

Briefing Note on the Essex Waste Strategy and the PFI Project

1. Introduction

This briefing note is intended to cover:

- Background information on the Essex Waste Management Partnership;
- The waste management challenges facing Essex;
- Key targets and objectives of the draft Joint Municipal Waste Management Strategy for Essex;
- The Private Finance Initiative (PFI) Project, with a summary of the application that Essex and Southend are intending to submit to Government, including projects costs, performance, technology options and timetable.

2. The Essex Waste Management Partnership

2.1 The Essex Waste Management Partnership (the Partnership) comprises of Essex County Council (as waste disposal authority) and the twelve District and Borough Councils (as waste collection authorities) of Essex and the unitary authority of Southend-on-Sea Borough Council.

2.2 The objective of the Partnership is to deliver the policies and targets contained in the draft Joint Municipal Waste Management Strategy (JMWMS) for Essex, its District/Borough partners and the adopted Municipal Waste Management Strategy for Southend-on-Sea Borough Council.

2.3 The support by the Partner authorities for the PFI Project is asked for in two ways:

- A Memorandum of Understanding (MoU) signed by each of the twelve constituent waste collection authorities (a copy of the MoU is with each authority now for consideration; deadline for signing is end of July '07);
- A letter of support from each of the three Area Waste Management Joint Committees (East, West and Thames Gateway) signed by the Joint Committee Chairman on behalf of each of the constituent waste collection authorities demonstrating district and borough councils' support and commitment to the PFI Reference Project (this will be at the July '07 round of Joint Committee meetings);

- Southend Borough Council's support for the project is to be demonstrated by its Cabinet's approval of the PFI application and the signing of a joint letter of application with Essex County Council.

3.0 The Challenges Facing Essex

Waste Management

- 3.1 Currently in Essex we landfill 65% of all the household waste produced, with the balance (35%) being recycled. This has to change. Essex County Council, with its partner authorities, is in the process of confronting one of the single largest environmental and legislative challenges ever presented to local authorities.
- 3.2 Many of the key drivers for change emanate from measures introduced in response to the UK's interpretation of European Legislation and our own local drivers and community aspirations for improving the environment. These measures include the Landfill Tax, the EU Landfill Directive and the Landfill Allowance Trading Scheme (LATS). In addition, national government has set every local authority challenging recycling and composting targets in the short term.
- 3.3 The 1999 EU Landfill Directive requires EU Member countries to reduce the amount of biodegradable municipal waste that is disposed of to landfill. Biodegradable waste is the fraction of waste that will break down in the presence of air or under anaerobic conditions. The main driver behind the EU Landfill Directive is the prevention of the possible harmful effects arising from the break down of biodegradable municipal waste in landfill. When biodegradable waste rots down in landfill it does so anaerobically and produces methane gas which is difficult to capture and when released into the atmosphere is a potent greenhouse gas known to contribute towards global warming. The breakdown of biodegradable waste also produces leachate which can pollute water courses. It is estimated that on average 68% of household waste is biodegradable.
- 3.4 In order for the UK to meet these targets the Government, through the Waste and Emissions Trading (WET) Act 2003, has introduced the Landfill Allowance Trading Scheme (LATS). Under the LATS, County Councils (and unitary authorities) must divert significant amounts of biodegradable waste sent to landfill each year. From 2006 to 2020 (the current LATS period) the amount of biodegradable waste that must be diverted each year significantly increases over time. Failure to meet these landfill diversion targets will result in financial penalties of currently £150 per tonne.
- 3.5 To give this context, if Essex County Council fails to take action to comply with its LATS targets in 2009/10 the Council, and therefore Essex

taxpayers, could face a penalty of up to £9m. If we carry on managing waste as we do today, this penalty would increase to £24m by 2013.

