Strategies, and Planning Policy Guidance/Statement's, and the Statutory Development Plan.

5.5.2 With respect to energy need, the proposal will provide a secure source of renewable energy to the Paper Mill, help to reduce green house gas emissions, and make a significant contribution to the Regional Renewable Energy Targets.

5.5.3 With respect to the need for sustainable waste management, the proposal will make a significant contribution to diverting waste away from landfill in accordance with the waste hierarchy and make a significant impact in meeting the Regional Target for Landfill diversion.

5.5.4 Given the need to provide energy to the Paper Mill the location of the site was limited by capability and viability. Accordingly, the Alternative Site Report considered ten sites using established methodology compliant with Annex 10 of PPS10. The assessment of alternative sites has shown that the site is suitable in terms of its location and potential environmental effects.

5.5.5 The alternative technology review has highlighted other technologies and their relative merits when compared with Moving Grate Technology. Moving Grate Technology has been chosen as the proposed technology owing it being a proven technology at the scale proposed, and its environmental performance.

5.5.6 The proposed design and layout has evolved through an iterative process that has been informed by the sites landscape setting taking into account the views of key stakeholders and the community, to ensure that the design can accommodate the technical requirements and capacities whilst responding positively to the sites unique setting.

5.6 References

- EU Directive 08/98/EC – 'The Waste Framework Directive'
- EU Directive 2009/28/EC – 'The Renewable Energy Directive'
- The Waste Strategy 2007
- Draft National Policy Statement for Renewable Energy Infrastructure, November 2009

- PPS10: Sustainable Waste Management
- PPS23: Planning and Pollution Control
- PPS22: Renewable Energy
- PPS: Planning and Climate Change – Supplement to PPS1
- The UK Renewable Energy Strategy, July 2009
- The UK Low Carbon Transition Plan, July 2009
- The UK Biomass Strategy, May 2007
- The Kent Joint Municipal Waste Management Strategy
- The South East Plan: Regional Spatial Strategy for the South East of England May 2009
- Advanced Thermal Treatment of Municipal Solid Waste, DEFRA, 2005
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