Submission to the Department of Planning and Environment in response to the Response to Submission for an Energy from Waste Facility (SSD6236) – February 2018

Summary position

1. Council has reviewed the Response to Submission (RTS) provided by the proponent and has concluded that the application must be **refused**.

2. Council considered this submission at its Ordinary meeting on 28 February 2018 and resolved to:

   - Request that the Planning Assessment Commission refuse the application for the State Significant Development (SSD) application lodged by The Next Generation (TNG) NSW Pty Ltd for a 3 lot subdivision, roadworks and construction of an Energy from Waste (EFW) facility in Honeycomb Drive, Eastern Creek: The key reasons for refusal are:

     a. The application does not meet the Director General's requirements

     b. The findings from the recent parliamentary inquiry into energy from waste technology have not been released

     c. There is no social licence for this proposal; there is significant and valid community concern

     d. We have strong concerns about the projected emissions

     e. There are significant waste management gaps in the information provided in the RTS

     f. There are significant issues identified by our environmental consultant

     g. There are issues that have been overlooked and not addressed in the RTS

     h. It is a prohibited development.

   - Request that we be given the opportunity to review the comments on the Response to Submissions of the other agencies, including the Department of Health and the Environment Protection Authority, before a recommendation is made to the PAC.

   - Advise the NSW Department of Planning and Environment that Council will strongly consider exercising any available right of appeal should the application be approved.

Our submission

Our submission to the NSW Department of Planning and Environment outlines our reasons for refusal under the following headings:

1. Director General's requirements
2. Parliamentary inquiry into energy from waste technology
3. Community concerns
4. Projected emissions
5. Waste management gaps
6. Issues identified by our environmental consultant
7. Issues not addressed in the RTS
8. Prohibited development
9. Review of RTS by other agencies
10. Conclusion
11. Appendices

1 Director General's Requirements

We submit the application must be refused as:

- **The application does not meet the Director General's Requirements**

The Director General's requirements (DGRs) for the EIS were issued in December 2013. As part of the EIS, the proponent was required to provide a risk assessment of the potential environmental impacts of the development and describe what measures would be implemented to avoid, minimise, and, if necessary, offset the potential impacts of the development.

Our assessment has concluded that the DGRs have not been met as follows:

(a) Misleading information on the need for the development

The RTS states that a key factor that has influenced the project is *'to provide New South Wales with the highest standard of technology in the Energy from Waste sector that is tried and proven successful'.* The use of certain technology cannot be considered as justification for why the project should proceed.

(b) Refusal to consider alternatives

No alternative sites were considered for the development. The Director-General's requirements state that the EIS must consider alternatives. The amended EIS and subsequent RTS do not consider alternatives, but rather attempt to justify why no other alternatives are required. This is not the same thing and attempts to distract from satisfaction of the requirement.

Using increased distance from the electricity grid as justification as to why no other alternatives should be considered is short sighted considering the facility has the potential to produce heat and steam, but were not considered as part of the proposal.

(c) Lack of justification for the development

If the proponent was conclusively convinced that the development would have a positive development outcome, and be in the best interests of the local community, then it would have stuck to the initial proposal and have been confident in the fact that approval would be granted.

Prior to any Energy from Waste facility being approved in NSW, a new overarching waste strategy for NSW, that takes into account the findings of the parliamentary inquiry into the waste industry, should be developed. It should go above and beyond the NSW Waste Avoidance and Resource Recovery Strategy, to provide clear direction for the future of Energy from Waste in NSW. It should also provide clearer justification for the need for these types of facilities and how they fit into the waste hierarchy.

(d) No public interest

The proponent has reduced the scale of the development by half, without providing any reasoning other than it was always the case that the second phase would not be implemented until phase one was successful. This demonstrates that, at its core, this development is a private venture for profit, with no demonstrated public need.

(e) Lack of commitment to proper risk assessment – no baseline data

Our previous submissions highlighted that in order to adequately undertake a risk assessment, and to ensure the development does not have adverse environmental impacts, the proponent must undertake air quality monitoring. This must be done for a period of one year prior to the plant operating, to obtain accurate localised baseline data. This will be vital to determine that the plant is not adversely impacting on the air quality of the surrounding area.

The proponent responded by saying '*TNG is not responsible for the operation of air pollution monitoring systems and baseline studies under government agency authority, and as such cannot comment on the nature of investment in these operations'.*

This demonstrates that the proponent is not interested in properly assessing the impacts of its proposal, to ensure that it does not impact on the health of the surrounding community.

Our request has nothing to do with baseline studies under government agency authority, but was intended to give the proponent the opportunity to prove to the community that the plant will not have a detrimental impact. The lack of commitment by the proponent to this request is a significant concern as it suggests that they are not confident that the development will not have an impact.

2 Parliamentary inquiry into energy from waste technology

We submit the application must be refused as:

- **The findings from the recent parliamentary inquiry into Energy from Waste technology have not been released**

(a) The approval process needs to ensure specific controls for Energy from Waste facilities reflect what can be achieved with best available and developing technology. We have maintained that the approval process must ensure that:

- The risks have been adequately assessed
- The right environmental controls are put in place
- There is adequate community consultation
- There are no compromises and no concessions.

(b) We have recommended that the Environment Protection Authority's Energy from Waste Policy provides mandatory requirements for any future proposal including:

- Clear and defined minimum requirements for Energy from Waste facilities in the NSW Protection of the Environment Operations Act 1997
- Energy from Waste facilities proprietorship, operator checks and licensing restrictions
- Planned obsolescence of the facility to meet the requirements of the NSW Waste Avoidance and Resource Recovery Act 2001.

(c) It is our view that any Energy from Waste Policy statement must be specifically referred to in the act and/or regulations to ensure compliance with it is compulsory.

(d) To supplement the Environment Protection Authority's Energy from Waste Policy Statement, we believe there need to be minimum standards for emissions that are specific to, and absolutely reflect, the best technology available for Energy from Waste facilities. If we are to follow the world's example and embrace Energy from Waste as a solution to our waste disposal needs, we need to learn from the overseas examples and show our local communities that our standards are the best.

(e) There is the strong potential that the Portfolio Committee No. 6 Planning and Environment inquiry into 'energy from waste' technology held in 2017 may result in further restrictions being imposed on future Energy from Waste developments.

(f) It may also trigger a change to the *Protection of the Environment Act 1997 (NSW)* Regulations.

(g) The submission by WSROC to the parliamentary inquiry also highlighted that there has not been sufficient waste planning for Metropolitan Sydney.

(h) Prior to any Energy from Waste facility being approved in NSW, a new overarching waste strategy for NSW, that takes into account the findings of the parliamentary inquiry into the waste industry, should be developed. It should go above and beyond the NSW Waste Avoidance and Resource Recovery Strategy, to provide clear direction for the future of Energy from Waste in NSW and provide clearer justification for the need for these types of facilities and how they fit into the waste hierarchy.

(i) There is strong potential for changes to legislation and/or the NSW Government's Policy Statement on Energy from Waste. Therefore, the NSW Government has an imperative and a duty of care to ensure that the development is only considered after the findings of the parliamentary inquiry are made publicly available. This is the only way to ensure the best possible outcome for the residents of Blacktown City and neighbouring council areas.

3 Community concerns

We submit the application must be refused as:

- **There is no social licence for this proposal and there are significant and valid community concerns**

(a) As detailed in the Environment Protection Authority's Energy from Waste Policy Statement, the proposal must have the support of the local Council and the local community.

(b) Blacktown City Council hosted a joint community information forum with the proponent on 6 February 2017 in Minchinbury. Community members strongly expressed their health fears and environment concerns with this proposal and it was evident that the Blacktown community, in particular Minchinbury residents, do not want this proposal to go ahead.

(c) Community members also expressed concerns with the validity of the proposal as a solution to waste disposal. A copy of a very recent review by the European Commission of EFW in Europe is provided in Appendix 1. This raises valid concerns about the value of EFW plants in the waste hierarchy, which could have the result of significantly discouraging the achievement of recycling targets.

(d) Public concern has become most evident as about 1,000 public objections to the proposal were received by the NSW Department of Planning and Environment.

(e) Since then, about 12,000 signatures have appeared on a petition against the facility submitted to the NSW Government.

(f) The proponent was given the opportunity during the RTS to address community liaison initiatives recommended by Council, however failed to even address the suggestions in our submission.

(g) The proponent has been given ample opportunity to convince us that the proposal will benefit the local area, yet has failed to do so. Instead, the proponent has chosen to publicly dismiss our concerns at a number of public forums, including an address at a recent waste conference and various radio interviews.

(h) The proponent even offered to install solar panels at 1,000 homes in Erskine Park and Minchinbury once construction of the proposed waste incinerator begins. There is an irony about an offer to give away solar panels in exchange for getting support for a waste incinerating electricity generator. Giving away solar panels cannot be considered a social licence.

(i) Despite the assurances from the proponent that there has been adequate community consultation, the opposition and pressure from the community continues to mount.

4 Projected emissions

We submit the application must be refused as:

- **We have strong concerns about the projected emissions**

(a) Our concerns are centered around the changes to the predicted levels of emissions each time the proponent is given a further chance to revise the application.

(b) The following examples highlight our concerns:

- **Nitrogen Oxide**

  By way of example, the pollutant comparison table provided at Appendix 2 highlights the changing levels of Nitrogen Oxide emissions throughout the life of the ever-amending Environmental Impact Statement (EIS). The average emission limit continues to decrease, from 286 mg/m3 in the initial EIS, now down to 120 mg/m3 in the RTS.

  A check of the proponent's reference facility, 'Riverside', reveals consistent monthly average emissions of around 170 mg/m3. If the same technology is being used and a similar waste stream, then the proponent's ability to accurately report on projected emissions needs to be considered.

(c) The RTS Appendix N also states that the technology can be optimised to reach 120 mg/m³ Nitrogen Oxide and this has been adopted for the EFW facility. The increased efficiency comes with a modest increase of CAPEX and additional consumption of ammonia. If the proponent was truly concerned about the health of the community and using best practice, why wasn't this level of optimisation included in the first place.

- **Dioxin testing**

  In terms of monitoring emissions, it is also unacceptable that it is proposed that a facility of this magnitude would only undertake dioxin testing twice in a 12 month period. Relying on the assumption that the pollution control devices will adequately remove dioxins is unacceptable.

  Even the reference facility 'Riverside' conducts quarterly dioxin testing after having operated since 2011. If the facility is approved, to provide the public with an increased level of assurance, dioxin testing should be undertaken monthly during the proof of performance commissioning period.

- **Greenhouse gases**

  The project is claiming it will deliver a net positive greenhouse gas effect, and remove approximately 544,000 tonnes of CO_2 per annum, yet after 4 attempts at justifying this, our independent environmental consultant (Jacobs) has still determined that there is a general lack of detail and clarity surrounding the calculations.

  Jacobs has determined that 'there is a general lack of detail or clarity in calculations to determine the magnitude of GHG emissions. Greater detail should be presented on calculation methods. In particular, the specific assumptions regarding Degradable Organic Carbon (DOC) content and fossil carbon % of specific feedstocks could be presented to make clear the assumptions used in the calculation process'.

- **Cadmium**

  Jacobs has highlighted that there remains a potential for Cadmium to exceed the ambient air quality criteria in the event of plant upset conditions.

- **Other pollutants**

  A pollutant comparison table is provided at Appendix 2. It highlights the changes in projected pollutant levels for each revised version of the EIS and the RTS. For solid particles, TOC, Hydrogen Chloride, Mercury, Sulphur Dioxide, Hydrogen Fluoride and Carbon Monoxide there are significant reductions which are not justified in the RTS and require further explanation to verify the accuracy, particularly given that the technology has not changed.

(d) The other major concern is that the modelling for the projected emissions is based on when the plant is operating under ideal conditions. We are not aware of any modelling for a worst case scenario when the plant continues to operate instead of shutting down.

5 Waste management gaps

We submit the application must be refused as:

- **There are significant waste management gaps in the information provided in the RTS**

(a) There are still issues in the RTS that we have significant concerns about, including the source of the waste and the inability of the proponent to guarantee procedures and processes that satisfactorily demonstrate how all waste will be satisfactorily sorted.

(b) Waste fuel will be sourced through the neighbouring Genesis Xero Waste plant and also potentially without adequate screening through independent third parties.

(c) The RTS indicates that waste types will include chute residual waste from Genesis, commercial and industrial waste (C&I), construction and demolition waste (C&D), floc waste from car and metal shredding, paper pulp, glass recovery, garden organics, alternative waste treatment residues and material recovery plant waste residues.