Energy and Climate Change

- 3.6 A more sustainable waste management system for Essex could positively contribute to tackling climate change through diverting waste from landfill and treating the waste to extract full value from it. Waste is a resource and the efficient management of this material to harness its full potential could bring significant climate change advantages, particularly through capturing the renewable energy it contains. In Essex this could be achieved through:
- The production of biogas from the anaerobic digestion of organic material (primarily food waste from households);
This is recognised by **Friends of the Earth** as a renewable source of power: extract from a FoE report 'Dirty Truths Incineration and Climate Change' (May 2006) "*Anaerobic digestion generates power exclusively from the biomass portion of waste, so is truly renewable*".
 - The recovery of solid recovered fuel (SRF) from household residual waste; the SRF can be manufactured from part of the waste after as much material as possible has been pulled out for reuse, recycling and composting.
 - The beneficial use of SRF in an energy plant can generate electricity and utilise the waste heat in the form of heating for domestic properties or heat input to industrial processes. This highly efficient configuration is called 'combined heat and power' (CHP) and any facility in Essex will strive to achieve this. Under the criteria applied by the **Department of Trade and Industry (DTI)** CHP from waste can qualify for **Renewable Obligation Certificates (ROCs)** which recognise the benefits of producing energy in this way and enhance the value of the energy produced.
- 3.7 The issue of security of energy supply is gaining importance in the UK. It is recognised that there is no one type of energy technology that can solve this challenge alone, but the recovery of energy and heat from household waste can make a valuable contribution to helping the UK generate its own power supply. This contribution can be further amplified by incorporating CHP design into the energy recovery system. This is commented in the Government's Strategy for Combined Heat and Power to 2010 (Defra, 2004): "*We must address the growing threat of climate change, maintain the reliability of energy supplies, promote competitive energy markets and work towards eradicating fuel poverty.*"

Overview of the need for a Waste Strategy

- 3.8 Therefore, there are strong environmental and financial incentives to divert waste away from landfill by recycling, composting, treating and recovering value from this resource. Doing nothing is not an option for Essex.
- 3.9 In response to these challenges, Essex County Council, together with its twelve District and Borough partners, has prepared a draft Joint Municipal Waste Management Strategy (JMWMS) setting out the shared approach for the development and delivery of local authority waste management services within Essex.

4.0 The Essex Waste Strategy

- 4.1 The key objectives of the draft Joint Municipal Waste Management Strategy for Essex are:
- To meet landfill allowance and bio-diversion targets as set out in the Landfill Allowance Trading Scheme (LATS) and the requirements of the EU Landfill Directive;
 - Meet and exceed the countywide Best Value and National Waste Strategy 2000 recycling, composting and recovery targets (45% recycling by 2010/11), with an aspiration to attaining 60% recycling;
 - Reverse the trend in municipal waste growth from 3% to 2% by 2010 and to 1% by 2015 and beyond; and
 - Explore innovative disposal solutions, based on the Mechanical Biological Treatment (MBT) and Anaerobic Digestion (AD) family of technologies, to assist in diverting biodegradable waste from landfill and to recycle and recover more value from residual waste.
- 4.2 Supporting the objectives of the strategy, Essex County Council has published a policy on recycling and waste:

“That the County Council invites solutions for the long-term management of its residual waste requiring:-

- *The development of front end sorting to further recover dry recyclable material;*
- *The development of either anaerobic digestion or mechanical biological treatment coupled, as appropriate, with the recovery of biogas;*
- *That contractors identify and propose options for the management of the residual waste after treatment including the possible development of compost, soil conditioner, landfill or the use of a refuse derived fuel.”*

- 4.3 The draft Essex Waste Strategy has been supported by Essex authorities and has been the subject of a comprehensive public consultation programme over the last two years.
- 4.4 The County Council is also required to carry out a Strategic Environmental Assessment (SEA) on the Strategy by European legislation. The SEA process has already commenced with a Scoping Report drafted.
- 4.5 The current timetable is to complete the SEA process by the autumn of 2007 and for the final JMWMS for Essex to be adopted by each Essex authority by spring 2008.

