STATES OF JERSEY

ENERGY FROM WASTE FACILITY: ESTABLISHMENT AND ACCEPTANCE OF TENDER

Lodged au Greffe on 20th May 2008
by the Minister for Transport and Technical Services

STATES GREFFE

PROPOSITION

THE STATES are asked to decide whether they are of opinion –

to refer to their Act dated 13th July 2005 in which they approved a new solid waste strategy and charged the then Environment and Public Services Committee to investigate fully alternative and conventional technologies to provide the final disposal route for the residual waste remaining following the implementation of the systems and facilities; and to their Act dated 28th June 2006 in which they agreed that any such technologies for the final disposal route for the residual waste should be located at La Collette II Reclamation Site; and

(a) to approve the preferred solution for the replacement of the Bellozanne incinerator of an Energy from Waste facility, as set out in sections 8 and 10.1 of the Report of the Transport and Technical Services Department dated 20th May 2008;

(b) to authorise the Minister for Transport and Technical Services to accept the tender of the preferred bidder subject to the approval of the transfer from the Consolidated Fund of the necessary capital expenditure.

MINISTER FOR TRANSPORT AND TECHNICAL SERVICES

REPORT

ENERGY FROM WASTE FACILITY:
ESTABLISHMENT AND ACCEPTANCE OF TENDER

Executive Summary

- The Bellozanne incinerator was originally commissioned in 1979 and has now reached the end of its useful life. It no longer offers a reliable means of waste disposal for the Island and a replacement facility is required as a matter of urgency.

- Report and Proposition P.95/2005 "Solid Waste Strategy" charged the then Environment and Public Services Committee to recommend a preferred solution for a replacement to the Bellozanne incinerator to the States. This Report sets out how this requirement has been discharged and recommends a preferred solution.

- Good progress has been made with implementing the targets within the Solid Waste Strategy – details are given in Appendix 1 to the Report.

- Recycling of non-inert waste has increased from 20% to 30% since the Solid Waste Strategy was approved. Provided resources are made available, the 32% target set for 2009 can now be exceeded and **a 36% target by 2018 is considered achievable**. However, non-inert waste has increased by 9% since 2004, as a result of increasing household numbers, an increase which is broadly in line with expectations within the Solid Waste Strategy and has occurred despite significant waste minimisation and recycling efforts.

- 59 available alternative and conventional waste treatment technologies were investigated between 2003 and 2005. The majority failed the pre-qualification criteria set by the then Environment and Public Services Committee that companies must have at least two reference plants operating on a commercial basis for at least 2 years. The results were updated to include new technology companies emerging since the Solid Waste Strategy was approved and have been summarised within a "Technology Review Report" which has been circulated to all States Members.

- Transport and Technical Services obtained approval from the States for the La Collette II Reclamation Site as the location for the proposed replacement for the Bellozanne Incinerator in June 2006. Transport and Technical Services then undertook comprehensive Environmental and Health Impact Assessment procedures and obtained Planning in Principle for an "Energy from Waste" facility in October 2007.

- A robust procurement process has been followed for the proposed facility. Initial expressions of interest were invited from all potential waste technology providers. The 9 respondents were short-listed to 4 companies who were invited to tender in November 2007. Three bids were received at the end of February 2008.

- The States Statistics Unit confirmed in April 2008, that the number of households was projected to increase from 38,000 households in 2007 to 46,200 households in 2035. This is less than the 52,100 households projected in the Solid Waste Strategy for 2035 and means that a smaller capacity plant can be considered for the Island – **105,000 tonnes is recommended compared to the original 126,000 tonne plan proposed within the Solid Waste Strategy**.

- Bidders were requested to submit fixed price tenders for a 105,000 tonne plant by the end of April 2008 Two bids were received and fully evaluated.

- The bid from the consortium CNIM/Spie Batignolees/Camerons (the CNIM consortium) scored highest in technical, legal and financial evaluation, had the lowest initial capital outlay and has a lower operational cost to the Island. The CNIM consortium was therefore appointed "Preferred Bidder" by Ministerial Decision on 19th May 2008. Earth Tech/Fisia Babcock Environment also submitted a high quality bid ar

were appointed as “Reserve Bidder”.

- **The preferred solution recommended to the States** is for a two-stream, conventional Energy from Waste plant with modern flue gas treatment and a highly efficient steam turbine. The technology is fully proven, will exceed the high air quality standards required within the European Union Waste Incineration Directive (2000/76/EC) and is expected to generate up to 7% of the Island’s electricity needs.

- A “Waste Treatment – Cost Comparison Report” has been prepared to compare the costs of the preferred solution with waste treatment technology types promoted by the Environment Scrutiny Panel and is attached as Appendix 2 to this Report. The analysis indicates that, when both capital and operational costs are taken into account, the preferred solution being recommended to the States offers the best value to the Island.

- The capital cost of the preferred solution – £106.31 million– is summarised within Table 1 of Section 10– Financial and Manpower implications. Funding for the preferred solution is the subject of an accompanying Proposition from the Minister for Treasury and Resources.

- If the States approve the Proposition, and the accompanying Proposition of the Minister for Treasury and Resources in respect of funding, the Minister for Transport and Technical Services will progress to appoint the Preferred Bidder as Contractor and obtain financial close, including agreement with the Jersey Electricity Company, at the earliest possible time. Subject to approval, it is expected that the new Energy from Waste facility will be commissioned and ready for take-over in March 2011.

1.0 Background

1.1 A previous Public Services Committee received a draft Solid Waste Strategy in April 2000. The Strategy reported that the current Bellozanne Incinerator had reached the end of its useful life and recommended that a replacement Energy from Waste facility should be procured. The Committee accepted the Strategy in principle, but required further work on the potential for recycling and whether the Bellozanne incinerator needed to be replaced or upgraded. A review of the initial Strategy was then carried out by new Technical advisers in September 2001, which reached the same conclusions. The Public Services Committee sought confirmation of the optimum procurement route for the replacement facility and Price Waterhouse Coopers confirmed that this should be through a design and build contract in December 2002. Between 2003 and 2005, the Public Services Department reviewed alternative technology types (listed under section 4.1 below) at the request of the Public Services Committee.

1.2 On 13th July 2005, the States Assembly approved Report and Proposition P.95/2005 "Solid Waste Strategy". As a result of the approval, the then Environment and Public Services Committee was charged to investigate fully alternative and conventional technologies to provide the final disposal route for the residual waste remaining, following the implementation of certain recycling systems and facilities set out in the proposition, and to recommend a preferred solution for a replacement to the Bellozanne incinerator to the States with an accompanying cost/benefit analysis, environmental and health impact assessment no later than July 2008. This Report sets out how these requirements have been discharged and recommends a preferred solution.

1.3 On 28th June 2006, the States Assembly approved Report and Proposition P.45/2006 "Solid Waste Strategy: Locations for Proposed Facilities", and agreed that any such technologies for the final disposal route for the residual waste to replace the existing Bellozanne Plant should be located at the La Collette I reclamation site, immediately to the south of the Jersey Electricity Company Power Station.

2.0 Related requirements of Proposition 95/2005

2.1 A number of requirements related to the implementation of services and facilities within the Solid Waste Strategy were included within the Proposition and Report P.95/2005. An update on progress on these requirements is provided as Appendix 1 to this Report entitled"Solid Waste Strategy – Progress Report".

2.2 Also as a result of approval of P.95/2005 "Solid Waste Strategy", the then Policy and Resources Committee was charged to propose the inclusion of a funding strategy for certain capital projects identified by the proposition within the States Business Plan 2006 – 2010 by, if necessary, re-prioritising or deleting existing projects, or identifying additional sources of funds.

2.3 The Treasury and Resources Department have prepared an accompanying Report and Proposition to fulfil this additional requirement.

3.0 Review of Conventional and Alternative Residual Waste Technologies

3.1 In August 2003, the then Environment and Public Services Committee issued an advertisement in the Official Journal of the European Community requesting that companies express interest in providing a residual waste treatment solution for the Island. Nine companies formally expressed interest and were subject to detailed technical and financial assessment. In accordance with the requirements of the then Environment and Public Services Committee, any proposed technology had to have at least two reference plants, operating for at least 2 years on a commercial scale.

3.2 During the development of the Solid Waste Strategy, a large number of other waste treatment technologies were reviewed by Officers and their advisers. These reviews were summarised in a Technology Review Report written by the technical adviser in October 2005, which included reviews of 59 technologies. The report considered conventional and alternative technologies including all of those that had responded to the expression of interest advertisement in the Official Journal of the European

Community. The report was circulated to States Members.

3.3 The environmental performance, complexity and energy efficiency of the technology was considered. Finally, whether each technology offered was capable of dealing with the whole of Jersey's waste stream or produced any residual waste stream that required further treatment and/or disposal.

3.4 The original Technology Review Report was used to inform the process for short-listing those companies offering technologies that were considered to have the potential to be the best solution for the Island. Those recommended included gasification technologies in addition to conventional moving grate incineration.

3.5 The Technology Review Report has been updated to include all of the technologies that had been put forward by companies for consideration by Transport and Technical Services since the original Technology Report had been completed and this Report has been circulated to all States Members. The updated Report concludes that, although several new technology companies have emerged onto the market since 2005, none are sufficiently proven or have offered a viable solution for the whole of the Jersey waste stream.