(d) We are concerned that some of this material may be unsuitable for the EFW plant (e.g. it may contain hazardous material such as asbestos, with asbestos fibres not being able to be completely incinerated) and should continue to be sent to landfill, or it may be capable of further recycling.

(e) The RTS specifically states that it is ‘highly unlikely’ that asbestos will enter the waste stream, and if it does accidently then there is no way it can escape the facility as it will either end up as fly ash or bottom ash. If that is the case then all fly and bottom ash must be handled as potentially asbestos containing material and disposed of accordingly. Considering that ferrous material is proposed to be removed from the bottom ash and transported to a metal recycler, we need an assurance that the metal does not have some asbestos residue in it, as the metal is covered with ash.

(f) It is considered appropriate that each waste load should undergo a thorough sort (rather than just a quick visual inspection) prior to determining if it should be rejected or not. If the acceptability of the load is determined by a visual inspection only, there is the potential for problem items (e.g. asbestos, gas bottles, other hazardous materials and those foreign objects not suitable for incineration) to be concealed. We believe all waste should first go through the Genesis plant to prevent this from occurring.

(g) Point (c) above includes a list of items that will fuel the EFW plant, and includes everything from glass and paper to garden organics. It is considered totally unsatisfactory that paper, garden waste, etc. is being added to the fuel stream for the proposed EFW plant and is not being recycled.

(h) The RTS states on page 59 that it confirms that the proposal '**does not seek approval for receiving or processing of MSW'**. The RTS also states on page 43 that it will be 'making use of residual waste fuel obtained from the **processing of various sources of municipal solid waste (MSW)**, commercial and industrial (C&I), construction and demolition waste (C&D)'. Clarification is required on whether the facility does or does not intend to process MSW.

6 Issues identified by our environmental consultant

We submit the application must be refused as:

- **There are significant unresolved issues as identified by our environmental consultant**

(a) An independent environment consultant, Jacobs Group (Australia) Pty Limited (Jacobs), has been engaged by Council to assess the RTS. Jacobs has advised that the application has addressed some aspects previously raised, but there are still gaps.

(b) Jacobs has previously provided standalone reviews of the initial and amended EIS. These reviews do not emphatically represent the view of Council, but have been used by Council to assist in our assessment process.

(c) The Jacobs review focused on:

- an update on the technology proposed in the submission
- the specialist reports contained in the RTS, to ensure that inadequacies and discrepancies previously identified have been adequately addressed.

(d) The Jacobs review of the RTS has outlined the following material findings:

- In summary the amended EIS presents an improved assessment compared with the original EIS. However, there remain some critical aspects of the development as presented which require further consideration and clarification, as follows:
    - o An air cooled condenser (ACC) has been proposed as the main cooling system. This has not been demonstrated to be best practice. Air cooling increases the noise output, reduces the efficiency of the plant, particularly during summer time, but has lower water consumption. Lower electricity production from high ambient temperatures has not been accounted for.

- Odour management when the facility boilers are offline for maintenance has not been addressed.
- Additional waste audit, composition and modelling data has been presented, providing further information on the quantity and type of proposed feedstock. There is ambiguity surrounding the nomination of suitable facilities which are capable of accepting Air Pollution Control (APC) residues from the EFW process. There is also an inconsistency regarding treated wood waste. The RTS and project design brief (PDB) state that treated wood will be removed and sent to landfill. However, the MRA Feedstock Review Report included 5,523 tonnes of chromated copper arsenate (CCA) treated timber as part of the feedstock inputs. Clarification is required on whether CCA treated timber will constitute part of the input feedstock and, if not, which materials will make up the remaining input tonnages. It is still unclear how C&I and C&D outputs from the Genesis MPC facility will be measured and reported on, however it is presumed that audit assumptions are applied on receival.
- In terms of odour impacts, the air quality assessment states that combustion air for the furnace will be extracted from the tipping hall, but it is recommended that ventilation be discussed more fully. For example, in the event the EFW plant is shut down, how will the foul air from the tipping hall be extracted and treated.
- With respect to operational noise, the amended EIS includes an assessment of low frequency noise (LFN) impacts. However, no detail as to how LFN impacts have been predicted is provided. It is noted that the EFW facility is proposed to include 24 air cooled condenser (ACC) units, each with a sound power level of 102 dB(A). This is a significant source of noise and ACCs can have dominant low frequency components. In summary, further assessment of LFN is recommended, particularly as the noise modelling shows that compliance with project specific noise levels is marginal during adverse meteorological conditions within residential areas of Erskine Park.
- The amended EIS and RTS include an assessment of stack plume rise and consider the potential impacts on aviation safety as required by the Civil Aviation Safety Authority (CASA) Plume Rise Assessment. There appear to be 2 errors in the application of CASA guidance to calculation of plume rise heights. It is expected that the errors would underestimate the buoyancy of the plumes from each of the 4 ducts. This needs further assessment to determine if there is any change to the conclusion of the assessment, which is that aviation airspace navigation will not be adversely impacted by the development.

(e) The full review of the RTS by Jacobs is provided at Appendix 3.

7 Issues not addressed in the RTS

We submit the application must be refused as:

- **There are issues that have been overlooked and not addressed in the RTS**

(a) This is the fourth time Council has considered and reviewed a variation of the EIS for the proposal, with the previous times being in March 2014 (SD330112), August 2015 (DD350055) and February 2017 (DD370006).

(b) In our official submissions to the Department, Council strongly objected to the proposal. Objections and concerns were also raised by government agencies including the NSW Environment Protection Authority, NSW Department of Health and neighbouring councils.

(c) The proponent has had at least 3 formal attempts to get this right, yet a significant number of the issues raised in our most recent submission were overlooked or ignored by the proponent in its RTS.

(d) These have been summarised in the table below.

Outstanding issue not addressed in the RTS	Comment
Section 1 (15): The Genesis Xero Waste plant lodged a separate Section 75 W application under the Environmental Planning and Assessment Act 1979 to seek approval for the construction of an undercover pre-sort centre (PSC) on its site to increase the amount of recycling achieved. This was approved by the Department of Planning and Environment in September 2016.	There was no mention of any further undercover pre-sort reflected in sorting practices.
Section 2 (g) (viii) Summary Statement: The technology proposed is based on European climatic conditions with shutdowns potentially at ambient temperatures above 37 degrees Celsius. The application must be refused as the technology proposed is not appropriate to the Australian setting.	There has been no change to the technology proposed to be implemented in the facility.
Section 2 (5) Waste Management table: Data on Alternative Waste Treatment (AWT) (i.e. non landfilled waste) and Garden Organic (GO) residual waste has been based on the Sydney Metropolitan Area Council data, however there are no proposed contracts with Councils that have been discussed.	No proposed contracts with Councils that have been discussed.
Section 2 (5) Waste Management table: Projections for future changes to available tonnages of material are not presented, to review waste growth, waste composition change, potential changes in recycling rates and the resulting feedstock effects.	Projections only account for Stage 1 construction and operation.
Section 2 (5) Waste Management table: Greater detail, including sources of data and assumptions, should be provided to provide confirmation that the plant will have sufficient feedstock of approved materials. However, performance trials must be undertaken during the commissioning phase and verified by the EPA prior to the commencement of operations.	Not indicated to be completed during the commissioning phase.

Outstanding issue not addressed in the RTS	Comment
Section 2 (5) Waste Management table: Procedures for complying with the NSW EPA Energy from Waste Policy are not sufficiently detailed to allow the reader to determine how compliance will be achieved, and how the recovery rates of C&I and C&D material streams post-processing (after materials are presumably mixed) will be demonstrated to the NSW EPA.	Not addressed.
Section 2 (5) soil and water table: Further information is required regarding surface water quality and groundwater quality. Baseline monitoring should be undertaken to allow appropriate pre-development and operational monitoring requirements.	RTS does not provide sufficient data due to lack of monitoring points and monitoring events.
Section 2 (5) noise table: Further assessment of low frequency noise is recommended, particularly as the noise modelling shows that compliance with project specific noise levels is marginal during adverse meteorological conditions within residential areas of Erskine Park.	Further assessment not completed.
Section 5 (5): To address the concerns relating to design and in order to achieve an architecturally innovative building, the proponent should be required to conduct an Architectural Design Competition for the envelope of the building. Alternatively, the building envelope should be redesigned and reviewed by the Government Architect's office or a panel of eminent architects to ensure the architectural design objectives are met.	Envelope not changed and design competition not addressed.
Section 6 (3) (a) (i): Waste management concerns i The proponent must outline how foreign objects will be excluded from the waste stream, to prevent the need for an abnormal operation allowance that has the ability to have an impact on meeting emission criteria.	Not addressed.
Section 6 (3) (a) (ii): ii The proponent must ensure all waste (with no exclusion) undergoes some form of validated pre-treatment at off-site waste transfer stations, or otherwise goes via Genesis for sorting.	Not addressed.
Section 6 (3) (d): Human health concerns i The Next Generation must undertake air quality monitoring for a period of one year prior to the plant operating, to obtain accurate baseline data to be used to determine that the plant is not adversely impacting on the air quality of the surrounding area when operations commence.	Not adequately addressed by the statement on page 117 - *TNG is not responsible for the operation of air pollution monitoring systems and baseline studies under government agency authority, and as such cannot comment on the nature of investment in these operations.*

Outstanding issue not addressed in the RTS	Comment
Section 6 (3) (e) (i): General environmental and community concerns i The EPA's Energy from Waste Policy Statement requires best practice. Therefore, prior to any approval, there needs to be a requirement that the proponent demonstrates that it **goes beyond** the requirements of the European Union's Industrial Emissions Directive's Best Available Technology reference document.	RTS on page 75 - Report only notes that the emissions produced from the EFW facility are defined by emission limits for waste incineration set by the European Union Industrial Emissions Directive (IED; Directive 2010/75/EU).
Section 6 (3) (e) (iii): The Next Generation proposal should have a designated NSW EPA regulatory officer to exclusively monitor the environmental performance for the life of the plant.	Not addressed.
Section 6 (3) (e) (vii): The proponent must obtain ISO 14001 environmental certification to demonstrate that the process being undertaken is industry best practice using the best available technology.	Not addressed.
Section 6 (e) (xii) (xiii) (xiv): The proponent must establish a Community Liaison Group of local stakeholders, including nearby businesses, objectors and residents, Council and the EPA, which will be a forum to discuss concerns and monitor the performance of the plant. The proponent must offset some community concerns by funding local community improvements and enhancement programs, which must be outlined in a Community Strategy and incorporate a visitor information and education centre within the plant. This should be operated for the life of the plant without charge to visitors.	Not addressed.
The proponent must host regular community forums and hold an annual open day to allow residents to tour the plant.	
Section 6 (3) (e) (xvi): Payment of a host fee to Council (similar to the current arrangements at the Eastern Creek Resource Recovery facility), based on a fee per tonne of waste processed, to assist in offsetting the impact of the plant on the community, e.g. damage to road surfaces from significant heavy vehicle movements and the enhancement of existing open space areas in the nearby suburbs, to improve the quality of life of residents who feel impacted by the development.	Not addressed.
Section 9 (5): No updated flood modelling has been provided. The response to submissions proposes to conduct this prior to any CC being issued. It is unlikely that the proposed development will be adversely impacted by flooding based on the preliminary information available and therefore this can be resolved prior to any CC. The proposed works may encroach into the existing flood extents and this issue needs to be addressed as part of the detailed design.	Flood modelling not provided.

Outstanding issue not addressed in the RTS	Comment
Section 9 (6): The amended EIS does not provide details of how public access will be provided to the proposed precinct basin. Details of the required public access should be provided and approved by Council prior to the issue of any CC.	Not addressed.
Section 9 (7): The original stream erosion index calculations may have included full storm water reuse in the developed conditions modelling. Amended stream erosion index calculations need to be provided based on the current strategy of harvesting roof water only for reuse.	Not addressed.

8 Prohibited development

We submit the application must be refused as:

- **It is a prohibited development**

Council previously noted that 'Electricity generating works' are prohibited in the IN1 General Industrial Zone, except when the zone objectives can be satisfied. The urban design objective of the IN1 General Industrial zone still has not been met. On this basis, as the design has not improved, we believe the development is prohibited.

9 Review of RTS by other agencies

There are many similarities between our concerns and the submissions and concerns made by other agencies, including the Department of Health and the NSW Environment Protection Authority, on the amended EIS.

Our focus has been a review of the RTS as it relates to our concerns.

Our environmental consultant was asked to review the Department of Health and Environment Protection Authority submissions and some references to similar shared concerns have been provided.

Given the technical detail of the EPA's concerns, the EPA's own experts would need to assess whether the proponent's Response to Submission sufficiently answers its concerns.