5.0 The PFI Project

- 5.1 The aims of the PFI project have been agreed by all authorities and are summarised below:
- *To procure facilities for the medium & long term management of Essex & Southend's waste.*
 - *To work in Partnership with Southend & the twelve Districts and Boroughs to implement an integrated collection, treatment & disposal system which will deliver the aspirations of the Waste Strategies of Essex & Southend.*
- 5.2 In order to bid to Government (in this case Defra) for PFI credits an **Outline Business Case (OBC)** has been developed which includes within it a **Reference Project**. This is a joint application between Essex County Council and Southend on Sea Borough Council.
- 5.3 In December 2005, Essex and Southend submitted to Government an OBC for £90m of PFI credits. However, in May 2006 the PFI eligibility criteria were changed by Defra. During 2006/07, Essex and Southend, with the support of the Partnership, have been negotiating with Defra to produce a new OBC. This has now been drafted and needs to be submitted to Defra by the end of July 2007.
- 5.4 The new OBC has been constructed to meet the current PFI eligibility criteria and to address other key issues that were outstanding in order for the Essex project to be deliverable:
- **Environmental benefits –**
 - a) Maximises recycling;
 - b) Problems with markets for compost-like-outputs from the MBT process have now been addressed in the new OBC through switching to the source segregated collection/processing of clean food and garden waste. This

allows for the production of high quality composts with significant environmental benefit to soils;

- c) The new OBC now takes advantage of the energy locked up in the residual waste (previously sent to landfill) through the introduction of an energy facility. This also allows the future dependence on landfill to be substantially reduced;
- **Affordability** – the new reference project is more cost-effective for Essex taxpayers, notably due to the avoidance of a growing landfill tax burden (refer to section 6.0);
 - **New PFI Criteria** – the new OBC has been constructed to meet the new PFI eligibility criteria set by Defra in May 2006;
 - **Markets for materials** – the new reference project maximises the use of all materials finding useful and valuable markets for the outputs, e.g. high quality compost, renewable biogas etc

5.5 Due to delays in the PFI process, Essex and Southend are currently out to tender for Interim LATS contracts, which should provide interim facilities to treat some of the residual waste and divert it from landfill, thereby helping the Councils meet their LATS targets. These are short-term contracts for a maximum of 7 years, with contracts ending around 2015.

5.6 Essex County Council and Southend Borough Council, with the support of partner authorities, are in the process of submitting an application to Government for Private Finance Initiative (PFI) credits to contribute to the cost of provision of additional recycling and disposal infrastructure.

5.7 The Reference Project has been designed to meet the objectives of the Councils' Strategies, which will, when combined with the Partnership's interim Landfill Allowance Trading Scheme (LATS) management strategy, meet or exceed Essex and Southend's LATS targets from 2010 onwards. The Reference Project is designed for modelling purposes only in order to construct a robust and sound PFI bid.

5.8 A key aspect of the Reference Project is to demonstrate how all household waste in the system will be sustainably managed, either through recycling, composting, treatment, recovery or disposal. The list below outlines the overall system which was used for the modelling of the Reference Project:

- **Kerbside dry recycling**, e.g. paper, cans, plastics – these materials will go to material recovery facilities (MRF) for sorting (this could be via a local transfer station), then onto recycling markets;
- **Kerbside collection of food waste and green garden waste** (either mixed or separate depending on the local collection arrangements) –

these materials will go to anaerobic digestion plants (could be via a local transfer station). This will produce a high quality compost which can be put to land and biogas, which can be used to generate renewable energy.

- **Kerbside collected residual waste** (e.g. waste in the black sacks or grey wheeled bins) – this material will go to the mechanical biological treatment (MBT) facilities (via a local transfer station) where the waste will be mechanically sorted to recover as many recyclables as possible that have been left in the residual waste. These materials will go to markets. The remaining waste is then shredded and dried (through aerobic composting – this is the biological part of MBT) to produce a solid recovered fuel (SRF). This fuel will then be used in a specialised energy plant to produce renewable electricity. A small amount of material that cannot be recycled or recovered will go to landfill.

SRF is a higher quality product than refuse derived fuel with tighter quality specifications recognised by Industry.

It is envisaged that two MBT facilities will be required for Essex, one for the north area and one for the south area. For the purposes of the reference project model, there is only one energy plant and that is assumed to be located at the Rivenhall site in the Braintree District. In reality, the actual site that may be used will be subject to the response of the private sector when contracts are procured and will be dependent on the outcome of the planning application process.

- **Recycling Centres for Household Waste (or Civic Amenity sites)** – the dry recyclables from these centres are already sorted and will go straight to market; the green garden waste collected will go straight to windrow composting facilities to produce a high quality compost and the residual waste will go direct to landfill. In reality, some or all of the residual waste may go to the MBT facilities for further recycling and treatment if contractors can accommodate this.