3.6 The Environment Scrutiny Panel appointed their own technical consultant to review the technology selection within the Solid Waste Strategy. The resulting report contains many key findings that accord with the view of the Minister for Transport and Technical Services including that –

(i) the Bellozanne Incinerator has reached the end of its useful life and should be replaced immediately;

(ii) recycling on the Island will be harder and more expensive than in mainland Europe and that there are considerable barriers to overcome before composting kitchen vegetable waste could be introduced;

(iii) conventional Energy from Waste technology is a proven and acceptable technology and may be the best solution for the Island;

(iv) proven technology means "demonstrated at the same scale on the same feed (waste) for at least 2 years at two or more commercial reference facilities.

3.7 The Environment Scrutiny Panel's Report also challenged the Transport and Technical Services Department to consider alternative types of waste technology. Both modular Energy from Waste technology companies suggested within the report were invited to tender within the procurement for the preferred solution, but chose not to submit bids. Other alternative technologies promoted within the Report are not being actively marketed within Europe and/or did not respond to Transport and Technical Service's expression of interest advertisement. Technology companies being promoted by the Environment Scrutiny Panel do not meet the proven definition as defined by their own technical consultant (as set out in paragraph 3.6(iv) above).

3.8 The Environment Scrutiny Panel's Report also suggests an alternative strategy based upon collecting food waste and recyclables on alternate weeks to residual waste, composting the collected kitchen waste and drying residual waste to sanitise it so it can be stored to enable a smaller residual Energy from Waste facility to be procured. This alternative strategy is considered high risk, as –

(i) it relies upon a significant investment by the Parishes in waste collection over and above that assumed within the approved Solid Waste Strategy;

(ii) it assumes that there will be a sustainable market for kitchen vegetable derived compost, for which there is no current viable disposal route on the Island;

(iii) the Transport and Technical Services Waste Treatment Cost Comparison Report analysis has

confirmed that the disposal option alone would cost significantly more to operate than the preferred solution (as set out in Appendix 2 to this Report).

3.9 The Minister for Transport and Technical Services' response to the Environment Scrutiny Panel report on this subject has been circulated to all States Members.

4.0 Cost Comparison of Waste Technology Options

4.1 The Technology Review Report (see section 3 above) considered a wide range of residual waste treatment technology "types". These were –

(i) Energy from Waste (EfW) – Conventional Incineration
(ii) Energy from Waste – Fluidised Bed Combustors
(iii) Energy from Waste – Gasification and Pyrolysis
(iv) Steam Autoclaves
(v) Anaerobic Digestion (AD)
(vi) Mechanical and Biological Treatment (MBT)
(vii) Alternative technologies such as Plasma Gasification, Bioethanol Production or Liming.

4.2 The cost of a viable and sustainable waste management solution for the Island is significant – irrespective of the combination of recycling and treatment technology type that is chosen. To demonstrate this, Transport and Technical Services commissioned a cost comparison of three technology types - these being Conventional Energy from Waste, Mechanical Biological Treatment and Steam Autoclaves. For each technology type, scenarios employing different possible uses of the technology and variations in recycling rate were examined. These scenarios were based upon the technology types that were recommended for further consideration by the Environment Scrutiny Panel's Report.

4.3 The outcome of the analysis is attached as Appendix 2 to this Report and Proposition and is entitled "Waste Treatment Types – Cost Comparison Report". The analysis indicates that, when whole life costs are taken into account (that is both capital and operational costs), the option being recommended by the Transport and Technical Services Department offers the best value.

5.0 Environmental Impact Assessment of the Preferred Solution

5.1 Following approval by the States of the La Collette reclamation site for the replacement of the Bellozanne incinerator in 2006, Transport and Technical Services undertook a full Environmental Impact Assessment for the proposed facility. A short-list of 4 companies and 2 reserves had been agreed, all of which could be defined under the collective term "Energy from Waste", but which included a gasification technology solution in addition to conventional incinerators. As a result the proposed solution was confirmed as being an "Energy from Waste" technology type from this time.

5.2 The Environmental Impact Assessment was summarised within an "Environmental Statement" which formed part of an Outline Planning Application submission by Transport and Technical Services in January 2007. The Environmental Impact Assessment concluded that the proposed Energy from Waste facility would result in a considerable improvement in air quality for the Island. The only significant impact from the facility was determined to be the visual impact. The Outline Planning Application was the subject of a full public consultation process by the Planning Department and the Transport and Technical Services Department also organised its own public awareness as part of the application process.

5.3 There was a further need to review the potential impact of a Vapour Cloud Explosion at the neighbouring Fuel Farm in February 2007 following revised planning guidance being issued as a result of the Buncefield Fuel facility explosion in December 2005, resulted in the establishment of the La Collette Hazard Review Group. This Group commissioned a leading hazard consultant to review the risks at the La Collette Reclamation Site in general and of the proposed Energy from Waste facility in particular. The

hazard consultants report was considered by the Minister for Planning and Environment in October 2007, who determined that the risk was not unacceptable.

5.4 The bidders for the Energy from Waste contract that was tendered in November 2007 were required to design their technologies to contractually meet or exceed the environmental standards defined within the Environmental Statement. As a result, the only significant revision needed to the Environmental Statement that obtained Planning in Principle approval has been a revised statement on visual impact. The updated Environmental Statement will be submitted to the Minister for Planning and Environment as part of the Reserved Matters required under the Planning in Principle approval. A copy of the full Environmental Statement document has not been submitted with this Report and Proposition for practical purposes, but was offered in full to all States Members in January 2007, and a non-technical summary was circulated. The Minister for Transport and Technical Services has written to all States Members upon lodging this Report and Proposition offering them further copies as required.

6.0 Health Impact Assessment

6.1 The Minister for Health and Social Services has been charged with conducting a Health Impact Assessment on the proposed replacement of the Bellozanne incinerator as part of that Department's representation in response to the Planning Application submitted by Transport and Technical Services.

6.2 The Public Health Department commissioned an independent consultant with significant experience of conducting Health Impact Assessments (IMPACT – a consulting division of Liverpool University) to conduct the assessment. The consultant used a very wide definition of health in conducting the assessment to ensure that broad health-related issues were also addressed.

6.3 The assessment was conducted in two stages. The first stage was conducted in response to the Outline Planning Application and was completed in March 2007. The second stage was conducted in response to information that will form the basis of the Detailed Planning Application and Reserved Matters submission and is due to be completed in May 2008. A copy of the Health Impact Assessment documents has not been submitted with this Report and Proposition for practical purposes, but the Transport and Technical Services Department understand copies of reports from both stages of the Health Impact Assessment will be made available for all States Members to review prior to the Debate.

7.0 The Procurement process for the Preferred Solution

7.1 An Engineering, Procurement and Construction (Design and Build) Contract was proposed as the most appropriate means of procuring a replacement for the Bellozanne Facility by Price Waterhouse Coopers in December 2002. A contract and specification was prepared for the proposed Energy from Waste facility during 2007 in accordance with the Institute of Chemical Engineers Red Book standard form of contract, which is used internationally for procuring waste treatment plants.

7.2 A comprehensive tender evaluation process was developed by Transport and Technical Services with its technical adviser (Babtie Fichtner Limited), legal adviser (Eversheds LLP) and financial adviser (Deloitte and Touche LLP) incorporating technical, legal, commercial and financial evaluation. The evaluation framework has been subject to review by the States Internal Audit function whose initial findings have confirmed that the financial advice was consistent with best practice and sufficient to provide an adequate basis for the assessment of tenders and financing options.

7.3 Tenders were issued to four short-listed companies immediately following Planning in Principle approval being confirmed on 1st November 2007. These companies were:

(i) Constructions Industrielles De La Méditerranée (CNIM) SA (a French company offering conventional incineration technology working in joint venture with SBC or Spie Batignolles Camerons Limited (a Jersey registered company whose equal Shareholders are Spie Batignolles –

French civil engineering contractor and Camerons Limited a local civil and building construction company)).

(ii) Earth Tech/Cyclerval (a UK Engineering Consultancy working with a French technology company offering a variation on conventional incineration technology) NB: Fisia Babcock Environment replaced Cyclerval as technology provider when Cyclerval withdrew during the tender process.

(iii) Ener-G (A UK based company offering a gasification technology).

(iv) Lentjes UK (A German company offering a variety of Energy from Waste technologies).

Detailed discussions with all 4 bidders were held during the tender period to ensure that the companies were familiar with the process and the unique circumstances prevailing on the Island.

7.4 During the tender process a number of changes to company structure and ownership took place, which resulted in three bid submissions being received prior to the tender deadline of 29th February 2008.

7.5 Full tender evaluation was only undertaken on the bids which offered fixed prices. Detailed reviews of these bids were undertaken to identify potential areas for value engineering, rationalisation and cost reduction. The bidders were required to set out these potential savings within their final submissions.

7.6 Following a review of the Housing Needs Survey 2007 data, the States Statistics Unit confirmed that a lower number of households than originally envisaged within the Solid Waste Strategy (46,200 as opposed to 52,100) would be projected for the Island in the period through to 2035. As a result, Transport and Technical Services revisited its waste arisings model and was able to confirm that a smaller capacity facility could be considered.

7.7 Tenders had been issued on the basis of a 126,000 tonne capacity plant (2 x 9 tonne per hour streams) However, budget prices for a smaller 105,000 tonne capacity plant (2 x 7.5 tonnes per hour streams) hac also been sought in accordance with commitments made to States Members during the debate on the Solid Waste Strategy in 2005. Transport and Technical Services asked the bidders to submit fixed prices for a smaller capacity plant, by 30th April 2008.