There should be a requirement that we are given the opportunity to review the comments on the Response to Submissions from the other agencies, including the Department of Health and the Environment Protection Authority, before a recommendation is made to the PAC.

10 Conclusion

Despite the RTS addressing some issues identified in the amended SSD application to the original EIS, the development application must be refused for the reasons outlined in this submission.

11 Appendices

1. European Commission - The role of waste-to-energy in the circular economy (dated 26 January 2017)
2. Pollutant comparison table
3. Copy of Jacobs Group (Australia) Pty Limited RTS review

EUROPEAN
COMMISSION

Brussels, 26.1.2017
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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

The role of waste-to-energy in the circular economy

1. Introduction

On 2 December 2015, the Commission adopted an EU action plan for the circular economy,[1] offering a transformative agenda with significant new jobs and growth potential and aiming at fostering sustainable consumption and production patterns, in line with EU commitments under the 2030 Agenda for Sustainable Development.

The action plan stressed that the transition to a more circular economy requires action throughout a product's life-cycle: from production to the creation of markets for 'secondary' (i.e. waste-derived) raw materials. Waste management is one of the main areas where further improvements are needed and within reach: increasing waste prevention, reuse and recycling are key objectives both of the action plan and of the legislative package on waste[2].

Achieving these objectives can open up tangible economic opportunities, improve raw materials supply to industry, create local jobs and reaffirm European leadership in the green technologies sector, which has a proven growth potential also at global level. In the EU, the output of environmental goods and services per unit of gross domestic product has grown by more than 50 % over the last decade and the employment linked to this production has risen to more than 4 million full-time equivalents[3]. At global level, the World Bank has estimates that over the next 10 years EUR 6 trillion will be invested in clean technologies in developing countries, with some EUR 1.6 trillion accessible to SMEs.[4]

In order to tap into this potential, promote innovation and avoid potential economic losses due to stranded assets, investment in new waste treatment capacity needs to be framed in a long-term circular economy perspective and to be consistent with the EU waste hierarchy, which ranks waste management options according to their sustainability and gives top priority to preventing and recycling of waste. EU legislation on waste, including recent proposals for higher recycling targets for municipal and packaging waste and for reducing landfill, is guided by the waste hierarchy and aims to shift waste management upwards towards prevention, reuse and recycling.

This communication focuses on energy recovery from waste and its place in the circular economy. Waste-to-energy is a broad term that covers much more than waste incineration. It encompasses various waste treatment processes generating energy (e.g. in the form of electricity/or heat or produce a waste-derived fuel), each of which has different environmental impacts and circular economy potential.

The main aim of this communication is to ensure that the recovery of energy from waste in the EU supports the objectives of the circular economy action plan and is firmly guided by the EU waste hierarchy. The communication also examines how the role of waste-to-energy processes can be optimised to play a part in meeting the objectives set out in the Energy

[1] *Closing the loop — An EU action plan for the circular economy*, COM(2015) 614 final. A circular economy is one in which the value of products, materials and resources is maintained for as long as possible, minimising waste and resource use.

[2] COM(2015) 593, 594, 595 and 596 final.

[3] http://ec.europa.eu/eurostat/statistics-explained/index.php/Environmental_goods_and_services_sector

[4] *Building competitive green industries: The climate and clean technology opportunity for developing countries*, The World Bank, 2014.

Union Strategy[5] and in the Paris Agreement[6]. At the same time, by highlighting proven energy-efficient technology the approach to waste-to-energy set out here is meant to provide incentives for innovation and help create high-quality jobs.

To attain these objectives, the communication:

- clarifies the position of different waste-to-energy processes in the waste hierarchy and what this entails for public financial support (section 2);

- provides guidance to Member States on how to make better use of economic instruments and capacity planning with a view to avoiding or addressing potential overcapacity in waste incineration (section 3); and

- identifies the technology and processes which currently hold the greatest potential to optimise energy and material outputs, taking into account expected changes in the feedstock for waste-to-energy processes (section 4).

2. Positioning waste-to-energy processes in the waste hierarchy and the role of public financial support

The waste hierarchy[7] is the cornerstone of EU policy and legislation on waste and a key to the transition to the circular economy. Its primary purpose is to establish an order of priority that minimises adverse environmental effects and optimises resource efficiency in waste prevention and management.

This communication covers the following main waste-to-energy processes[8]:

- co-incineration of waste in combustion plants (e.g. power plants) and in cement and lime production;

- waste incineration in dedicated facilities;

- anaerobic digestion of biodegradable waste;

- production of waste-derived solid, liquid or gaseous fuels; and

- other processes including indirect incineration following a pyrolysis or gasification step.

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[5] http://ec.europa.eu/priorities/energy-union-and-climate/state-energy-union_en

[6] http://unfccc.int/paris_agreement/items/9485.php

[7] As set out in Article 4 of Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives, OJ L 312, 22.11.2008, p. 3.

[8] As identified in the dedicated Commission study: *Towards a better exploitation of the technical potential of waste-to-energy*, European Union, 2016. http://publications.jrc.ec.europa.eu/repository/bitstream/JRC104013/wte%20report%20full%2020161212.pdf.

These processes have different environmental impacts and rank differently in the waste hierarchy. In fact, waste-to-energy processes encompass very different waste treatment operations, ranging from 'disposal' and 'recovery' to 'recycling'. For example, processes such as anaerobic digestion which result in the production of a biogas and of a digestate are regarded by EU waste legislation9 as a recycling operation. On the other hand, waste incineration with limited energy recovery is regarded as disposal. The figure 1 below illustrates the positioning of different waste-to-energy processes along the EU waste hierarchy.

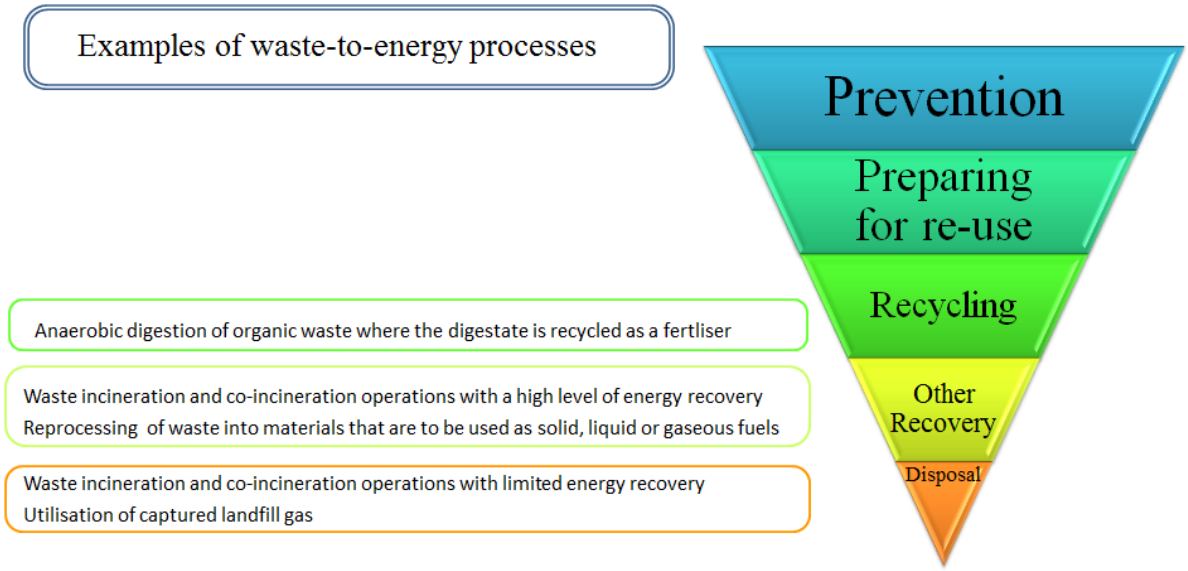


Figure 1. The waste hierarchy and waste-to-energy processes

It important to stress that the waste hierarchy also broadly reflects the preferred environmental option from a climate perspective: disposal, in landfills or through incineration with little or no energy recovery, is usually the least favourable option for reducing greenhouse gas (GHG) emissions; conversely, waste prevention, reuse and recycling have the highest potential to reduce GHG emissions.

It is also worth recalling that Member States have some flexibility in the application of the hierarchy, as the ultimate goal is to encourage those waste management options that deliver the best environmental outcome.[10] For some specific waste streams, achieving the best environmental outcome may entail departing from the priority order of the hierarchy, i.a. for reasons of technical feasibility, economic viability and environmental protection. This must be justified in line with the provisions laid out in Article 4(2) of the Waste Framework

[9] Article 2 (6) of Commission Decision 2011/753/EU establishing rules and calculation methods for verifying compliance with the targets set in Article 11(2) of Directive 2008/98/EC of the European Parliament and of the Council. OJ L 310 of 25.11.2011.

[10] Article 4 (2) of Directive 2008/98/EC in conjunction with the EU guidance on the interpretation of the waste hierarchy: http://ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf (pages 48 to 52).

Directive[11]. For instance, in some specific and justified cases, (e.g. materials that contain certain substances of very high concern), disposal or energy recovery may be preferable to recycling[12].

To support the transition towards a more circular economy, public financing of waste management, whether national or at EU level, should be consistent with the goal of shifting upwards in the implementation of the EU waste hierarchy.

At EU level, the transition towards more sustainable waste management systems receives financial support, mainly through the co-financing of the Cohesion Policy funds[13] In the case of these funds, pre-conditions must be met to ensure that new investments in the waste sector are in line with waste management plans designed by Member States to meet their preparation for reuse and recycling targets. As stated in the circular economy action plan, this means that investments in treatment facilities for residual waste, such as extra incineration capacity would only be granted in limited and well justified cases, where there is no risk of overcapacity and the objectives of the waste hierarchy are fully respected.

Investments channelled through other EU financing mechanisms, such as the European Fund for Strategic Investment (EFSI) also have an important role to play in attracting private financing to the best and most 'circular' solutions for waste management through loans, guarantees, equity and other risk-bearing mechanisms. In addition, available EU financial support for research and innovation in waste-to-energy technologies, (e.g. Horizon 2020[14], but also Cohesion Policy funds) contributes to ensuring continued EU leadership and bringing advanced energy-efficient technologies to the market.

At national level, public financial support has also often played a key role in developing more sustainable waste management solutions and in promoting renewable energy and energy efficiency. When assessing public financial support for waste-to-energy processes, it is particularly important not to undermine the waste hierarchy by discouraging waste management options with higher circular economy potential. This is clearly reflected in the existing guidelines on state aid for environmental protection and energy which state that support for energy from renewable sources using waste or support for cogeneration and district heating installations using waste can make a positive contribution to environmental protection provided it does not circumvent the waste hierarchy. Public funding should also avoid creating overcapacity for non-recyclable waste treatment such as incinerators. In this respect it should be borne in mind that mixed waste[15] as a feedstock for waste-to-energy

[11] *Supporting environmentally sound decisions for waste management*, European Union, 2011. http://publications.jrc.ec.europa.eu/repository/bitstream/JRC65850/reqno_jrc65850_lb-na-24916-en-n%20_pdf_.pdf

[12] As announced in the Circular Economy action plan, the Commission is currently analysing options to address the interface between chemicals, products and waste legislation, including how to reduce the presence and improve the tracking of chemicals of concern in products.

[13] In particular, the European Regional Development Fund and the Cohesion Fund.

[14] http://www.eib.org/products/blending/innovfin/

[15] For the purpose of this communication, this category includes the following non-separately collected waste streams: household and similar waste, undifferentiated materials and sorting residues.

processes is expected to fall as a result of separate collection obligations and more ambitious EU recycling targets. For these reasons, Member States are advised to gradually phase-out public support for the recovery of energy from mixed waste.

3. Waste-to-energy processes for treating residual waste: finding the right balance

The transition towards a circular economy requires striking the right balance when it comes to waste-to-energy capacity for the treatment of non-recyclable waste. This is critical to avoid potential economic losses or the creation of infrastructural barriers to the achievement of higher recycling rates. Previous experience in some Member States shows the risk of stranded assets is real.

A recent study[16] commissioned by the European Environment Agency maps existing dedicated incineration capacity for municipal waste in the EU-28 countries and the flows of municipal waste and refuse-derived fuel (RDF)[17] between Member States. The study shows that between 2010 and 2014, the incineration capacity in the EU-28 countries (plus Switzerland and Norway) increased by 6 % to 81 Mt and that waste flows between some Member States for the incineration of municipal waste and RDF remained significant in some cases. In 2013, close to 2.5 Mt of waste (most of it RDF) was shipped for energy recovery.