5.9 The overall performance of the system through the combination of the activities above will bring the recycling rate for Essex (with Southend) to over 50%. The aim of the Partnership is to achieve 60% and this will be progressed through comprehensive promotion campaigns and education programmes to further increase participation in kerbside recycling collection schemes.

5.10 In summary, the key environmental and financial benefits to the Reference Project system are shown below.

Benefits of Anaerobic Digestion

- a) The anaerobic digestion (AD) of source segregated food and garden waste will produce high quality compost that meets the nationally recognised quality standard of PAS 100.

PAS 100 is a publicly available specification for compost materials has been prepared and published by the British Standards Institution). PAS 100 composts have a good long term, sustainable market and can be applied to agricultural land. There is a vast amount of land nationally which would benefit from the application of this quality of compost to improve nutrient retention, fertility, soil structure and water retention properties.

- b) In addition, the AD of source segregated food and garden waste may produce a useful liquid fertiliser.
- c) AD of source segregated food and garden waste yields biogas (methane) which is efficiently captured and used to produce renewable energy, which is eligible for renewable obligation certificates (this means the energy produced yields twice the value of electricity generated from non-renewable resources [fossil fuels]). Conventional aerobic composting fails to capture this valuable biogas resource.
- d) The AD of source segregated food waste (and green garden waste) is widely supported by key organisations such as:

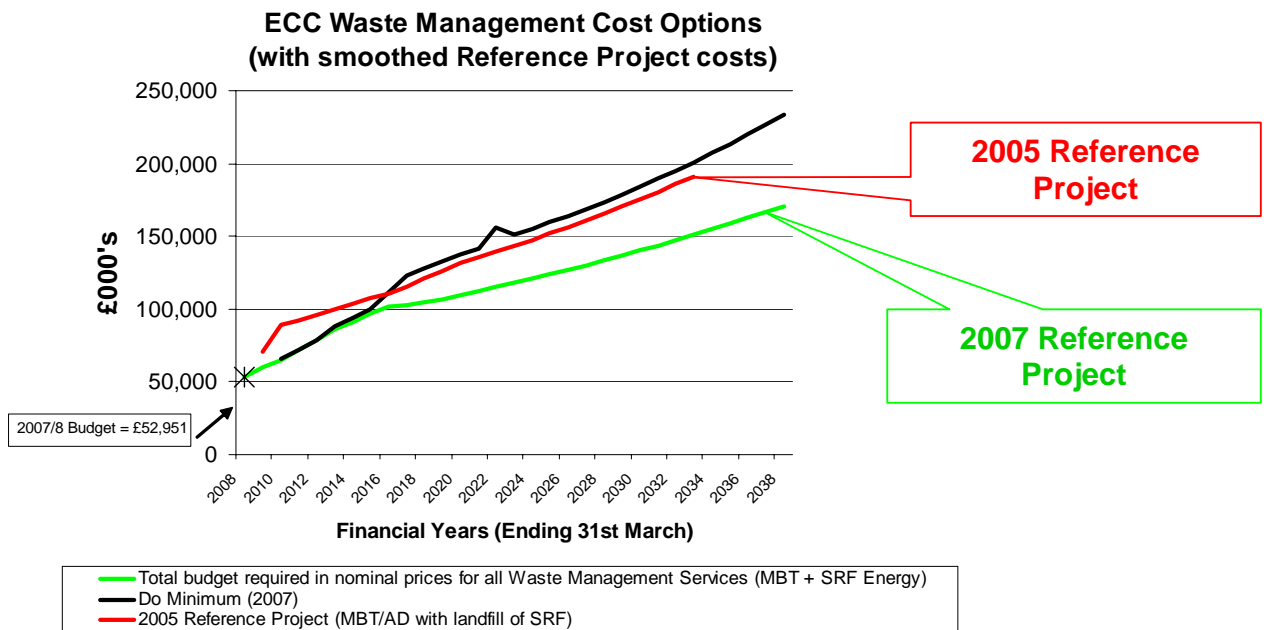
- **Friends of the Earth** – extract from a FoE report ‘Dirty Truths Incineration and Climate Change’ (May 2006): *“The most interesting technology is anaerobic digestion of separately collected organic waste (e.g. kitchen waste). This technology is very resource efficient, generating both methane (biogas) that can be used to generate power, and a soil improver which can be used to fertilise land (which also brings climate change benefits through storing up some carbon in the soil).*
- **Waste Resources Action Programme (WRAP)** - extract from recent report ‘Dealing with Food Waste in the UK’ (March 2007): *If the system chosen for biowaste collection and treatment is separate collection of food waste coupled to anaerobic digestion, the environmental performance of the system is likely to be the best compared to all the other systems examined in this report..... Anaerobic digestion is more favourable from an environmental perspective, primarily because the process produces methane which can be used to generate energy.*