7.8 Following a further comprehensive evaluation, the bid from the consortium of CNIM/Spie Batignolees/Camerons (the CNIM Consortium) was confirmed to have scored highest on technical, commercial and financial criteria and overall scores. In addition, the CNIM consortium bid has a lower capital outlay and a lower operational cost to the Island. The CNIM Consortium was appointed as "Preferred Bidder" by Ministerial Decision on 19th May 2008. The Earth Tech/Fisia Babcock joint venture was also submitted a high quality bid and were appointed as "Reserve Bidder" at the same time.

8.0 Preferred Residual Waste Technology Solution for the Island

8.1 The preferred solution for the Island offered by the CNIM Consortium is led by Constructions Industrielles De La Méditerranée (CNIM) SA, which had a turnover of 527 million Euros in 2007 and which offers a full Parent Company Guarantee for the contract.

8.2 The proposed technology is a two-stream, conventional Energy from Waste plant with modern flue gas treatment and a steam turbine. The technology is highly proven. There are over 130 CNIM plants operating throughout the world and 15 in similar configuration to the plant offered to Jersey.

8.3 The Flue Gas Treatment system technology proposed is highly efficient and meets and/or exceeds all of the environmental requirements specified within the Environmental Statement, including compliance with the European Union Waste Incineration Directive (2000/76/EC) and Waste Management (Jersey) Law 2005.

8.4 The plant is offered with a 10 Megawatt capacity steam turbine that would be capable of generating between approximately 5% and 7% of the Island's electricity needs. The plant separates the fly ash from the useful bottom ash that would enable approximately 90% of the ash to be recycled into construction materials in due course.

8.5 The plant has been designed in accordance with a Design Brief prepared by Hopkins Architects Limited who were appointed by Transport and Technical Services to re-design the proposed facility on the request of the Minister for Planning and Environment. The design of the facility is smaller than that stipulated within the Planning in Principle approval, being 20 metres shorter in length.

9. Co-operation with the Jersey Electricity Company and Enabling Works

9.1 A key benefit of locating the proposed facility at the La Collette reclamation site is that this enabled the potential for co-operation with the Jersey Electricity Company (JEC) with regard to equipment employed within the La Collette Power Station.

9.2 Discussions between Transport and Technical Services and the JEC commenced in late 2005 and have considered a number of potential shared services. Transport and Technical Services has achieved an agreement in principle with the JEC for the following services:

(i) Use of 2 of the 8 flues within the La Collette Power Station chimney for the purposes of emissions from the Energy from Waste facility after full Flue Gas Treatment has taken place.

(ii) Use of the sea-water cooling system employed by the JEC when generating electricity at the Power Station.

(iii) Provision of a de-mineralised water supply and heavy fuel oil supply for the Energy from Waste facility boilers.

(iv) In addition, the JEC will provide an electricity supply for start-up and contingency operation of the Energy from Waste facility and will accept electricity generated by the steam turbine at a market rate.

9.3 The agreement in principle with the JEC requires a small initial capital payment to enable the connections outlined above to take place and then on-going maintenance and rental revenue payments. The capital and revenue cost of the proposed arrangement is included within the Financial and Manpower Implications section below.

9.4 A number of enabling works are required to enable the development of the proposed Energy from Waste facility. These will be the subject of separate planning applications, or form part of the detailed planning application and Reserved Matters submission in relation to the Planning in Principle for the facility. Land transactions will be dealt with by Property Holdings under Ministerial Decisions. Project management costs are required and the project also includes costs for decommissioning the Bellozanne incinerator.

10. Financial and manpower implications

10.1 The overall capital cost of the preferred solution to the States of Jersey is set out in Table 1 below.

	Capital cost (£ million)
Enabling Works	3.63

Engineering Procurement and Construction (EPC) Contract	93.35
Jersey Electricity Company (JEC) Connections	0.40
Decommissioning of the Bellozanne incinerator	2.08
Project Management (including incurred Feasibility costs)	6.85
Total	106.31

10.2 This cost is exclusive of fluctuations in currency during, and any delay beyond the six month period from 30th April 2008, during which the Preferred Bidder's tender is fixed. Allowance has been made within the funding for the project for appropriate contingencies to deal with these possibilities.

10.3 The overall estimated revenue cost to the States of Jersey in the first year of operation of the proposed new facility compared to the current equivalent budget has been evaluated. The revenue cost is within the limits of the current equivalent Transport and Technical Services budgets for this operation. No cost saving is currently proposed as this will not be known until the facility has been commissioned.

10.4 The staffing of the proposed facility compared to the current equivalent operations has been assessed and is within the current equivalent Transport and Technical Services staff allocation for these operations. There may be opportunities for efficiencies, because the proposed operation will adopt more modern working practices. However, as the facility involves the operation of services that have not been undertaken before, it will be necessary to fully commission the plant before any savings can be realised.

11. Next Steps, Construction and Programme

11.1 If the States approve the Proposition, and the accompanying Proposition of the Minister for Treasury and Resources in respect of funding, the Minister for Transport and Technical Services will progress to appoint a Contractor and obtain financial close, including agreement with the Jersey Electricity Company, at the earliest possible time. Simultaneously, Transport and Technical Services will seek to obtain detailed planning permission for the facility by September 2008 and commence permitted enabling works with immediate effect.

11.2 Transport and Technical Services proposes to offer the Contractor the development site by December 2008 with a view to full construction commencing in January 2009. The Preferred Bidder indicates that a 28 month construction period is required. Construction will be controlled through the Planning and Regulatory functions of the States of Jersey and additional significant contractual controls have been introduced to ensure that construction causes the minimum disruption possible. If appointed, the Preferred Bidder expects to be able to provide the completed and commissioned Energy from Waste facility for take-over in March 2011. Subject to approval, it is expected that the new Energy from Waste facility will be commissioned and ready for take-over in March 2011.

APPENDIX 1

SOLID WASTE STRATEGY – PROGRESS REPORT

1. Background

1.1 A number of requirements related to the implementation of services and facilities were included within the Report and Proposition P.95/2005 "Solid Waste Strategy" approved by the States Assembly on 13th July 2005. This report sets out progress in implementing these requirements.

2.0 Progress on Recycling Performance

2.1 Since the approval of the Solid Waste Strategy in 2005, tremendous improvements in recycling have been achieved by the Island. In 2004, 19,591 tonnes of waste were recycled from a total of 96,692 tonnes of non-inert waste collected, giving a recycling rate of 20%. In 2007, 32,377 tonnes of waste were recycled from a total of 106,587 tonnes, giving a recycling rate of 30%. It can be seen that this 10% increase in recycling levels has been achieved despite an increase in the total non-inert waste collected in that period of over 9%. Recycling levels have exceeded projections in each of the years since the Strategy was approved and the level for 2007 is approximately 3% higher than anticipated. This means the 2009 target of 32% set within the Strategy can now be exceeded – subject to resources being made available.

2.2 Waste projections within the Solid Waste Strategy were calculated using a waste arisings model which used assumptions within the Island Plan 2002 and Housing Needs Survey 2004 to estimate waste growth on the Island and then examined the impact of implementing the recycling and waste minimisation proposals with the Strategy. The model has been updated with actual waste arisings and latest population and household information provided by the States Statistics Unit. The latest projections indicate that the number of households on the Island will increase from approximately 38,000 in 2007 to approximately 46,200 by 2035.

2.3 A review of the Solid Waste Strategy beyond the 2009 target has been undertaken and confirms that a significant increase in recycling provision is appropriate and could be sustained. However, a number of recycling services will need to be introduced including:

(i) door to door recycling collection schemes in each Parish similar to the pilot currently in operation in the Parish of St. John, collecting a minimum of paper, card, plastic bottles, metal cans and textiles by 2014.

(ii) a significant increase in the number of "bring" collection banks to ensure that a similar proportion of waste is collected for recycling as the population increases.

(iii) Introduction of door-to-door collection of glass in the Parish of St. Helier by 2011.

(iv) The introduction of a new Permanent Re-use and Recycling Centre collecting recyclables and public green waste by 2011.

(v) The introduction of further recycling of commercial waste including separation of cardboard, metal and timber on a significantly larger scale through separate collections and separation at the proposed Energy from Waste facility by 2011.

(vi) The collection of more than 23,400 tonnes of garden waste by 2035.

2.4 Provided that such investment in recycling infrastructure continues to be made, a recycling rate of approximately 36% is considered sustainable on the Island from 2018.

2.5 The household numbers confirmed by the States Statistics Unit are lower than those modelled to produce the estimates within the Solid Waste Strategy and this means that a smaller capacity residual waste treatment facility can also be considered. This is addressed within the body of the Report.

3.0 Progress on Specific Recycling Initiatives

3.1 The Environment and Public Services Committee was tasked:

(i) (A) to provide a recycling centre for the reception and recycling of paper, aluminium, glass and PET plastic and other materials, before the end of 2006, and to achieve the recycling aims stated in the report;

(B) to investigate the commercial opportunities afforded by European and international recycling companies in tendering for the construction and/or operation of the Recycling Centre.

3.2 A temporary Re-use and Recycling Centre was introduced at Bellozanne in June 2007 and has proved to be a popular and successful addition to the Island's recycling service. The centre offers residents the opportunity to recycle paper, card, glass, cans, textiles, scrap metal, waste oil, batteries, waste electrical equipment, mobile phones, construction rubble and plastic bottles. Furniture is collected for re-use by local charitable organisations. In its first year of operation, over 1,500 tonnes of waste have been recycled at the facility.