The study also confirms that dedicated incineration capacity for municipal waste is unevenly spread in the EU. Germany, France, the Netherlands, Sweden, Italy and the UK account for three quarters of the EU's incineration capacity. Sweden and Denmark have the highest per capita incineration capacity with 591 kg/cap and 587 kg/cap respectively, followed by the Netherlands, Austria Finland and Belgium. In contrast, the southern and eastern parts of the EU are practically devoid of dedicated incineration capacity and are highly reliant on landfill. This data is in line with Eurostat statistics on the incineration rates of municipal waste which also show great variation across Member States.

Depending on their specific situation, Member States have various options to ensure that waste-to-energy capacity, in particular incineration, is properly balanced:

Member States with low or non-existent dedicated incineration capacity and high reliance on landfill

These Member States should give priority to further development of separate collection schemes and recycling infrastructure in line with EU legislation. The gradual diversion of waste from landfill should go hand-in-hand with the creation of greater recycling capacity. Reducing the landfilling of biodegradable waste is particularly urgent from a climate perspective so as to reduce methane emissions. Here, the development of combined energy recovery and material recycling capacity in the form of anaerobic digestion could represent an attractive management option.

[16] *Assessment of waste incineration capacity and waste shipments in Europe*, WI et al, 2016. European Topic Centre on Waste and Materials in a Green Economy (ETC/WMGE), 2017.
http://forum.eionet.europa.eu/nrc-scp-waste/library/waste-incineration

[17] RDF is a fuel produced from the treatment (e.g. shredding and dehydrating) of municipal solid waste.

When reviewing national waste management plans and assessing the need for additional waste-to-energy capacity for the treatment of non-recyclable waste (e.g. incineration), Member States should take a long-term perspective and carefully assess the following factors:

- the impact of existing and proposed separate collection obligations and recycling targets on the availability of feedstock to sustain the operation of new incineration plants over their lifespan (20 -30 years);

- the available capacity for co-incineration in combustion plants and in cement and lime kilns or in other suitable industrial processes; and

- planned or existing capacity in neighbouring countries.

In justified cases, the cross-border shipments of waste could help to make optimal use of the waste-to-energy capacity already available in a number of Member States. Exporting non-recyclable waste for energy recovery to another Member State should not necessarily be seen as contradicting the so-called principle of proximity (i.e. using the nearest appropriate facility) that underpins EU waste legislation.[18] However, before opting for such approach competent authorities in the Member States should carry out a life-cycle analysis to ensure that the overall environmental impacts, including those related to the transport of waste, do not offset the sought benefits

Where the creation of new capacity for the treatment of residual waste appears justified based on the assessment of all the factors mentioned above, Member States should pay particular attention to the use of state-of-the-art energy-efficient technologies and to the size and location of the plant (e.g. to avoid future overcapacities and ensure combined supply of electricity and heat or cooling to local residents and industry where possible). It is also crucial to ensure full compliance with the requirements for incineration and co-incineration facilities set out in EU legislation, in particular the Industrial Emissions Directive 2010/75/EC.[19]

Member States with high dedicated incineration capacity

The European Environment Agency study suggests there is currently no incineration overcapacity in the EU as a whole. However, the statistics[20] show that some individual Member States are excessively reliant on incineration of municipal waste. This situation may be partly explained by high demand for heat through district heating networks, the higher efficiency of their waste-to-energy processes and high levels of social acceptance. Nonetheless, such high rates of incineration are inconsistent with more ambitious recycling targets. To address this problem a number of measures can be taken at national level and have already been implemented in some Member States, in particular:

[18] See Article 16 of Directive 2008/98/EC.

[19] OJ L 334, 17.12.2010. This Directive includes operational requirements and emission limit values based on the best available techniques, aimed at protecting human health and the environment from industrial processes.

[20] http://ec.europa.eu/eurostat/documents/2995521/7214320/8-22032016-AP-EN.pdf

- introducing or increasing incineration taxes, especially for processes with low energy recovery while ensuring they are paired with higher landfill taxes;

- phasing out support schemes for waste incineration and, where appropriate, redirecting support to higher-ranking processes in the waste hierarchy; and

- introducing a moratorium on new facilities and decommissioning older and less efficient ones.

4. Optimising the contribution of waste-to-energy processes to the EU's climate and energy objectives in the circular economy

According to the Commission study, in 2014 approximately 1.5 % of the EU's total final energy consumption was met by recovering energy from waste through incineration, co-incineration in cement kilns and anaerobic digestion (i.e. around 676 PJ/year). Whereas this percentage should not significantly increase in the future as more waste is directed to recycling, improving the energy efficiency of waste-to-energy processes and promoting those processes which combine material and energy recovery can contribute to decarbonising key sectors such as heating and cooling or transport and to reducing greenhouse gas emissions from the waste sector. For instance, diverting one tonne of biodegradable waste from a landfill towards anaerobic digestion to produce biogas and fertilisers can prevent up to 2 tonnes of CO_2 equivalent emissions.[21]

Expected changes in waste-to-energy feedstock

Mixed waste still accounts for a substantial share of the waste used in waste-to-energy processes, mainly incineration (52 %). Existing legal requirements and the circular economy waste proposals are bound to change this situation. Rules on separate collection and more ambitious recycling rates covering wood, paper, plastic and biodegradable waste are expected to reduce the amount of waste potentially available for waste-to-energy processes such as incineration and co-incineration. Ljubljana is an example of a city that has already managed to move rapidly and successfully to high levels of separate collection: From 2011 on Ljubljana has invested in the modernisation of the waste management infrastructure leading to the separate collection rate of 60% on total municipal waste generation[22].

For *biodegradable waste*, the implementation of the requirements laid down in the Landfill Directive,[23] in combination with the proposed new rules to ensure separate collection of bio-waste, should result in greater production of waste-derived biogas for the use in cogeneration, injection into the gas grid, and the use in transport fuels, and fertilisers through anaerobic digestion. Proposed changes to the Fertilisers Regulation,[24] currently under discussion in Parliament and the Council, should support this trend by opening up the single market for

[21] *Review of comparative LCAs of food waste management systems – Current status and potential improvements*, A. Bernstad, J. la Cour Jansen, Science Direct, Volume 32, Issue 12, December 2012.

[22] http://ec.europa.eu/environment/waste/studies/pdf/Separate%20collection_Final%20Report.pdf

[23] Article 6 (a) of Directive 1999/31/EC on the landfill of waste. OJ L 182 of 16.7.1999.

[24] http://ec.europa.eu/DocsRoom/documents/15949

waste-derived fertilisers. The potential of biodegradable waste coupled with anaerobic digestion processing in a biogas plant is seen in Milan.[25] Since 2014, the city has almost reached 100% collection of food and organic waste, providing an average of 120 000 tonnes of biodegradable waste per year. At full capacity (12.8 MW), the city biogas plant should produce some 35 880 MWh of electricity a year, enough to supply 24 000 people, and yield 14 400 tonnes of fertiliser.

In the case of *waste edible oils and fats*, there is scope for improving the efficiency of collection and treatment systems to produce products such as biodiesel and hydrogenated vegetable oils (HVO). The resulting waste-derived biofuel can be used directly in transport, including the use of HVO in aviation..

As regards plastic waste, industry data[26] shows that disposal and energy recovery remain the most common treatment options and that while landfilling has decreased over the past ten years incineration has been growing with big disparities between Member States linked to various states of implementation of existing EU legislation. This confirms the need for urgent and concrete steps to improve the recyclability and reusability of plastics and to encourage innovation in this field. The upcoming EU strategy on plastics in the circular economy[27] will precisely aim to improve the economics, quality and uptake of plastic recycling and reuse by looking at the entire value chain. It will consider some new developments in the treatment of plastic waste, such as re-refining and innovations in design, so that in the future a higher share of plastic waste can be prevented or diverted from energy recovery to recycling, thus reducing overall GHGs impacts.[28].

The Commission study found that *wood waste* is commonly used as a feedstock for incineration. As highlighted in the circular economy action plan, a cascading use of renewable resources such as wood, with several reuse and recycling cycles, should be encouraged where appropriate, in line with the waste hierarchy. In this context, it should be recalled that in its legislative package on waste, the Commission has, *inter alia*, proposed a higher mandatory EU-level target on recycling wood packaging waste. Where reuse or recycling is not possible, energy use of wood waste is desirable to replace fossil fuels and avoid landfilling of wood.

Using the most energy-efficient waste-to-energy techniques

Where waste-to-energy processes are opted for, there is a need to ensure that the most efficient techniques are used: this maximises their contribution to the EU's climate and energy objectives. The Commission study estimates that if proven techniques and supporting measures are properly implemented, the amount of energy recovered from waste could rise by 29 % to 872 PJ/year, using exactly the same amount of waste as feedstock. This shows the potential for energy efficiency improvements. The Commission study found that the best

[25] http://european-biogas.eu/wp-content/uploads/2016/03/Milan.pdf

[26] http://www.plasticseurope.org/Document/plastics---the-facts-2016-15787.aspx?FolID=2

[27] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013DC0123

[28] Recycling plastics releases only a forth or even less of the GHG emitted by producing plastics from fossil-based primary feedstock *(Increased EU Plastics Recycling Targets: Environmental, Economic and Social Impact Assessment*, Bio by Deloitte, 2015).

proven techniques to increase energy efficiency for the four waste-to-energy processes below were as follows:

- *co-incineration in combustion plants:* gasification of solid recovered fuel[29] (SRF) and co-incineration of the resulting syngas in the combustion plant to replace fossil fuels in the production of electricity and heat;

- *co-incineration in cement and lime production:* conversion of waste heat to power in cement kilns;

- *waste incineration in dedicated facilities:*
  - the use of super heaters;
  - harnessing the energy contained in flue gas;
  - the use of heat pumps;
  - supplying chilled water for district cooling networks; and
  - distributing heat from waste through low temperature district heat networks.

- *anaerobic digestion:* upgrading of the biogas into bio-methane for further distribution and use (e.g. injection into the gas grid and transport fuel).

Apart from the above-mentioned specific techniques, the Commission study highlights the superior energy efficiency levels attainable by installations working in combined heat and power (CHP) mode, compared to plants merely producing either heat or electricity.

In addition to these techniques, the study lists supporting measures to improve energy and/or material efficiency in these processes. This includes the development of industrial parks and symbiosis whereby a waste-to-energy plant processes the waste generated by industries located nearby while providing them heat and power in return; or the recovery of materials found in incinerator bottom ash.

In anaerobic digestion, it is also important to avoid the risk of methane leaks from biogas plants due to poor design or maintenance, as these would offset some of the plants' environmental benefits.

5. Conclusions

Waste-to-energy processes can play a role in the transition to a circular economy provided that the EU waste hierarchy is used as a guiding principle and that choices made do not prevent higher levels of prevention, reuse and recycling. This is essential in order to ensure the full potential of a circular economy, both environmentally and economically and to reinforce the European leadership in green technology. Moreover, it is only by respecting the waste hierarchy that waste-to-energy can maximise the circular economy's contribution to decarbonisation, in line with the Energy Union Strategy and the Paris agreement. As mentioned earlier, it is waste prevention and recycling that deliver the highest contribution in terms of energy savings and reductions in GHGs emissions.

[29] SRF is a fuel produced from non-hazardous waste in accordance with EU standards EN15359.

In the future, more consideration should be given to those processes, such as anaerobic digestion of biodegradable waste, where material recycling is combined with energy recovery. Conversely, the role of waste incineration – currently, the predominant waste-to-energy option - needs to be redefined to ensure that increases in recycling and reuse are not hampered and that overcapacities for residual waste treatment are averted.

The Commission calls on all Member States to take into account the guidance provided in this communication when evaluating and revising their waste management plans under EU legislation[30]. When planning future investments on waste-to-energy capacity, it is essential that Member States take into consideration the risk of stranded assets. When assessing national waste management plans and monitoring progress towards the EU recycling targets, the Commission will continue to provide guidance on ensuring that waste-to-energy capacity planning is consistent with, and supportive of, the waste hierarchy and that it takes into account the potential of new and emerging waste treatment and recycling technologies.

The Commission remains committed to ensuring that EU funding and other public financial support is directed towards waste treatment options that are in line with the waste hierarchy, and that priority is given to waste prevention, reuse, separate collection and recycling.

[30] See Article 30(1) of Directive 2008/98/EC.

Pollutant comparison table

This table highlights the changes in projected pollutant levels for each revised version of the EIS and the RTS. It also provides a comparison of the NSW regulations compared to the European regulations. The North London Heat and Power Project – Islington Council is provided as a best practice example.