Benefits of the MBT and Energy Plant

- e) Solid Recovered Fuel (SRF) is manufactured from only part of the waste and is one of many outputs from the process;
- f) SRF is a higher quality product and has much tighter quality specifications (2005 'MBT: A Guide for Decision Makers – Processes, Policies & Markets'). This means that many objectionable materials such as batteries and glass are recovered from the waste prior to the energy generation process.
- g) The use of SRF to generate energy is not mass burn incineration; only part of the waste is used to manufacture SRF after as much material as possible has been pulled out for reuse and recycling first;
- h) Renewable heat and energy can be recovered from SRF, therefore to landfill this renewable energy source would be an 'environmental crime' at a time when security of national energy supply is of great concern;
- i) The energy produced could provide electricity for 55,000 homes in Essex.
- j) If both heat and energy are captured, then the power generated will be eligible for renewable obligation certificates (providing additional financial value);
- k) The combined use of MBT to extract dry recyclables, treat residual waste and recover energy from the SRF is more beneficial in terms of climate change impacts than continuing to send waste directly to landfill.
- l) Any energy plant built will meet the highest standards of emission control set for industrial processes.
- m) Using SRF in an energy plant is also a more cost effective solution than landfilling SRF due to:
 - Avoided landfill costs;
 - Avoided Landfill Tax – in 2007/08 the County Council will pay an estimated £11m of landfill tax, this is estimated to double to £22m in 2010/11 ;
 - Avoided risk of failure to comply with LATS targets and associated financial penalties;
 - Opportunity to generate income from sales of surplus LATS allowances and higher value energy.

6.0 Future Costs

- 6.1 In order to deliver the objectives of the JMWMS and to meet environmental and legislative targets, it is estimated that an investment of £300m of capital funding is needed in Essex and Southend over the next five years or so to provide all the new facilities required.
- 6.2 Government has provisionally allocated Essex and Southend £90m of PFI credits which will equate to approximately £7m revenue funding per year from the start of the PFI contract and over that period (likely to be 25 years). The likely award date of the PFI contract (if approved) is autumn 2009, with the first MBT and AD facilities in operation by 2011.
- 6.3 A critical analysis carried out as part of the OBC is the Value for Money (VfM) analysis and this has been performed in accordance with the “HM Treasury Value for Money Assessment Guidance” as issued in November 2006 and the “Supplementary VfM Guidance for Waste PFI” prepared by Partnerships UK (“PUK”) for Defra in November 2006. The analysis confirms PFI as offering the potential to deliver value for money for the project when compared to Essex and Southend paying for this project without private sector or PFI investment.
- 6.4 The graph below illustrates the future costs of the current Reference Project (green line) versus the ‘Do minimum’ (black line) and the previous Reference Project in 2005 (red line).



- 6.5 The 'Do minimum' option assumes that the interim LATS contracts will be delivered; two transfer stations provided; Essex and Southend will have to purchase LATS allowances at £150 per tonne or pay penalties at the same cost, the countywide recycling rate is a do minimum of meeting BVPI targets.
- 6.6 The 2007 Reference Project provides the system described in 5.8 and an assumed level of recycling of over 50%.

7.0 Conclusion

In conclusion the strategic and financial evaluation of options for waste disposal shows that the Reference Project will provide the greatest deliverable environmental benefit for the Partnership and is the most cost-effective solution for dealing with waste in Essex.