3.3 The Solid Waste Strategy envisaged that La Collette reclamation site would be the most appropriate location for a permanent Re-use and Recycling Centre, subject to the consideration and amelioration of any health, safety, environmental and traffic implications. When it became clear that it was more appropriate for the Energy from Waste facility to be located at La Collette, the location of the Re-use and Recycling Centre had to be reconsidered. A review of the hazard from the adjacent Fuel and Gas Storage Facility was undertaken and it emerged that it was not appropriate to locate waste facilities serving the general public close to the Fuel and Gas Storage facility.

3.4 The Strategy had envisaged that collection of public green waste should be adjacent to the Re-use and Recycling Centre. The La Collette hazard review meant that the public green waste collection has to be relocated away from La Collette and so Transport and Technical Services considered possible sites where the a Re-use and Recycling Centre and Public Green waste facilities could be co-located. Transport and Technical Services has considered over 40 possible locations for such a facility and supported a Proposition P.7/2008 from Deputy Ben Fox in January 2008 for the establishment of two facilities to serve the Island.

3.5 It is now proposed to construct a permanent Re-use and Recycling Centre, including public green waste collection, in 2010, when a suitable permanent location for the facility has been confirmed within the Island Plan. Once the location of the facility is confirmed, the commercial opportunities afforded by European and International recycling companies tendering for the operation for the construction and/or operation of the Recycling Centre will be investigated.

4.0 Progress in Promoting Waste Minimisation and Recycling

4.1 The Environment and Public Services Committee was tasked:

(i) (C) To take active steps to promote waste minimisation and recycling throughout the community and to encourage all States Departments to lead by Example.

4.2 The Solid Waste Strategy included examples of waste minimisation schemes, including the promotion of washable nappies and home composting which have been actively promoted by Transport and Technical

Services.

4.3 Over 2,000 home compost units have been provided to residents at a subsidised rate since the Strategy was approved and annual campaigns and a subsidy for nappy re-use has also been actively promoted. Every school in Jersey has an annual promotional visit by Transport and Technical Services' Recycling Officer and tailored waste minimisation and recycling initiatives have been developed with each one.

4.4 A recycling trailer has been refurbished to assist in getting the message over to the public and Transport and Technical Services has won acclaim for its promotional work including the Jersey Ideal Home top exhibition award in 2006. Transport and Technical Services has promoted the introduction of recycling collections from all States Departments since the Strategy was approved and currently nine Government buildings have recycling collections.

5.0 Progress in developing a new Enclosed Compost Facility

5.1 The Environment and Public Services Committee was tasked:

(ii) to provide a modern composting facility for recycling of garden and green waste by 2007.

5.2 The current open "wind-row" composting facility at La Collette continues to operate efficiently, accepting in excess of 15,000 tonnes of green waste from residents and businesses that would otherwise require alternative means of disposal and producing a high quality soil improver to the highest European standards. In 2007, 403,000 litres of Genuine Jersey Soil Improver were sold generating income of £46,423 which helped offset the cost of operating the facility. The remaining soil improver product was accepted by agriculture at a subsidy of £10 per vergée.

5.3 In February 2006, following a review of potential compost sites in States ownership, the Minister for Transport and Technical Services recommended to the States that the location for an enclosed in-vessel compost facility should be La Collette II Reclamation Site Industrial Area.

5.4 Following strong representations from the Environment Scrutiny Panel and States Members from Havre des Pas, the Minister agreed to defer the confirmation of this location and to await a Working Party Report on Composting which was finally presented States Members in October 2006. This report indicated that there might be alternative better sites for composting facilities in private hands and so Transport and Technical Services issued an expression of interest for a site or sites for composting in January 2007. 18 Expressions of interest were received and these privately owned sites, together with the 11 States-owned sites that had been included in the initial site assessment were subject to detailed site evaluation.

5.5 Following further consultation with the Environment Scrutiny Panel, the original preferred location of the La Collette II Reclamation Site Industrial Area, was confirmed as the best performing location for an enclosed composting facility and for the reception of commercial green waste by Ministerial Decision (MD-T-2007-0113) in December 2007.

5.6 In September 2007, the Constable of St. Helier threatened to judicially review the States Public Health Department's enforcement of the Statutory Nuisances (Jersey) Law 1999 in relation to alleged odour nuisance from the existing open-windrow composting operation at La Collette. As a result Transport and Technical Services was issued with an Abatement Notice (Ref. 08/07) on 22nd November 2007 requiring the alleged odour nuisance to be abated in 150 days. Transport and Technical Services have maintained that this could only be achieved by progressing the development of the enclosed composting facility and appealed the notice on 11 December 2007. On 28 February 2008 it was agreed that the abatement notice should be put in abeyance whilst the Public Health Department determined what acceptable odour levels around the existing composting facility should be. Once an acceptable odour level is defined it will be possible for Transport and Technical Services to progress the development of the replacement in-vessel compost facility further.

6.0 Progress in developing a Pilot Door to Door Recycling Collection Service

6.1 The approved "Solid Waste Strategy" Report and Proposition P.95/2005 required:

(iii) That the Comité des Connétables be charged to work with the Environment and Public Services Committee to introduce a pilot scheme for a coordinated collection system for recyclables (including paper, aluminium, glass and PET plastics).

6.2 Transport and Technical Services supported the Parish of St. John in introducing a pilot door to door collection of newspapers and magazines and food and drinks cans in August 2006. It was agreed that the costs of collection would be funded by the Parish with Transport and Technical Services subsidising the costs of bulking, transporting and reprocessing collected materials and a private business providing the initial supply of collection containers.

6.3 The collection has proved extremely popular with residents with a 70% participation rate from residents and has recycled approximately 340 tonnes of waste since inception. Initially, the collection was for newspapers and magazines and food and drinks cans, but was extended to include plastic bottles in March 2008. All Parishes, with the exception of the Parish of St. Helier, already have a door to door collection of separated glass for recycling. The Parish of St. Helier withdrew its door to door glass collection scheme following concerns about the safety of the collection. It is understood this collection may be re-introduced in future, and it would need to be if recycling targets within the Solid Waste Strategy are to be achieved.

6.4 Transport and Technical Services has promoted the benefits of the St. John pilot collection service to all the other Parishes and the Parish of St. Mary recently became the second Parish to agree to commence a similar collection service subject to confirmation of funding. Transport and Technical Services is working with another private business with a view to offering up to three further Parishes to sponsor the introduction of collection containers for their own door to door collection services. Transport and Technical Services has also undertaken to support the costs of bulking, transporting and reprocessing collected materials for coordinated collection schemes. The Parish of St. Helier has also undertaken its own recycling collection trial, which has informed the recommended coordination service being promoted by Transport and Technical Services.

7.0 Co-operation with Guernsey

7.1 The approved P.95/2005 Proposition required:

(vi) that the Committee be charged to take active steps to seek co-operation from the States of Guernsey on any measures from which joint benefit, financial or otherwise, can be derived in any area of waste management and to report to the States thereon at regular intervals.

7.2 The Solid Waste Strategy identified the possible economies of scale from developing a single facility to serve both Guernsey and Jersey or of Jersey accepting a quantity of waste from Guernsey during the early years of operation of the proposed Energy from Waste plant and before Guernsey developed their own waste treatment facility.

7.3 To this end a joint feasibility study was developed by the then Jersey Public Services Department with the Environment Department of Guernsey which was completed and debated by the States of Guernsey in January 2006. Although the feasibility study demonstrated that the concepts were viable and potentially offered savings over separately procured facilities, the proposal was not approved by the States of Guernsey who indicated "*that a joint Channel Island incineration facility does not present an acceptable long-term strategy for Guernsey…* (and)*… that to contract now for Jersey's spare capacity between 2010 and 2014 is a high risk strategy that should not be adopted*".

7.4 However, following a change of administration in Guernsey during 2007, the new administration revived discussions with the Minister for Transport and Technical Services about the potential for co-operation on use of the Jersey Energy from Waste facility in the early years of the operation of the proposed Jersey facility when there would be some spare capacity available.

7.5 General elections in Guernsey took place in April 2008 and a new administration is now in place. It is understood from Guernsey Officers that the States of Guernsey are due to receive a report on procurement options in the summer of 2008.

8. The Bellozanne Covenant and Financial Mechanisms for Environmental Objectives.

8.1 The approved Report and Proposition P.95/2005 "Solid Waste Strategy" charged the then Environment and Public Services Committee to work with the Parish of St. Helier to undertake further research and bring forward for consideration proposals for the resolution of the present covenant on the Bellozanne site and to work with the then Finance and Economics Committee to undertake further research and bring forwards proposals for financial mechanisms for the purposes of meeting future environmental objectives.

8.2 The Minister for Planning and Environment is considering the options for some form of Environmental Taxes for the Island with the full support of the Minister for Transport and Technical Services. Any proposals for such taxes have to be considered by the States Assembly. The Minister for Planning and Environment is aware that proposals for addressing the Bellozanne Covenant will need to be included within any recommended solution for Environmental Taxes. The preferred solution for residual waste management proposed in this Report is complimentary to but not dependent upon Environmental Taxes.

APPENDIX 2

WASTE TREATMENT TYPES – COST COMPARISON

JERSEY TTSD

WASTE TREATMENT TYPES

COST COMPARISON SUMMARY

Print Date: 19 May 2008

ISSUE NUMBER	1	2					
DATE	14/05/08	15/05/08					
AUTHOR	JW	JW					
CHECKED	JA	JA					

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1 INTRODUCTION

During the States debate on the Solid Waste Strategy in 2005, the then Public Services Committee undertook to present to the States a cost benefit analysis of the various alternative residual waste treatment types.