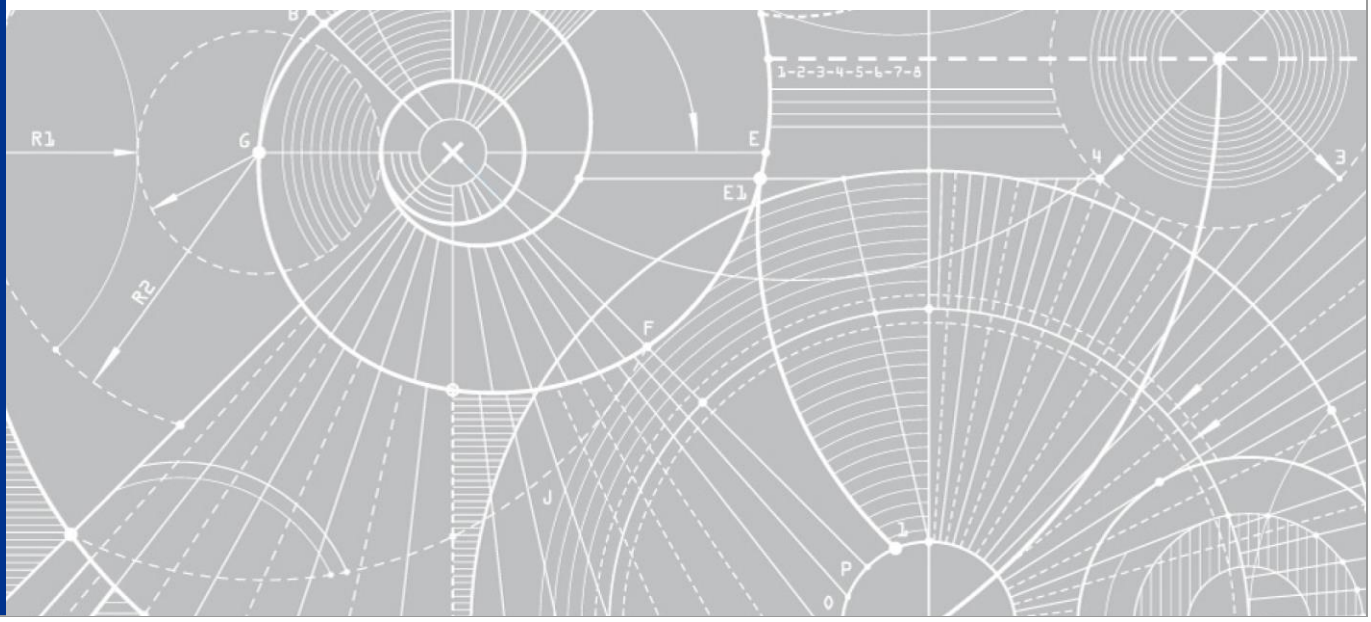
Pollutant	The Next Generation Eastern Creek RTS Updated Report	The Next Generation Eastern Creek Amended EIS	The Next Generation Eastern Creek Initial EIS	North London Heat and Power Project – Islington Council (Expected emissions under normal operation)	Industrial Emissions Directive (IED) (2010/75/EU) (Daily Average)	POEO Clean Air Regulation Schedule 3 (Group 6) (One hour averaging period)
Solid particles /Dust/ Particulate Matter (mg/m^3)	1	1	22	1	10	50
Nitrogen dioxide NO_2 (mg/m^3)	120	188	286	10-25	200	500
TOC (mg/m^3)	.015	.015	14	1	10	40 (as VOC)
Dioxins and furans (ng/m^3)	.01	.01	.01	.005 -.01	No applicable standard	0.1
Hydrogen Chloride HCL (mg/m^3)	9	9	43	6	10	No applicable standard
Cadmium Cd (mg/m^3)	.009	.009	.04	.001	No applicable standard	0.2
Mercury Hg (mg/m^3)	.004	.004	.04	.008	No applicable standard	0.2
Sulphur Dioxide SO_2 (mg/m^3)	27	27	143	20	50	No applicable standard
Hydrogen Fluoride HF (mg/m^3)	0.5	4	3	0.5	1	No applicable standard
Carbon Monoxide CO (mg/m^3)	23	23	71	10	50	125

The Next Generation Energy from Waste

BLACKTOWN CITY COUNCIL

EIS Review of RtS (DRAFT)

19 January 2018



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The Next Generation Energy from Waste

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Contents

Executive Summary

Introduction

Jacobs has been engaged by Blacktown City Council (BCC) to undertake a technical review of the Response to Submissions (RtS) Report SSD6236: Energy from Waste, Eastern Creek, Urbis December 2017

Jacobs has provided previous EIS reviews for the same facility for BCC as follows:

- The Next Generation Energy from Waste Blacktown City Council EIS Review 30 Oct 2014 (Jacobs, 2014);
- The Next Generation Energy from Waste Blacktown City Council EIS Review 27 July 2015 (Jacobs, 2015); and
- The Next Generation Energy from Waste Blacktown City Council Amended EIS Review 1 February 2017 (Jacobs, 2017).

Jacobs, 2014 was a review of key impacts associated with the developed as proposed in the original EIS. Jacobs, 2015 provided an amended review following consideration of comments made by Jacobs by the proponent in a revised version of the EIS. Jacobs, 2017 reviews the Amended EIS dated November 2016.

This report (Jacobs, 2018) reviews the proponents RtS Report.

The review focuses only those key environmental aspects as agreed with Blacktown City Council – that being:

- Strategic Planning
- Air quality - potential harm from offensive and hazardous odours and emissions
- Health Risk
- Noise
- Waste management

In particular, the review focuses on the proposed technology and how the EIS has addressed the Director General's requirements and key issues raised in submissions to the original EIS.

The amendment of the project description as provided in the RtS is not considered required to be readvertised for additional public consultation through the application of Section 89F of the EP&A Act whereby:

If a development application for State significant development is amended, or substituted, or withdrawn and later replaced before it has been determined by the Minister, and the Secretary has complied with Section 89F (1) (relating to the public exhibition) in relation to the original application, compliance with 89F (1) in relation to the amended, substituted or later application is not required, unless the Secretary determines that the amended, substituted or later application substantially differs from the original application and the environmental impact of the development concerned has not been reduced by the changes proposed in the amended, substituted or later application.

Material Findings

In summary the amended EIS presents an improved assessment compared with the original EIS. However, there remain some critical aspects of the development as presented which require further consideration and clarification, as follows:

- An air cooled condenser (ACC) has been proposed as the main cooling system. This has not been demonstrated to be best practice. Air cooling increases the noise output, reduces the efficiency of the plant, particularly during summer time, but has a low water consumption. Lower electricity production from high ambient temperatures has not been accounted for.
- Odour management when the facility boilers are offline for maintenance has not been addressed.

- The Director General Requirements (DGRs) were issued in December 2013 and include a requirement that if an EIS is not lodged within 2 years further consultation with the Director General in to the requirements for lodgement is required. The timelines provided in the Amended EIS indicates an EIS was lodged in April 2015. It is assumed that the Proponent has obtained agreement from the Department as to the continuing validity of the DGRs however it is noted that many of the guidelines listed in the DGRs have since been revised or replaced. Appendix A of the RtS provides a cross reference to Section 8 of the report as addressing this comment. Section 8 of the report provides an updated cross reference table as to how the DGRs have been addressed but provides no guidance on altered requirements for lodgement. On the basis that the amended EIS was lodged and exhibited by the Department it is assumed that any amended lodgement requirements were address. This is not considered a reason for refusal of the application and was raised to highlight that technical assessment guidelines mentioned in the DGRs had been superseded and that other sections of the submission addressed technical adequacy.
- Additional waste audit, composition and modelling data has been presented, providing further information on the quantity and type of proposed feedstocks. There is ambiguity surrounding the nomination of suitable facilities which are capable of accepting APC residues from the EfW process. There is also an inconsistency regarding treated wood waste. The RtS and PDB state treated wood will be removed and sent to landfill. However, the MRA Feedstock Review Report included 5,523 tonnes of CCA treated timber as part of the feedstock inputs. Clarification is required on whether CCA treated timber will constitute part of the input feedstock and if not, which materials will make up the remaining input tonnages. It is still unclear how C&I and C&D outputs from the Genesis MPC facility will be measured and reported on however it is presumed that audit assumptions are applied on receival.
- In terms of odour impacts the air quality assessment states that combustion air for the furnace will be extracted from the tipping hall, but it is recommended that ventilation be discussed more fully. For example, in the event the EfW plant is shut down, how will the foul air from the tipping hall be extracted and treated.
- With respect to operational noise the Amended EIS includes an assessment of low frequency noise (LFN) impacts. However, no detail as to how LFN impacts have been predicted is provided. It is noted that the EfW facility is proposed to include 24 air cooled condenser (ACC) units each with a sound power level of 102 dB(A). This is a significant source of noise and ACCs can have dominant low frequency components. In summary further assessment of LFN is recommended, particularly as the noise modelling shows compliance with project specific noise levels is marginal during adverse meteorological conditions within residential areas of Erskine Park.
- The Amended EIS and RTS includes an assessment of stack plume rise and considers the potential impacts on aviation safety as required by the Civil Aviation Safety Authority (CASA) Plume Rise Assessment. There appears to be two errors in the application of CASA guidance to calculation of plume rise heights. It is expected that the errors would underestimate the buoyancy of the plumes from each of the 4 ducts. This needs further assessment to determine if there is any change to the conclusion of the assessment which is that aviation airspace navigation will not be adversely impacted by the development.

Summary Review

In summary the key findings are as follows:

Technology Review

The concept design, based on a steam cycle waste to energy plant, with grate combustion system is sound, and reflects the good practice for standalone WTE plants.

The concept design should be demonstrated using heat and mass balances for solids, liquids and gases i.e. heat balance for the steam cycle, fuel and ash balance, air and flue gas balance and a water balance. These are essential for verifying inputs and outputs to the waste to energy plant. The plant efficiency, availability, and electrical output are likely to be less than the figures stated in the EIS, due to the reasons noted in the report body below.

Director General's Requirements

Strategic planning and consultation

- It is assumed that the Proponent has obtained agreement from the Department as to the continuing validity of the DGRs however it is noted that many of the guidelines listed in the DGRs have since been revised or replaced. Not specifically addressed in the RtS but on the basis that the Department continues to accept and exhibit assessment documentation it is considered that this requirement has been met.

- The extent to which the proposed Western Sydney Priority Growth Area: Land Use and Infrastructure Strategy and Draft District Plan supersede and differ from the draft Structure Plan required to be addressed by the DGRs is not publically available. Jacobs assumes that the Department of Planning and Environment will consider the consistency of the proposal against the Land Use and Infrastructure Strategy and Draft District Plan in assessing the project. The RtS does not directly respond to this point and no formal response was considered necessary.

- Relevant statutory requirements including consideration of typical planning related legislation and EPIs (i.e. SEPPs, LEP and DCPs) appear to have been appropriately identified and reviewed. No response required.

- It is not apparent how the amended EIS allows adequate consideration of the subdivision effects as required by Clause 24 of State Environmental Planning Policy (Western Sydney Employment Area) 2009. Limited additional information is provided to address this comment but a plan of subdivision has been provided.

- The EIS does not identify any specific development contributions. Notwithstanding it commits to a VPA which is assumed to be sufficient. The RtS identifies that the plan of subdivision has been "developed to support the preparation, execution and registration of an appropriate Voluntary Planning Agreement for the purpose of guaranteeing the collection of contributions to ensure the delivery of infrastructure". Council may elect to specify their expectations of the content of the VPA to allow it to be conditioned should the project be approved.
- The EIS provides justification that the site is suitable for the proposed development.

Waste management

- The relevant waste management legislation and policy is identified and reviewed.

- Further composition, audit and modelling data has been provided which addresses the majority of outstanding issues.

- Procedures for complying with the NSW EPA Energy from Waste Policy are not sufficiently detailed to allow the reader to determine how compliance will be achieved to demonstrate how the recovery rates of C&I and C&D material streams post-processing (after materials are presumably mixed) will be demonstrated to the NSW EPA.
- Appendix A Response to Submissions table does not appear to clearly address the recommendation to nominate where potential treatment of APC residue would occur. There is still ambiguity in relation to the specific facilities which have been nominated for treatment and disposal of this output.
- An inconsistency relating to use of treated wood as a feedstock has been noted. The Project Definition Brief (page 14 and 22) and RtS (page 62) notes QA procedures will continue to remove treated wood for disposal to landfill. However, Table 5 of the Feedstock Review Report includes an estimated 5,523 tonnes of Treated wood (CCA treated) as proposed feedstock. It is noted that the 5,523 tonnes of CCA treated wood represents just under 1% of the total tonnage required for Phase 1 (553,500 tonnes). If TNG aims to send all CCA treated wood waste is disposed to landfill it is unclear why this was included in the feedstock modelling and what feedstock type would replace this proportion of the input feedstock. Confusion surrounding the inclusion or exclusion of CCA treated wood waste as a feedstock requires clarification.