The alternative waste treatment types considered in this Report are composting or anaerobic digestion of separated kitchen waste, mechanical and biological treatment and steam autoclaving. All of these options generate waste streams, and the various methods of disposing of these streams have been considered. This document compares the estimated capital and operating costs of each alternative waste treatment type.

In addition, one of the recommendations from the Juniper Consultancy Services Ltd report Independent Review of the Planned Infrastructure for implementing the Island's Waste Strategy" April 14th 2008 for the Environment Scrutiny Panel for Scrutiny was that a much smaller plant, about 80,000 tonnes per annum, should also have been considered, with an option to expand it in the future. This report therefore also considers the case where a smaller plant is installed now, with the potential cost of expanding it some time in the future.

The analysis carried out is a purely economic one. It does not mean that we consider all of the options viable for the Island, as other considerations such as the sustainability of exporting waste off-Island or the availability of suitable sites also need to be taken into account. The intention is determine whether there is an alternative option which would be much cheaper. Some of the options we do not consider to be feasible, for example the production of large quantities of poor quality organic material for which we have been unable to confirm a suitable disposal route on the Island. We have also not taken into account the increased space needed for the multiple facility solutions, assuming for comparison purposes that there is space to build these without any additional land value costs.

2 CONCLUSIONS

The cost comparison of the seven alternative disposal cases considered shows that the cheapest option for the Island is the preferred solution to install a conventional energy from waste plant.

Option	Treatment	Annual Cost (including capital finance cost)
Preferred Solution	105,000 tonne per annum energy from waste plant	£10.3M
Case 1	Smaller energy from waste plant and kitchen waste composting	£11.2M
Case 2	Smaller energy from waste plant and kitchen waste anaerobic digestion	£11.1M
Case 3	105,000 tonne per annum mechanical biological treatment plant with refuse derived fuel and rejects exported for disposal in the UK	£14.2M
Case 4	105,000 tonne per annum mechanical biological treatment plant with refuse derived fuel exported for disposal in the UK and organic rejects used as a "soil improver" on the Island	£11.4M
Case 5	105,000 tonne per annum mechanical biological treatment plant with refuse derived fuel burnt in a new energy from waste plant in Jersey and organic rejects used as a "soil improver" on the Island	£12.2M
Case 6	105,000 tonne per annum steam autoclave plant with refuse derived fuel and rejects exported for disposal in the UK.	£19.9M
Case 7	105,000 tonne per annum steam autoclave plant with refuse derived fuel burnt in a new energy from waste plant in Jersey and rejects exported for landfill in the UK	£19.0M

The annual cost includes the finance cost of the capital, including repayment, the operating costs of the facilities, cost of disposal of any waste outputs and any revenue from power sales or recyclables.

We believe we have provided realistic costs for the alternatives, and in most cases erred on the low side to ensure that alternative treatment types are not penalised because we have not carried out detailed tendering exercises or accurately estimated any enabling works required on these options.

Despite this, the costs of the alternatives are higher, largely because they all require multiple facilities or disposal routes. The additional cost of providing more capacity in an energy from waste plant is relatively low due to the significant economy of scale in this type of plant.

This report does not consider the risks or sustainability of the alternative disposal routes. The preferred solution is the least risky option because it does not require additional land use, raising planning issues on Jersey, or the need to export significant amounts of waste from the Island which is considered to be environmentally, financially and legally questionable.

We have also considered the option of only building a smaller plant now, of about 80,000 tonnes per annum which would be capable of dealing with Jersey's waste for the next few years. The evaluation shows this would initially be about £11M cheaper than the preferred solution.

However, even with the reduced household growth now expected on the Island and using the same waste growth rate as assumed in the Solid Waste Strategy, this plant would rapidly become too small to cope with Jersey's waste (probably by 2015). If a third stream were added, as Juniper have suggested would be possible, this would require an additional investment of about £42M in today's money, and would require an increase in operating costs as more staff would be needed.

It should also be noted that building a smaller plant would be very high risk, as the time required to add additional capacity via a third stream would be about 5 years, to plan, procure, gain States and planning approvals and then build the plant. Jersey would therefore be threatened by having inadequate disposal capacity if waste arisings did grow quickly, and being forced to undertake the unsustainable export of waste. In addition, the extra land required for a third stream would mean that either the existing ash mound would need to be substantially removed, or the Connex bus depot would need to be relocated.

Building a smaller plant and taking a substantial risk does not appear to be a sensible option for the Island, unless there is strong evidence that waste arisings will not increase, which there is not. It is noted that introducing an intensive kerbside collection scheme, handling and transporting the additional recyclables as required by the Solid Waste Strategy assumptions, will still be a costly exercise.

John Weatherby **Jon Agnew**

3 RESIDUAL WASTE COST COMPARISON METHODOLOGY

The preferred solution is for the Island's residual waste to be disposed of in a conventional energy from waste plant. The recommendation presented to the States is for a plant with an average annual capacity of 105,000 tonnes per annum supplied by the CNIM consortium. The price of this plant has been established by competitive tendering. Operating costs have been evaluated based upon Island costs available from the existing plant, augmented by any additional costs for the new plant.

Fichtner have estimated the overall capital and operating costs for a variety of alternative waste disposal methods. These are:

Case 1: 9,000 tonnes per annum of organic kitchen waste is separated at source and composted in a simple in-vessel composting plant. The remaining residual waste is burnt in a smaller energy from waste plant. It should be noted that whilst the mass capacity of the plant drops to 96,000 tonnes per annum, the thermal capacity only reduces by 3% as kitchen waste contains little useful energy. The additional compost produced is assumed to be used as soil conditioner in Jersey.

Case 2: 9,000 tonnes per annum of organic kitchen waste is separated at source and digested in an anaerobic digestion plant as suggested by Juniper. The remaining residual waste is burnt in a smaller energy from waste plant. It should be noted that whilst the mass capacity of the plant drops to 96,000 tonnes per annum, the thermal capacity only reduces by 3% as kitchen waste contains little useful energy. The additional compost produced from the digestate is assumed to be used as soil conditioner in Jersey. The biogas produced in the digestor is used to generate electricity.

Case 3: All the 105,000 tonnes per annum of residual waste is passed to a Mechanical Biological Treatment (MBT) plant. Here, ferrous and non ferrous metals are separated for recycling. The material is biologically dried, losing about 25% of its mass, and sorted into three streams (as well as the metal): refuse derived fuel; stone and glass for use as aggregate; and organic fines. In Case 3, the refuse derived fuel is exported to the mainland for use in an energy from waste plant which will require a gate fee (that is Jersey will pay for its disposal), and the organic material is exported to the mainland for landfilling. UK landfill costs are used, including landfill tax, but no costs are included for any potential landfill allowance penalties which are up to £150/biodegradable tonne. The Island would therefore not require a new energy from waste plant. The MBT plant modelled is similar to that proposed by Juniper in their report for the Environment Scrutiny Panel.

Case 4: This case assumes the same 105,000 tonnes per annum MBT facility as Case 3, but the organic material is disposed of on-Island as low quality soil improver. It should be noted that this material is low quality containing contaminants from the waste, and has very limited use in the UK, with the main use as landfill restoration material. The Juniper report for the Environment Scrutiny Panel agrees that this is not a sustainable solution for the Island.

Case 5: This case assumes the same 105,000 tonnes per annum MBT facility as Case 3, but the organic material is disposed of on-Island as low quality soil improver. The Juniper report for the Environmental Scrutiny Panel agrees that this is not a sustainable solution for the island. In addition, the refuse derived fuel is sent to a new Jersey energy from waste plant. This plant is smaller than the one in the preferred solution. Also refuse derived fuel is dry and so it can be stored for longer. We have therefore modelled a single stream plant which reduces costs further.

Case 6: All the 105,000 tonnes per annum of residual waste is passed to a steam autoclave plant. The material is heated with steam, breaking the material down into a fibre, and other semi-clean components. This adds about 5% to its total mass. The material is sorted into several streams: organic fibre; stone and glass for use as aggregate; recyclables such as ferrous metal, non-ferrous metal and plastic bottles; and rejects. In this option, the fibre is exported to the mainland for use in an energy from waste plant which will require a gate fee (that is Jersey will pay for its disposal), the recyclables receive a small overall revenue and the reject material is exported to the UK for landfilling. The Island would therefore not require a new energy from waste plant.

Case 7: This case uses the same 105,000 tonnes per annum steam autoclave facility as Case 6, but the fibre is sent to a new Jersey energy from waste plant. This plant is smaller than the one in the preferred solution, but still requires a two stream plant as the fibre cannot be stored for extended periods. The rejects are exported to a UK landfill.

The main differences between the options is summarised in Table 1.

The basis of the cost comparison is to assume that for each case one or more facilities are required to process up to 105,000 tonnes per annum of residual waste. The costs of the disposal of all this waste has to be taken into account. This assumes that the Island is already recycling and composting the additional waste produced on top of this. These costs are considered to be the same for all options, and are therefore excluded. The costs estimated take into account the capital and operating costs and revenues of each option, but have not included development, planning, enabling works and project management, which are considered to be broadly similar in each case.

The preferred solution costs have been derived from the Preferred Bidder's price, and estimates of the cost of running the facility. The cost of the other options has been estimated from Fichtner's extensive database of this type of project. Fichtner have been involved with over ten UK mechanical biological treatment projects where plants have or are being installed, including ones using technology recommended for consideration by Juniper. We have also supported several steam autoclave projects currently in late stages of development, so we have genuine cost estimates for this type of facility. We have adjusted these costs to a Jersey price using general civil price adjustments recommended by the States Quantity Surveyor and specific information gleaned from the tenderers during the assessment of the energy from waste plant bids.

4 ASSESSMENT RESULTS

The results of the comparison exercise are presented in Table 2 on page 9. The assumptions behind this model are listed in the table in Appendix A.

The model assesses the average annual cost of each solution. This is intended for comparison only, as some of the project costs, such as development costs, planning and enabling works are not included. The result is in our view clear. The most cost effective and sustainable option is the preferred solution. We believe we have taken an optimistic view of the other cases to put them in the best possible light, by selecting capital costs which are on the low side. Despite this, largely because of the cost of installing two facilities or exporting large amounts of material for disposal, the preferred solution is the best value option for the Island.

In our view, the preferred solution is also the most deliverable and sustainable option. Multiple facility options require more land, which on a small Island is not easy to find. They also require more staff. Some options rely heavily on the need to spread more waste material on land. Mixed waste compost is particularly difficult to deal with, as even in the UK it is proving difficult to find long term disposal routes for such material. Options based on the export of waste material are equally challenging, as it is not clear that other countries would accept Jersey's waste. In the UK's case, even if this were allowed, it is likely that additional costs due to landfill avoidance penalties may be imposed. These have not been taken into account in this analysis.

The conclusion therefore appears clear – a simple economic comparison shows that the cheapest long term waste management solution for Jersey's residual waste is to install an energy from waste plant as proposed.

Table 1 – Summary of waste treatment options

Base Case	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Energy from Waste 105,000 tonnes per annum	Energy from Waste 96,000 tonnes per annum	Energy from Waste 96,000 tonnes per annum	Mechanical Biological Treatment 105,000 tonnes per annum	Mechanical Biological Treatment 105,000 tonnes per annum	Mechanical Biological Treatment 105,000 tonnes per annum	Steam Autoclave 105,000 tonnes per annum	Steam Autoclave 105,000 tonnes per annum
Recycling and Composting continuing as usual at about 30% of total waste (in line with 2005 Solid Waste Strategy) across all scenarios therefore excluded from this costing comparison							
	Kitchen Waste Composting 9,000 tonnes per annum	Kitchen Waste Anaerobic Digestion 9,000 tonnes per annum	42,000 tonnes per annum of Refuse Derived Fuel exported to UK energy from waste plant	42,000 tonnes per annum of Refuse Derived Fuel exported to UK energy from waste plant	42,000 tonnes per annum of Refuse Derived Fuel sent to Jersey energy from waste plant	73,000 tonnes per annum of Fibre exported to UK energy from waste plant	73,000 tonnes per annum of Fibre exported to Jersey energy from waste plant
Recycling of metal from ash and bottom ash	Recycling of metal from ash and bottom ash	Recycling of metal from ash and bottom ash	Recycling of metal and stones	Recycling of metal and stones	Recycling of metal and stones, plus bottom ash	Recycling of metal, plastics and stones	Recycling of metal, plastics and stones, plus bottom ash
			22,000 tonnes per annum of Residues exported to UK landfill	22,000 tonnes per annum of Organic disposal on Jersey at sludge costs	22,000 tonnes per annum of Organic disposal on Jersey at sludge costs	24,000 tonnes per annum of Residues exported to UK landfill	24,000 tonnes per annum of Residues exported to UK landfill

Table 2 – Jersey waste disposal cost comparison summary: Processing 105 ktpa of residual waste

	Preferred solution	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
CAPITAL COSTS								
Energy from Waste facility	£91,600,000	£89,600,000	£89,600,000	---	---	£56,946,000	---	£70,501,000
Bulky Waste Facility	£1,800,000	£1,800,000	£1,800,000	£1,800,000	£1,800,000	£1,800,000	£1,800,000	£1,800,000
Composting	---	£3,000,000	---	---	---	---	---	---
Anaerobic Digestion	---	---	£6,500,000	---	---	---	---	---
Mechanical-Biological Treatment	---	---	---	£46,395,000	£46,395,000	£46,395,000	---	---
Autoclave	---	---	---	---	---	---	£40,261,000	£40,261,000
Total Capital Cost	**£93,400,000**	**£94,400,000**	**£97,900,000**	**£48,195,000**	**£48,195,000**	**£105,141,000**	**£42,061,000**	**£112,562,000**
ANNUAL FINANCE COST	**£8,040,000**	**£8,127,000**	**£8,428,000**	**£4,149,000**	**£4,149,000**	**£9,051,000**	**£3,621,000**	**£9,690,000**
OPERATING COSTS								
Staffing Cost	£1,662,000	£1,954,000	£1,863,000	£393,000	£393,000	£1,532,000	£1,045,000	£2,707,000
Materials Cost	£834,000	£844,000	£841,000	£100,000	£100,000	£384,000	£1,305,000	£1,782,000
Maintenance Cost	£1,977,000	£2,027,000	£2,067,000	£710,000	£710,000	£1,849,000	£1,070,000	£2,480,000
Disposal Cost	£453,000	£463,000	£462,000	£8,391,000	£5,657,000	£347,000	£12,606,000	£3,417,000
Power Import Cost	£15,000	£379,000	£44,000	£555,000	£555,000	£562,000	£424,000	£439,000
Power Export Revenue	£2,704,000	£2,623,000	£2,654,000	£0	£0	£1,418,000	£0	£1,276,000
Recyclates Revenue	£0	£0	£0	£147,000	£147,000	£147,000	£203,000	£203,000
TOTAL OPERATING COST	**£2,237,000**	**£3,044,000**	**£2,623,000**	**£10,002,000**	**£7,268,000**	**£3,109,000**	**£16,247,000**	**£9,346,000**
TOTAL ANNUAL COST	***£10,277,000***	***£11,171,000***	***£11,051,000***	***£14,151,000***	***£11,417,000***	***£12,160,000***	***£19,868,000***	***£19,036,000***
Ranking	1	3	2	6	4	5	8	7

5 SMALLER PLANT OPTION

Juniper suggested that the option of building a plant sized to take today's residual waste, about 80,000 tonnes per annum, should be considered.

We have analysed this option by estimating the cost of a smaller two stream plant based upon the current tender information. This is summarised in the following table.

Smaller Plant Cost Assessment		
Preferred Solution		
Annual throughput	105,000	tonnes per annum
Capacity	15	tonnes per hour
2 x 7.5 tonnes per hour contract price	**£93.4**	**Million**
New 80,000 tpa plant		
Annual throughput	80,000	tonnes per annum
Capacity	11.4	tonnes per hour
80,000 tonne plant Cost	**£82.7**	**Million**
Third stream		
Capacity (Third Stream)	3.6	tonnes per hour
Total 3 stream capacity (80,000 plant + Third Stream)	105,000	tonnes per annum
Third Stream Plant Cost	£38.4	Million
Ash mound relocation	£0.90	Million
Planning and development	£3.00	Million
Third Stream Total Cost (2008 cost basis)	**£42.3**	**Million**
Total Cost for 3 stream plant (2008 cost basis)	**£125**	**Million**

The cost assessment assumes that the new plant to be installed immediately would have a capacity of 80,000 tonnes per annum, with a corresponding hourly throughput of 11.4 tonnes per hour. This plant would be built in the same location as the preferred solution. If waste does not grow, or additional recycling could be put in place to match any growth in waste, the estimated cost saving over the preferred solution is £10.7M. This excludes any additional recycling costs which are likely to more than cancel out this cost saving.

Operating cost savings will be relatively small. It will require the same number of staff to operate a 2 x 7.5 t/h plant as to operate a 2 x 5.7 t/h plant. Consumable costs are proportional to waste throughput, and therefore will be the same for either plant for the same annual tonnage. There may be some maintenance cost savings for the smaller plant. However, if a third stream is added, costs would increase substantially, as more staff will be needed, and maintenance for three units is comparatively more than for two units.

If residual waste arisings do grow as predicted so that the capacity of the smaller 80,000 tonnes per annum were exceeded, a third stream could be added as suggested by Juniper. We have estimated the basic cost for such a plant based on installing a third stream to take the capacity back to the recommended 15 t/h, that is an additional 3.6 t/h. This plant would be a stand-alone unit located alongside the 80,000 tonne per annum plant. The estimated cost of this plant would be £38.4M at today's prices. This cost reflects the fact that there is a significant economy of scale in this type of equipment. This is because the infrastructure around the facility (the roads, tipping area and access provisions) do not become much smaller as they are sized to cope with the same vehicle size. In addition, a new boiler unit needs the same number of components such as pumps, fans and electrical equipment, they are just smaller. Finally, design and project management costs are largely similar, independent of the unit size.

In addition to the plant cost, there is currently insufficient space available to locate a third stream alongside a new plant. There would be two options:

1) Remove a substantial part of the ash mound, estimated as about 40m wide, to relocate the entrance road and install the third stream to the East of the new plant.

2) Locate a stand-alone third stream on the site of the Connex bus workshop. As this would require the relocation of the workshop and mean the two plants were completely separated, plus that the new plant would sit very close to the oil farm, this option has not been considered further.