Air quality, GHG and human health

- The air quality, odour, ozone reports are in general prepared in accordance with the EPA's *Approved Methods for the Modelling and assessment of Air Pollutants in NSW, 2005*.

- Generally – although the GHG aspect of the report has been updated to address a couple of residual issues – there is a general lack of detail or clarity in calculations to determine the magnitude of GHG emissions. Greater detail should be presented on calculation methods. In particular, the specific assumptions regarding DOC content and fossil carbon % of specific feedstocks could be presented to make clear the assumptions used in the calculation process.

- The odour assessment should provide more information on building ventilation as relevant to the management of fugitive odours.

- The health risk assessment is generally in accordance with the 2012 enHealth document *Environmental Health Risk Assessment – Guidelines for assessing human health risks from environmental hazards*.

Noise

- The noise assessment in general is in accordance with the EPA's *Industrial Noise Policy (INP), 2000*.

- With respect to operational noise the Amended EIS now includes an assessment of low frequency noise (LFN) impacts. Where LFN impacts of dB(C) minus dB(A) exceed 15 dB the *EPA's Industrial Noise Policy (INP) (EPA, 2000)* requires 5B(A) to be added to measured noise levels before comparing with project specific noise criteria. The assessment states that the EPA LFN criteria is not triggered, and therefore no noise penalty is applied in the assessment. However, no detail – for example 1/3 octave noise sprectra for significant is provided so as to critically consider the LFN impacts. It is noted that the EfW facility is proposed to include 24 air cooled condenser (ACC) units each with a sound power level of 102 dB(A). This is a significant source of noise and ACCs can have dominant low frequency components. In summary further assessment of LFN is recommended, particularly as the noise modelling shows compliance with project specific noise levels is marginal.

Plume Rise Assessment

- Jacobs has reviewed the Ramboll Environ, 2017 Plume Rise Assessment. We note in the Ramboll assessment they calculate the buoyancy enhancement associated with the 2 ducts using an approach from Manins et al. 1992. There are two errors in the application of this approach. Each of these errors would underestimate the buoyancy of the plumes from each of the 4 ducts and the errors also compound one another.

- There is an accompanying letter to the Ramboll 2017 report which specifically responds to the Jacobs, 2017 review. Ramboll defend the approach they have used. In response we provide advice from Dr Peter Hurley of CSIRO (the developer of the TAPM model) where it is stated that approach of Manins et al. 1992 is not useful for the TAPM model, and suggest an alternate approach as advised in Jacobs, 2017 be used. This is a potentially material error as in Jacobs experience the approach advised by Hurley, 2008 email would result in a buoyancy enhancement factor of approximately 2 for two adjacent and identical ducts, which is higher than 1.3 calculated by Ramboll.

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to review The Next Generation EIS for an Energy from Waste Facility proposed at Eastern Creek, NSW in accordance with the scope of services set out in the contract between Jacobs and the Client. That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs derived the data in this report from information sourced from the Client (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

This report has been prepared on behalf of, and for the exclusive use of, Jacobs's Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party

1. Introduction

1.1 General Introduction

In response to an email (the Brief) from Blacktown City Council (BCC) dated 20 December 2017 and a subsequent Proposal, Jacobs was engaged by BCC to undertake a technical review of the RtS Report SSD6236: Energy from Waste, Eastern Creek, Urbis December 2017 (Urbis, 2017).

1.2 Scope of Review

The scope of the review as per reviews in 2014, 2015 and 2017 is as follows:

> *BCC are looking to appoint a suitably experienced consultant to conduct a technical review of the Environmental Impact Statement and the RtS Report to provide comment and guidance to Council on the EIS for compliance with the relevant legislation, codes of best practice and guidelines to assess the suitability of the proposal.*

This review focuses on the technical accuracy of the RtS Report (Urbis, 2017) and its amended specialist studies consistent with the Director General Requirements (DGRs) and to provide advice to BCC as to whether the project meets relevant criteria and standards.

Specifically, this review report makes an assessment as to whether the issues we raise in our report dated 1 February 2017 (Jacobs, 2017) have been adequately addressed in the RtS Report (Urbis, 2017). Appendix A of Urbis, 2017 provides the Government Agency and Industry Submissions Summary and Analysis. The Jacobs report is referred to as DPE Ref No. 188212 Blacktown City Council – BCC Attachment 1.

We note that the issues that are stated to be responded to by Urbis, 2017 Appendix A in regards to BCC Attachment 1 (Jacobs, 2017) is not a complete list of the issues raised in Jacobs, 2017. As such this report is structured such that it sets out all the issues raised in Jacobs, 2017, and then outlines the degree to which the issues have been addressed.

1.3 Project History

The Amended EIS (Urbis, 2016) provides the following summary of the project history including various amendments:

An application for approval of an Electricity Generating Facility under section 89D(1) of the Environmental Planning and Assessment Act 1979 was lodged with the Department of Planning and Environment in April 2015. An Environmental Impact Statement (EIS) was prepared and placed on exhibition from 27 May 2015 to 27 August 2015. 43 submissions including one (1) petition were recorded in response to the exhibition of the EIS of the project.

The purpose of this report is to amend the EIS and SSD, DA in accordance with clause 55 of the Environmental Planning and Assessment Regulation 2000 and provide a RtS aimed at:

- *describing the changes made to the proposal since the public exhibition of the EIS;*
- *provide an updated environmental assessment for the proposal, that considers the changes and associated technical and environmental assessment reports that amended as a consequence of the amended project definition brief; and*
- *responding to the submissions made as part of the public exhibition of the EIS.*

In response to the issues raised during the submission and exhibition process the following changes have been made:

- *reduction in the identified volume of residual waste to be thermally treated from 1.35 million tonnes to a maximum of 1.105 million tonnes per annum;*
- *construction and operation will be phased. Initial waste processing will be limited to phase 1 allowing up to 552,500 tonnes of residual waste fuel to be thermally treated per annum. Implementation of phase 2 will be subject to the proponent satisfying the Environmental Protection Authority of the availability of eligible waste fuels; and*
- *modified subdivision layout and amendment to the description of land to which the application relates to part Lot 1, part Lot 2 and Lot 3 in DP 1145808.*

Combined with the above, the amended application seeks to withdraw and replace the Fichtner concept design report with the Ramboll Project Definition Brief. In general, the Project Definition Brief developed and refined the technological design and operation of the facility providing greater clarity and depth of information that has been used to support key technical and environmental assessments used to determine and verify environmental impacts.

The key areas of the project amended by the Project Definition Brief include:

- *Adoption of a design capacity of 1.35M tonnes;*
- *Amended design fuel profile and composition;*
- *Amended waste volume outputs (Ash and APC volumes); and*
- *Refined technology design that optimises the SNCR to reduce NOx emissions.*

As outlined above, the Ramboll Project Definition Brief forms the basis of the project design providing key parameters on which other key technical documents have been prepared. Accordingly, the following technical reports have been amended:

- *Air Quality and Greenhouse Gas Report;*
- *Ozone Report;*
- *Odour Impact Assessment Report;*
- *Noise and Vibration Report;*
- *Human Health Risk Assessment Report; and*
- *Traffic Impact Statement.*

As the facility has a technological design capacity of the of 1.35 million tonnes this has been adopted as a "worst case scenario" and forms the basis of all technical and environmental assessments.

In conjunction with the project amendments, further technical information and reports has been prepared or sourced to respond to matters raised by Agencies and Government in response to exhibition. These additional reports include:

- *A plume rise assessment report to consider the potential for stack emissions to affect aircraft;*
- *An airspace operations assessment to consider the potential for emissions stacks to interfere with existing or future Obstacle Limitation Surfaces or PAN OPS of airports within the Sydney Metropolitan Area;*
- *An assessment of the development against the Best Available Technology;*
- *Historical contamination investigations undertaken during 1994 and 1998;*
- *The development of an ongoing community consultation strategy to be implemented post consent; and*
- *Development of a Proof of Performance Framework to align with the NSW EPA Energy from Waste Policy.*

The RtS Report SSD6236: Energy from Waste, Eastern Creek, Urbis December 2017 (Urbis, 2017) states that it:

sets out responses to the 1,043 submissions received and clarifies the presentation of the supporting modelling information so as to make it directly and specifically referrable to the SSDA as amended.

A key amendment to the SSDA confirmed in this RtS report and documentation is that the application seeks approval for only Stage 1 construction and operation of the EfW Facility for processing of 552,500 tonnes of waste per annum only. The proposal has been designed with an engineering capacity of between 405,000 and 675,500 tpa with an optimum expected throughput of 552,500 tpa. The construction and operation of Stage 2 of the EfW Facility will be the subject of a separate and future development application.

In order to fully address and respond to the issues raised in submissions on the amended EIS, this RtS report includes amendments to the EfW proposal, an updated Project Definition Brief (PDB) prepared by Ramboll and revisions to the technical reports that support the proposal for the Stage 1 development only.

2. Energy from Waste Technology Review

2.1 Overview

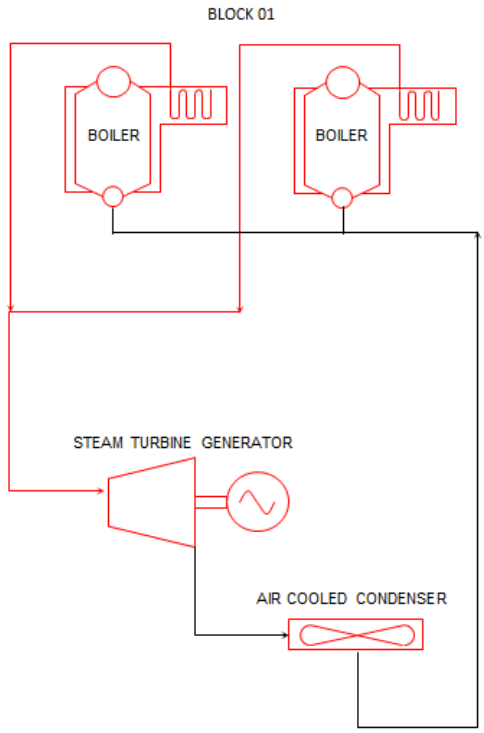
The Project Definition Brief is by Ramboll Environ, dated September 2017.

The technology proposed is a grate boiler designed for firing waste, coupled to a steam turbine generator and air cooled condenser. The proposed technology supplier is Hitachi Zosen Inova, (formerly Von Roll), providing an air cooled moving grate for combustion. Part of the grate is water cooled to allow for firing high calorific (low moisture) fuels.

The plant (phase 1) is designed in one block with 2 boilers feeding a single steam turbine generator (refer **Figure 1** below). Phase 2, which is a second block of 2 boilers + 1 steam turbine, has been removed from the current development application, and would be the subject of a separate development application in the future.

The TNG plant design appears to be based on the Ferrybridge waste to energy plant in the UK.

Figure 1 — Phase 1 Two boilers and one steam turbine generator.



Grate firing is the most appropriate technology for firing the fuel proposed.

The boiler / steam turbine cycle is the most appropriate means of generating electricity from the waste for a stand-alone plant.

2.2 Cooling System

An air cooled condenser (ACC) has been proposed as the main cooling system. The Ramboll Project Definition Brief (September 2017) states "*A BAT [best available technology] assessment has concluded that the use of ACC represents BAT for this installation based on its geographical location*". However, the BAT review in Appendix M dated 19 September 2017 concludes an ACC has been chosen "*As result of the local conditions and to minimize the water consumption*". It doesn't consider any of the other criteria for cooling such as higher noise, reduced efficiency, and summertime derating. In addition, the local ambient conditions, which include high ambient temperatures suggest an air cooled condenser is not used. It is noted that all non-coastal power stations in NSW use cooling towers, and none use air cooled condensers.

Air cooling reduces the efficiency of the plant, particularly during summer time when the plant will need to reduce load to avoid a trip, but air cooling does have low water consumption. The Bureau of Meteorology data for nearby Prospect indicates an average of 10.4 days per year with temperatures exceeding 35°C. The reduced plant output during summer has not been specified.

The alternative is wet evaporative cooling towers, which produce less noise, and have greenhouse gas (GHG) benefits by improving the electrical generation capacity of the plant, and are less affected by high ambient temperatures in summer, but have a high water consumption. The Ramboll BAT report did not consider cooling towers and their benefits to the facility based on:

- different climatic conditions in Australia;
- best practice; and
- potential use of recycled water

For this installation, air cooling has not been justified as being best practice, with clear comparison with the main alternative of a cooling tower design. This issue was raised in May 2015, and again in January 2017 but has not been demonstrated by the proponent.