Removal of a large part of the ash mound is possible, but has some significant consequences. The hazardous ash would require locating, probably to new ash pits at La Collette. A preliminary cost estimate for moving the ash, creating new pits and making good the remaining part of the ash mound is £0.9M. Carrying out these works while the new 2 stream plant was operating close to capacity would be difficult, as road access would be disrupted. There are also environmental issues with moving the ash, and making good the existing ash pits, which are currently sealed, would also be difficult. Finally, the intention is to raise the existing ash mound to provide landscaping to partially screen the new plant from Havre de Pays. Removing a 40m strip would reduce the overall height of the mound, making the new plant more visible.

It is noted that if Jersey were to install a small capacity plant with the option to install a third stream later, the normal practice would be to allow for this in the engineering of the initial phase. This commonly means that roads are located to avoid needing to move them with a third stream, a larger bunker is provided so that there is no need to install a new bunker, and auxiliary systems, such as the ash handling system are designed to allow the ash from the third stream to be added in easily to avoid needing separate ash handling storage areas. This usually costs money initially, eating into the saving on the smaller plant, but makes a more significant saving in the total cost of the three streams.

Installing a third stream would not be a simple task. Even if each stage went smoothly, initial engineering and development would take about a year. The procurement process, States approval and the planning process would then be likely to add at least a further year. The enabling works to remove and make good the ash mound would take many months, followed by a construction phase for the third stream of around 28 months. Therefore at least 5 years would need to be allocated for this project. It is difficult to see how and when a decision could be made regarding the installation of a third stream, bearing in mind the potential variation in annual waste arisings, and the lack of any other disposal route. The current waste model predicts that residual waste will exceed 80,000 tonnes per annum by 2015. Therefore, pragmatically, planning for this would need to start by 2010 – well before the 80,000 tonne per annum plant was operating!

It is our strong recommendation that whilst the option to plan to install a third stream later and take a risk on a smaller plant is possible, it would not make sense for Jersey, as it would deliver only small initial cost savings, and place the Island's waste disposal strategy under high risk.

Appendix A Assumptions Used to Derive Table 2

Number	Description
1	**General**
1.01	Based on the year 2020
1.02	Plant construction begins in 2008
1.03	6.5% discount rate used for annual finance cost calculation which includes inflation. Finance cost includes interest costs plus repayment over 25 years.
1.04	The £92M turnkey price for Preferred solution was compared with the cost of a comparable facility in the UK to determine an overall "Jersey" cost factor which was then used to scale UK based prices for the other facilities
1.05	Current recycling and composting continue as normal (circa 30% as per the Solid Waste Strategy) across all scenarios, therefore the costs of these have been excluded from the comparison
1.06	The Bulky Waste Facility capital cost is £1.8M and maintenance is £144,750, which is present in all scenarios

2	**Preferred solution - Energy from Waste facility**
2.01	Staffing costs based on: 1 plant manager @ £61,899, 1 operations manager @ £54,023 1 Lab and environ compliance officer @ £31,000 1 technical supervisor @ £31,000, 2 technicians @ £30,784 6 shift managers @ £48,051, 6 process controllers @ £36,000, 6 plant operators @ £36,000, 5 drivers RHP @ £30,357, 5 ash cleaning operators @ £30,375
2.02	Maintenance for the Energy from Waste facility is taken as 2% of the capital cost
2.03	All other quantities based on the Preferred Bidder's tender and associated costs

3	**Case 1 - Energy from Waste and 9,000 additional tonnes/year of Kitchen Waste to Composting**
3.01	£2M capital cost reduction for the Energy from Waste facility, based on 9,000 tonnes/year of Kitchen Waste going to composting but only 3% reduction in energy produced, therefore 3% reduction in plant size.
3.02	As change in throughput is low, staffing costs are based on the Preferred solution: 1 plant manager @ £61,899, 1 operations manager @ £54,023 1 Lab and environ compliance officer @ £31,000 1 technical supervisor @ £31,000, 2 technicians @ £30,784 6 shift managers @ £48,051, 6 process controllers @ £36,000, 6 plant operators @ £36,000, 5 drivers RHP @ £30,357, 5 ash cleaning operators @ £30,375
3.03	Maintenance for the Energy from Waste facility is taken as 2% of the capital cost
3.04	A 3% reduction in ash production from the Energy from Waste facility
3.05	A 3% reduction in power exported from the Energy from Waste facility
3.06	All other quantities based on the Preferred Bidder's tender and associated costs
3.07	9,000 tonnes/year throughput of Kitchen Waste for composting
3.08	£3M capital cost for the composting facility (Based on a simple In-Vessel Composting facility), taking into account odour issues.

Number	Description
3.09	Staffing costs based on: 1 plant manager @ £38,000 1 secretary @ £18,000 and 1 admin @ £17,000 1 electrician @ £27,000 and 2 technicians @ £21,000 1 shift manager @ £30,000, 1 operator @ £26,000, 2 unskilled workers @ £15,000 and 1 crane operator and 3 drivers all @ £16,000
3.10	Maintenance yearly average is approximately 3% of the total capital cost
3.11	4,000 tones/year of compost is disposed of as a soil improver at a cost similar to that of sludge, £4 per tonne
3.12	5,000 MWh/year power required for the composting process, based on simple In-Vessel Composting system
3.13	Approximately 4,500 tonnes/year of water is required, scaled from the water usage of a similar composting process

4	**Case 2 - Energy from Waste and 9,000 tonnes/year of Kitchen Waste to Anaerobic Digestion**
4.01	£2M capital cost reduction for the Energy from Waste facility, based on 9,000 tonnes/year of Kitchen Waste going to composting but only 3% reduction in energy produced, therefore 3% reduction in plant size.
4.02	As change in throughput is low, staffing costs based on the Preferred solution: 1 plant manager @ £61,899, 1 operations manager @ £54,023 1 Lab and environ compliance officer @ £31,000 1 technical supervisor @ £31,000, 2 technicians @ £30,784 6 shift managers @ £48,051, 6 process controllers @ £36,000, 6 plant operators @ £36,000, 5 drivers RHP @ £30,357, 5 ash cleaning operators @ £30,375
4.03	Maintenance for the Energy from Waste facility is taken as 2% of the capital cost
4.04	A 3% reduction in ash production from the Energy from Waste facility
4.05	A 3% reduction in power exported from the Energy from Waste facility
4.06	All other quantities based on the Preferred Bidder's tender and associated costs
4.07	9,000 tonnes/year of Kitchen Waste throughput for digestion
4.08	Staffing costs based on: 1 technician @ £ 30,784 1 shift leader @ £48,051, 2 operators @ £36,000
4.09	Water consumption is estimated as 1/3 of the waste throughput in order to increase the moisture content from 60% to 90%.
4.10	Maintenance costs based on 2% of the capital cost
4.11	4,000 tones/year of compost is disposed of as a soil improver at a cost similar to that of sludge, £4 per tonne
4.12	Power imported is based on 45 kWh/tonne of input waste
4.13	900 MWh/year electricity produced from biogas

5	**Case 3 - Mechanical-Biological Treatment with Refuse Derived Fuel fraction exported to UK Energy from Waste facility and organic fraction exported to UK landfill**
5.01	Capital cost was scaled based on two similar plants in the UK, using 5% inflation, the euro element of the price was taken as 50% (based on the UK facility's cost

Number	Description
	breakdown) and the exchange rate is now 1.28 euro/£.
5.02	Staffing costs based on a similar UK facility: 1 plant manager @ £61,899 1 secretary @ £18,000 1 electrician @ £27,000, 1 technicians @ £30,784, 2 labourers @ £24,000 2 operators @ £36,000, 2 drivers/crane operators @ £24,000
5.03	Maintenance, Materials and Power imported costs are based on a similar UK plant
5.04	Mechanical-Biological Treatment facility outputs are (percentage of the input waste): 25% lost to atmosphere 40% Refuse Derived Fuel 21% Organics/Reject 9% Stone/Glass 3.3% Ferrous metal 0.7% Aluminium 1% Water effluent
5.05	Export costs per tonne of waste, based on the Response to Scrutiny Report on Waste Recycling: £40 shipping £20 transport £70 gate fee (as a 25 year cement kiln contract is not sustainable) £20 landfill £48 landfill tax BMW penalty has been excluded
5.06	42,000 tonnes/year of Refuse Derived Fuel is exported to a UK Energy from Waste facility (Shipping + Transport + Gate Fee)
5.07	22,050 tonnes/year of Organics/Reject is exported to a UK landfill (Shipping + Transport + Landfill + Landfill tax)
5.08	9,450 tonnes/year of stone/glass is disposed of for re-use at the in-organic landfill on Jersey for £11.33 / tonne (Based on current prices)
5.09	3,500 tonnes/year of ferrous metal is sent to Jersey scrapyard with no net profit
5.10	735 tonnes/year of aluminium is recycled for £200 per tonne (net)

6	**Case 4 - Mechanical-Biological Treatment with Refuse Derived Fuel fraction exported to UK Energy from Waste facility and residue sold as soil improver on Jersey**
6.01	Capital cost was scaled based on two similar plants in the UK, using 5% inflation, the euro element of the price was taken as 50% (based on the UK facility's cost breakdown) and the exchange rate of 1.28 euros/£.
6.02	Staffing costs based on a similar UK facility: 1 plant manager @ £61,899 1 secretary @ £18,000 1 electrician @ £27,000, 1 technicians @ £30,784, 2 labourers @ £24,000 2 operators @ £36,000, 2 drivers/crane operators @ £24,000
6.03	Maintenance, Materials and Power imported costs are based on a similar UK plant
6.04	Mechanical-Biological Treatment facility outputs are (percentage of the input waste): 25% lost to atmosphere 40% Refuse Derived Fuel