2.3 Steam Cycle

The steam conditions (430°C 70 bar) are similar to other waste to energy plants, and are acceptable. We assume HZI has selected the steam temperature based on the analysis of the fuel.

No heat balance has been provided. This is essential to demonstrate the performance of the plant, which is the basis for all fuel, ash, water and air emissions.

2.4 Availability

The "availability" of a waste to energy plant is the amount of time that it is able to consume waste and produce electricity over a period of time. It is typically measured in hours per year or a percentage.

The assumed plant availability is 91.3% (8000h operation at full load) which is high for a long term average. After the initial teething issues are ironed out of the plant, it may be possible to achieve availability in the range 85 - 92%, based on best practice overseas. The proposed availability of the plant is given below:

- Plant availability 8,000 hours

  Loss of availability breakdown:

  - Scheduled plant stop 14 days 336 hours
  - Scheduled inspection 2 days (48 hours)
  - Unplanned stops 376 hours
  - Equivalent loss of availability from derating, partload, start/stops not considered

However, the availability is expected to be lower in the first few years of operation. In addition, the availability factor has underestimated the extent of forced outages, and has not included turbine overhauls (approximately every 5 years). Some aspects of the design do not support high availability (the demin plant capacity requiring 72h to refill). Lastly, the proper measure of availability is the equivalent availability factor, where deratings of plant are taken into account. e.g. derating in summertime due to high ambient temperatures. A lower availability will lead to lower volumes of waste fired and ash produced, and a reduction in the electricity the plant produces.

2.5 Efficiency

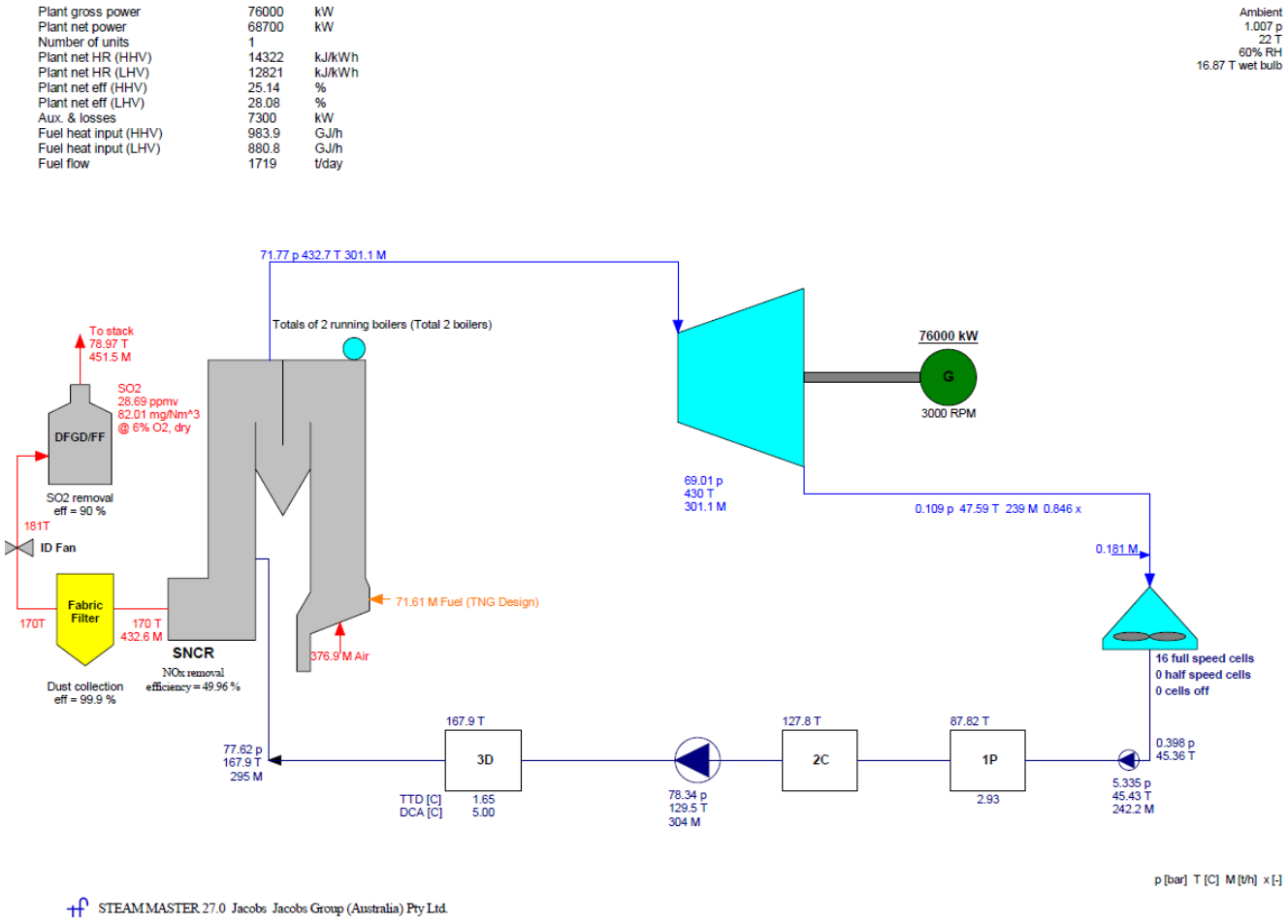
"The Facility has an assumed net average annual electrical efficiency of 29.1%" (Ramboll 2017 pg 25). No basis is provided for this assumption, in terms of a supplier's heat balance diagram (refer Figure 2 below). It appears that this has been based on the Ferrybridge plant in the UK, which has a higher CV fuel, and significantly lower ambient temperatures, which both contribute to a higher efficiency. A heat balance of the boiler is provided by HZI, however there is no heat balance diagram for the steam turbine, condenser and feedheating plant.

The net average annual efficiency has been overstated, as the 29.1% does not include:

- Step-up transformer losses;
- Based on full load operation in a new and clean condition (excludes lower efficiency due to start-up / shutdowns, part load operation, and boiler fouling);
- Different ambient conditions in Australia compared to the UK;
- The site electricity consumption 7.3MW (9.6%) is considered low, especially due to the large air cooled condenser proposed, and odour controls required; and
- Is based on an assumption rather than a heat balance.

We anticipate the average plant efficiency will be approximately 25%, based on the steam conditions provided, but this can only be confirmed with a supplier's heat balance.

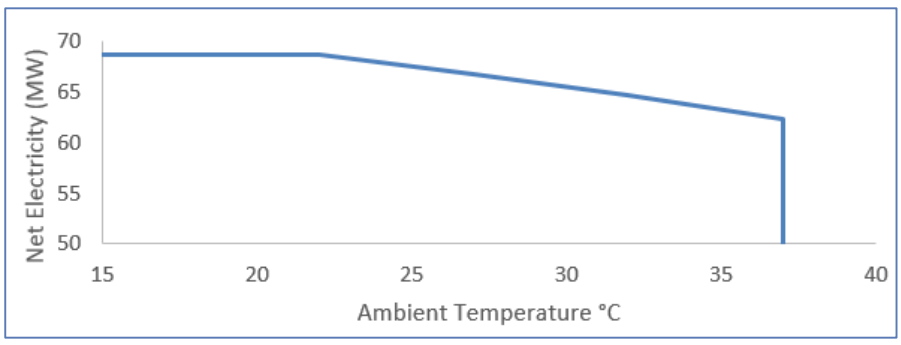
Figure 2: Typical Heat Balance Diagram



2.6 Net Output

The net plant output 68.7MWe (Project Definition Brief pg16). This will need to be verified on a heat balance diagram. The plant output reduces with higher ambient temperatures and would be approximately 62 MW at 37°C (refer **Figure 3**).

Figure 3: Estimated Net Output Reduction with Ambient Temperature



2.7 Fuel

The waste (fuel) analysis has been revised, and is appropriately based on separate C&I and C&D compositional data.

The “floc waste” Net Calorific Value appears to be overestimated by 10%, but this is only 15% of the waste, and will only have a minor impact on the mixed fuel CV. Given the floc waste is approximately 50% ash, there is probably limited benefit in firing this waste, due to the extra corrosion risk, and the higher cost of ash.

2.8 Water

The overall water consumption is nominated as 23.25 m³/h (186ML/yr). The water treatment plant effluent and the boiler blowdown volumes will be consumed by ash quenching. Therefore, the waste water will be disposed with the bottom ash in evaporation and absorption (bottom ash 23% H_2O by weight).

The air cooled condenser will require water for cleaning the heat transfer surfaces, but this doesn’t appear to be accounted for.

Water generated from commissioning (e.g. boiler chemical clean at commissioning) would be removed from site by truck to a licensed facility. This is reasonable due to the small volumes proposed. We would recommend a boiler maintenance drain tank be added, to allow for reuse of the water following maintenance.

2.9 Energy for Process

The steam turbine is suited to export 20MW of process heat (assumed to be low pressure steam of approximately 30 t/h). Any user of process heat would need to be located on land adjacent to the TNG facility due to the limited distance that this volume of steam could be exported. There is vacant land available to the south of the site, but no user of process heat has been identified, nor the reduction in electricity production from process heat export.

2.10 Ash

Ramboll and HZI have provided an estimation of the ash composition based on literature and plant operational data (but no references supporting their analysis have been provided). The results indicate the bottom ash can be classified as General Waste, and Boiler Ash and APC residue as Restricted Solid Waste, because of Lead and Cadmium levels (however no discussion is provided on the sources of lead and cadmium, and why they are high). These ash classification results are not consistently reported throughout the EIA, and several times it is suggested that the APC residues will require trucking to a hazardous waste facility (which is a possibility, but unlikely a normal operating scenario).

2.10.1 Bottom Ash

The concept design includes a boiler wet bottom for bottom ash, where the ash is quenched with water, and a dry ash handling system for the boiler hopper ash and fly ash (APC residues), which are appropriate.

Best practice is to recycle bottom ash, (e.g. as aggregate) and this is now proposed.

2.10.2 Boiler Ash

If the boiler ash (from horizontal pass hoppers) is of sufficient quality, it will be recycled with the bottom ash. This is best practice (BREF pg vii).

2.10.3 Air Pollution Control (APC) Residues

The EFW plant will generate around 25,850 tonnes per annum of Air Pollution Control residues (APC residues). The APC consists mostly of fly ash, plus spent lime (in roughly equal proportions) with a small amount of activated carbon and contaminants. A breakdown of the ash constituents has been provided in Section 8 of the EIA.

The APC residues will be trucked off site, but there are no details regarding the offsite treatment facility or long term disposal location. The proposed treatment and disposal locations should be nominated (e.g. Elizabeth Drive facility).

2.10.4 Ash Processing

The FGT residues will be stored in separate enclosed silos before being transported by sealed tankers to an appropriate offsite treatment facility.

The potential treatment of FGT ash is mentioned, however there are no facilities nominated where this treatment would occur. We are also unaware of the existence of any such treatment facilities in the region. Best practice for FGT residues is that they are re-processed on site, reducing their hazard level to inert and to enable recycling, before transport off site. Landfilling at an appropriately licensed site should be a last resort.

2.11 Best Available Techniques Review

The Best Available Techniques review was completed by Ramboll Hardturmstrasse.

Ramboll elected to compare the TNG project with clauses from the “Reference Document on the Best Available Techniques for Waste Incineration” August 2006 by the European Commission also known as “BREF”.

The analysis was lacking in proper justification in some areas, however there are no material issues arising from the review, except how odour is controlled when the facility is down for maintenance.

Control of Fugitive Odour

To control fugitive odour emissions from waste handling, enclosed buildings are used, storage of waste is limited to 7 days, and air from these areas is extracted and used for combustion. This is best practice for odour control at waste to energy plants, established through experience.

Air is drawn from the tipping hall and waste bunker for combustion in the boilers, however the revised Ramboll and Pacific Environment documents do not indicate how odour will be controlled due to outages of plant. BREF states “it is also considered to be BAT to make provision for the control of odour (and other potential fugitive releases) when the incinerator is not available (e.g. during maintenance) by: a. avoiding waste storage overload, and/or b. extracting the relevant atmosphere via an alternative odour control system. Ramboll and Pacific Environment does not address the latter in the case of when the boiler (incinerator) is offline.

Each boiler is expected to require 2 planned outages each a year, of 2 days and 14 days (Source HZI). The facility is built containing 2 boilers per tipping hall. One mitigation for odour, when a boiler is shut down, is to utilise the second boiler to extract air from the tipping hall. However, this doesn’t address the potential odour issue when both boilers are offline, such as when one boiler is down for maintenance, and the other trips, or when common plant such as waste feeding, steam turbine, or condenser are offline, requiring both boilers to be shut down.