Number	Description
	21% Organics/Reject 9% Stone/Glass 3.3% Ferrous metal 0.7% Aluminium 1% Water effluent
6.05	Export costs per tonne of waste, based on the Response to Scrutiny Report on Waste Recycling: £40 shipping £20 transport £70 gate fee (as a 25 year cement kiln contract is not sustainable) £20 landfill £48 landfill tax BMW penalty has been excluded
6.06	42,000 tonnes/year of Refuse Derived Fuel is exported to a UK Energy from Waste facility (Shipping + Transport + Gate Fee)
6.07	22,050 tonnes/year of Organics/Reject is disposed of as soil improver at costs similar to that for sludge of £4 per tonne
6.08	9,450 tonnes/year of stone/glass is disposed of for re-use at the in-organic landfill on Jersey for £11.33 / tonne (Based on current prices)
6.09	3,500 tonnes/year of ferrous metal is sent to Jersey scrapyard with no net profit
6.10	735 tonnes/year of aluminium is recycled for £200 per tonne
6.11	We do not believe that this option is possible as the organic fraction will not comply with Animal By-Products Regulations and PAS 100 (Compost standard)

7	**Case 5 - Mechanical-Biological Treatment with residue exported to UK landfill and Refuse Derived Fuel fraction to Jersey based Energy from Waste facility**
7.01	Capital cost was scaled based on two similar plants in the UK, using 5% inflation, the euro element of the price was taken as 50% (based on the UK facility's cost breakdown) and the exchange rate of 1.28 euro/£.
7.02	Staffing costs based on a similar UK facility: 1 plant manager @ £61,899 1 secretary @ £18,000 1 electrician @ £27,000, 1 technicians @ £30,784, 2 labourers @ £24,000 2 operators @ £36,000, 2 drivers/crane operators @ £24,000
7.03	Maintenance, Materials and Power imported costs are based on a similar UK plant
7.04	Mechanical-Biological Treatment facility outputs are (percentage of the input waste): 25% lost to atmosphere 40% Refuse Derived Fuel 21% Organics/Reject 9% Stone/Glass 3.3% Ferrous metal 0.7% Aluminium 1% Water effluent
7.05	Export costs per tonne of waste, based on the Response to Scrutiny Report on Waste Recycling: £40 shipping £20 transport

Number	Description
	£70 gate fee (as a 25 year cement kiln contract is not sustainable) £20 landfill £48 landfill tax BMW penalty has been excluded
7.06	42,000 tonnes/year of Refuse Derived Fuel is exported to a Jersey based Energy from Waste facility
7.07	22,050 tonnes/year of Organics/Reject is exported to a UK landfill (Shipping + Transport + Landfill + Landfill tax)
7.08	9,450 tonnes/year of stone/glass is disposed of at the in-organic landfill on Jersey for £11.33 / tonne (Based on current prices)
7.09	3,500 tonnes/year of ferrous metal is sent to Jersey scrapyard with no net profit
7.10	735 tonnes/year of aluminium is recycled for £200 per tonne
7.11	Energy from Waste facility based on a single stream design as throughput is low
7.12	Net Calorific Value of the Refuse Derived Fuel fraction is assumed to be approximately 15 MJ/kg
7.13	Energy from Waste facility sized on the input waste and Net Calorific Value
7.14	Staffing costs based on reduced staffing of the Preferred solution due to the single stream: 1 plant manager @ £61,899, 1 operations manager @ £54,023 1 Lab and environ compliance officer @ £31,000 1 technical supervisor @ £31,000, 1 technicians @ £30,784 4 shift managers @ £48,051, 4 process controllers @ £36,000, 4 plant operators @ £36,000, 3 drivers RHP @ £30,357, 3 ash cleaning operators @ £30,375
7.15	Maintenance for the Energy from Waste facility is taken as 2% of the capital cost
7.16	All other quantities based on the Preferred Bidder's tender and associated costs

8	**Case 6 - Autoclave with Fibre fraction exported to UK Energy from Waste facility and residue exported to UK landfill**
8.01	Capital cost scaled from a similar plant in the UK, using 5% inflation, the euro element of the price was taken as 10% (based on the UK facility's cost breakdown) and the exchange rate of 1.28 euro/£
8.02	Staffing costs based on similar UK facility: 1 plant manager @ £61,899 , 1 maintenance manger @ £44,123 , 1 operations manager @ £54,023 1 admin clerk @ £19,000 1 electrician @ £27,000, 1 technician @ £30,784, 8 labourers @ £24,000 2 shift managers @ £48,051, 2 plant operators @ £36,000, 9 vehicle drivers/crane operators @ £24,000
8.03	Water required was taken as 15 tonnes per tonne of input waste
8.04	277 kWh of fuel per tonne of input waste required for steam generation
8.05	Maintenance of Autoclave based on similar plant in the UK
8.06	Effluent based on 5 tonnes per tonne of waste input
8.07	Autoclave outputs are (percentage of the input waste): 69% Fibre 7% aggregates 23% organics/residue 3.7% ferrous metal

Number	Description
	0.9% aluminium 7.6% plastics N.B. this totals more than 100% due to the water input
8.08	Export costs per tonne of waste, based on the Response to Scrutiny Report on Waste Recycling: £40 shipping £20 transport £70 gate fee (as a 25 year cement kiln contract is not sustainable) £20 landfill £48 landfill tax BMW penalty has been excluded
8.09	72,700 tonnes/year of Fibre is exported to a UK Energy from Waste facility (Shipping + Transport + Gate Fee)
8.10	23,900 tonnes/year of organic/residue is exported to a UK landfill (Shipping + Transport + Landfill + Landfill tax)
8.11	7,600 tonnes/year of stone/glass is disposed of for re-use at the in-organic landfill on Jersey for £11.33 / tonne (Based on current prices)
8.12	3,900 tonnes/year of ferrous metal is sent to Jersey scrapyard with no net profit
8.13	1,010 tonnes/year of aluminium is recycled for £200 / tonne
8.14	8,000 tonnes/year of plastic is recycled for no net profit (once shipping and handling costs have been incorporated)
8.15	Process required approximately 55 kWh / tonne of waste

9	**Case 7 - Autoclave with residue exported to UK landfill and Fibre fraction to Jersey based Energy from Waste facility**
9.01	Capital cost scaled from a similar plant in the UK, using 5% inflation, the euro element of the price was taken as 10% (based on the UK facility's cost breakdown) and the exchange rate of 1.28 euros/£
9.02	Staffing costs based on similar UK facility: 1 plant manager @ £61,899 , 1 maintenance manger @ £44,123 , 1 operations manager @ £54,023 1 admin clerk @ £19,000 1 electrician @ £27,000, 1 technician @ £30,784, 8 labourers @ £24,000 2 shift managers @ £48,051, 2 plant operators @ £36,000, 9 vehicle drivers/crane operators @ £24,000
9.03	Water required was taken as 15 tonnes per tonne of input waste
9.04	277 kWh of fuel per tonne of input waste required for steam generation
9.05	Maintenance of Autoclave based on similar plant in the UK
9.06	Effluent based on 5 tonnes per tonne of waste input
9.07	Autoclave outputs are (percentage of the input waste): 69% Fibre 7% aggregates 23% organics/residue 3.7% ferrous metal 0.9% aluminium 7.6% plastics N.B. this totals more than 100% due to the water input
9.08	Export costs per tonne of waste, based on the Response to Scrutiny Report on

Number	Description
	Waste Recycling: £40 shipping £20 transport £70 gate fee (as a 25 year cement kiln contract is not sustainable) £20 landfill £48 landfill tax BMW penalty has been excluded
9.09	72,700 tonnes/year of Fibre is exported to a Jersey based Energy from Waste facility
9.10	23,900 tonnes/year of organic/residue is exported to a UK landfill (Shipping + Transport + Landfill + Landfill tax)
9.11	7,600 tonnes/year of stone/glass is disposed of at the in-organic landfill on Jersey for £11.33 / tonne (Based on current prices)
9.12	3,900 tonnes/year of ferrous metal is sent to Jersey scrapyard with no net profit
9.13	1,010 tonnes/year of aluminium is recycled for £200 / tonne
9.14	8,000 tonnes/year of plastic is recycled for no net profit (once shipping and handling costs have been incorporated)
9.15	Process required approximately 55 kWh / tonne of waste
9.16	Energy from Waste facility based on a 2 stream design to increase availability and remove waste storage problems if a single line was shut down
9.17	Net Calorific Value of the Fibre is assumed to be approximately 7 MJ/kg
9.18	Energy from Waste facility sized on the input waste and Net Calorific Value
9.19	Staffing costs based on the Preferred solution staffing levels due to a similar sized plant: 1 plant manager @ £61,899, 1 operations manager @ £54,023 1 Lab and environ compliance officer @ £31,000 1 technical supervisor @ £31,000, 2 technicians @ £30,784 6 shift managers @ £48,051, 6 process controllers @ £36,000, 6 plant operators @ £36,000, 5 drivers RHP @ £30,357, 5 ash cleaning operators @ £30,375
9.20	Maintenance for the Energy from Waste facility is taken as 2% of the capital cost
9.21	All other quantities based on the Preferred Bidder's tender and associated costs