2.12 Conclusion

The TNG concept, based on a steam cycle waste to energy plant, with grate combustion system is sound, and reflects good practice for standalone WTE plants.

The concept design should be demonstrated using heat and mass balances for solids, liquids and gases i.e. heat balance for the steam cycle, fuel and ash balance, air and flue gas balance and a water balance. These are essential for verifying inputs and outputs to the waste to energy plant.

Treatment on site of ash onsite and recycling (as aggregate, concrete additives etc.) is best practice, and this best practice should be applied rather than landfilling of ash.

Further information should be provided with respect to proposed odour management at time of plant outage.

3. Director General Requirements

3.1 Strategic Planning

Director General Requirements	Summary of Applicant's position	Jacobs Comment
DGRs (general comment)	A summary of the DGRs and cross reference to where in the EIS they are addressed is provided in Table 4 (page 20) of the EIS. The Table identifies that all DGRs have been addressed.	The DGRs were issued in December 2013 and include a requirement that if an EIS is not lodged within 2 years further consultation with the Director General in to the requirements for lodgement is required. The timelines provided in the Amended EIS indicates an EIS was lodged in April 2015. It is assumed that the Proponent has obtained agreement from the Department as to the continuing validity of the DGRs however it is noted that many of the guidelines listed in the DGRs have since been revised or replaced. Refer to key issues sections which provide comments on the Adequacy of the EIS in relation to applicable standards and guidelines. **Appendix A of the RtS report provides a cross reference to Section 8 of the RtS document as addressing this comment. Section 8 of the RtS provides an updated cross reference table as to how the DGRs have been addressed but provides no guidance on altered requirements for lodgement. On the basis that the amended EIS was lodged and exhibited by the Department it is assumed that any amended lodgement requirements were address. This is not considered a reason for refusal of the application and was raised to highlight that technical assessment guidelines mentioned in the DGRs had been superseded and that other sections of the submission addressed technical adequacy.**

Director General Requirements	Summary of Applicant's position	Jacobs Comment
An assessment against SEPP (Western Sydney Employment Area) 2009)	An assessment of the proposed development against this SEPP is provided in Section 8.3.2. The section provides statements describing the proposed development in relation to land use zone objectives and clauses identified as relevant to the development. It does not clearly state an opinion that the development is consistent but instead refers to the various supporting assessments in inferring that the development is largely consistent.	Section 8.3.2 does not address clause 24 Development involving subdivision which states that: *"The consent authority must not grant consent to the carrying out of development involving the subdivision of land unless it has considered the following:* *(a) the implications of the fragmentation of large lots of land,* *(b) whether the subdivision will affect the supply of land for employment purposes,* *(c) whether the subdivision will preclude other lots of land to which this Policy applies from having reasonable access to roads and services".* It is noted that Table 38 of the Amended EIS provides an assessment of the proposed development against the Eastern Creek Precinct Plan which includes statements that: *"The activities of the Facility will directly create jobs for 55 staff. While this quantum of jobs does not achieve the desired job per hectare rate for the precinct, the proposal is appropriate for the following reasons:* *It constitutes an intensification of employment on an underutilised part of the site….* *The Facility will not prevent adjacent lands within the Precinct from achieving the desirable employment densities".* **It is not apparent how the amended EIS allows adequate consideration of the subdivision effects as required by Clause 24 of the SEPP. Appendix A of the RtS identifies that Sections 6.2.1.2 and 3.4 of the RtS discusses the application of the SEPP (Western Sydney Employment Area) 2009). Section 6.2.1.2 provides no additional comment on clause 24 and as such does not provide a formal response to this issue. Section 3.4 of the RtS states that "The amended subdivision plan is for administration purposes only and has no implications for adjacent landowners or impacts on amenity, the environment or the like".**

Director General Requirements	Summary of Applicant's position	Jacobs Comment
A demonstration that the development is consistent with the Broader Western Sydney Employment Area draft Structure Plan 2013;	Consideration of the Proposals consistency with the Broader Western Sydney Employment Area draft Structure Plan 2013 is provided in Section 7.3 of the Amended EIS and finds that "the proposed Facility is seen to directly align the draft Structure Plan through the provision of well located, serviced employment lands".	A note on the Department of Planning Major Project website in relation to the draft Structure Plan states "With the announcement of the Western Sydney Airport, the Broader Western Sydney Employment Area now forms part of the Western Sydney Priority Growth Area. A Land Use and Infrastructure Strategy is now being prepared for the area and will be publicly exhibited. For further information, please view the project web page". Limited additional information is available in relation to the Land Use and Infrastructure Strategy. It is further noted that the Greater Sydney Commission has released a Draft West Central District Plan that "maps the 20-year vision for the West Central District of Greater Sydney". Jacobs notes that this Draft District Plan has not been considered in the Amended EIS as both the amended EIS and District Plans are both dated November 2016. Jacobs notes that the District Plan includes Sustainability Priority 11: Support opportunities for District waste management which includes a commitment to "protect precincts that have functioning waste management facilities from encroachment by residential and other sensitive development" and Action S9: Identify land for future waste reuse and recycling which notes "As the West Central District grows, the need to manage waste will grow. In higher density neighbourhoods, there may be opportunities to improve the efficiency of waste collection services by introducing innovative precinct based waste collection, reuse and recycling. In accordance with Action 4.3.2 of A Plan for Growing Sydney, the Environment Protection Authority and the Department of Planning and Environment, in participation with councils, will identify additional land for waste management, reuse and recycling and how and where precinct-based waste collection services could operate within Greater Sydney". The extent to which the Land Use and Infrastructure Strategy and Draft District Plan supersede and differ from the draft Structure Plan is not apparent. Jacobs assumes that the Department of Planning and Environment will consider the consistency of the proposal against this strategy in assessing the project. **Appendix A of the RtS refers to Section 6.2 of the RtS to address this item. Section 6.2 of the RtS does not respond directly to this comment and it remains our expectation that the Department will review the adequacy of strategic land use considerations provided in the environmental assessment documentation given the significant changes in strategic land use planning occurring in Western Sydney.**
Justification that the site is suitable for the proposed	Project justification is provided in Section 5 of the amended EIS with consideration of alternatives in	The site location would appear justified based on: • Proximity to Genesis MPC to maximise efficiencies with this facility;

Director General Requirements	Summary of Applicant's position	Jacobs Comment
development	relation to location in Section 5.3.2.	• Ideal location within Eastern Creek Industrial Precinct; • Opportunity for shared infrastructure with the Genesis Xero Waste Facility, including roads; • The broader site is an appropriate distance from sensitive receivers including residential areas; • The broader site is buffered by other industrial land uses and roads, and does not adjoin sensitive land uses; and • Proximity to a major road network. Furthermore, the development should be considered in the planning context that it can take advantage of being located next to an active landfill where more sensitive employment uses may be precluded. Issues with respect to the developments location in the Western Sydney Employment Lands are addressed elsewhere in this table. No response considered required.
Demonstration that satisfactory arrangements have been or would be made to provide, or contribute to the provision of, the necessary local and regional infrastructure required to support the development.	Section 4.3.1 of the Amended EIS states that "TNG and BCC have agreed to prepare draft Voluntary Planning Agreement (VPA). A draft VPA will be prepared and issued to the Department of Planning and Environment during the assessment of this amended EIS."	The EIS does not identify any specific development contributions. Notwithstanding it commits to a VPA which is assumed to be sufficient. **Appendix A of the RtS references section 3.4 as addressing this issue. Section 3.4 provides an amended plan of subdivision "developed to support the preparation, execution and registration of an appropriate Voluntary Planning Agreement for the purpose of guaranteeing the collection of contributions to ensure the delivery of infrastructure". On this basis it is expected that a VPA would be conditioned to be negotiated with Council should the development be approved. Council should specify their expectations in this regard to allow them to be conditioned appropriately.**

3.2 Waste Management

A key amendment to the SSDA confirmed in the RtS dated 14 December 2017 (and previously outlined in the revised EIS) is the reduction in the volume of residual waste to be thermally treated from 1.35 Mtpa to a maximum of 1.105 Mtpa with waste processing to be undertaken in 2 stages. Stage 1 will process up to 552,500 tpa along two lines. Stage 2 will be subject to a future and separate SSDA. As such only Stage 1 need be assessed against the DGRs.

The following amendments are noted in the RtS report as they relate to Waste Management:

- Feedstock review in accordance with the Resource Recovery Criteria of the NSW EfW Policy Statement Report (MRA Consulting Group September 2017) – see Appendix J (hereafter, referred to as the 'Feedstock Review Report').
- Chute Residual Waste: Composition Audit (EC Sustainable April 2017) – see Appendix J (hereafter, referred to as the 'CRW Compositional Audit'), updates the CRW Audit (2014) of residual waste from the Genesis Xero MPC submitted as part of the original Waste Management Report (Environ, March 2015) and referred to in the updated EIS Waste Management Assessment (Ramboll Environ October 2016).
- MRF residual waste: Composition Audit (EC Sustainable April 2017) - see Appendix J (hereafter, referred to as the 'MRF Compositional Audit').
- Audit of potential feedstock (shredder floc) (A.Prince Consulting September 2016) - see Appendix J (hereafter, referred to as the 'Shredder Floc Audit').
- Project Definition Brief has been reviewed and updated to incorporate waste audit and feedstock review technical advice, reporting and analysis – see Section 4.6.1 and Appendix D.
- BAT Evaluation has been supplemented with an addendum letter – see Section 4.6.3 and Appendix M.
- Minor grammatical update to Waste Management Report – see Section 4.6.16.
- Provision of chemical composition for the proposed waste stream demonstrating a net calorific value (NCV) of 12.3MJ/kg – see Section 6.6.2 Figure 19 and 20 and Appendix J, updates Table 7 of the original EIS Waste Management Report (Environ, March 2015) and the updated EIS Waste Management Report (Ramboll Environ, October 2016).

Director General Requirements	Jacobs Review: Waste Management Report (2016)
• A description of the classes and quantities of waste that would be thermally treated at the facility	The amended report provides tonnages of the materials expected to be processed at the TNG Facility annually, along with classification of the waste. It states that the construction and operation of the facility will be undertaken in two phases with 'Phase 1' comprising 50% of the original processing tonnage (i.e. only 2 lines will be operational of the 4 lines). This comes to a difference of greater than 500,000 tonnes. Greater confidence is given to the numbers as a large proportion of the waste for Phase 1 is already received on site (see Section 7.1). It is stated that the EPA and DPE have been provided with the confidential data report supporting this claim. The fuel mix and composition analysis has been revised (see Table 7), and is based on separate C&I and C&D compositional data taken from industry (references are provided in Section 4) and Genesis Facility audit data (which is unavailable for public review and assumed to have been presented to the EPA and DPE). With regard to other waste availabilities not currently received at the Genesis Facility, the report states that discussions with the EPA have confirmed that floc is not excluded from EfW and may potentially be included in an amended version of the NSW EfW Policy. Data on Alternative Waste Treatment and Garden Organic residual waste has been based on SMA council data with no information of contracts or discussions having been undertaken with councils to secure these waste types. No further information in this regard is provided in the Project Definition Brief (Ramboll October 2016) or the Proof of Performance (POP) framework provided. Therefore, these tonnages are still based on a number of assumptions (including availability of these residual wastes for use at the facility and also timing of these residual wastes being made available for the facility given existing contractual conditions). It is should be noted that the “Proximity Principle” has been removed by the EPA through revision of the POEO Regulation and therefore the argument that this regulation will help to divert waste back to NSW landfills cannot be supported. The NSW EPA, as part of their NSW EfW Policy, require that operators undertake POP trials to demonstrate compliance with air emissions standards. The POP trials include an Availability Test which will be used to characterise the wastes received at the facility and to confirm that the plant is operated within the stated combustion configuration whenever sufficient waste fuel is available. The revised EIS includes a POP framework (see Appendix LL.1 and LL.2). Recommendation: References have been provided in the report for the various fuel types. DADI is the source of the much of this data

Director General Requirements	Jacobs Review: Waste Management Report (2016)
	however the confidential nature of this information means it has only been made available to the EPA and DPE. MRF, AWT and GO residual tonnage estimates assume that these waste materials will be available with no information of contracts. It is noted that referencing Councils which may be eligible to send their material for EfW without an understanding of whether this fits with their strategy is a high risk assumption where the facility is reliant on this input. No projection of the changes of waste flows over time is provided, as noted in the previous review. It is not just the waste composition and tonnages at the current time that are important, but how these will likely change over the lifetime of the proposal. The EIS states the following (see Section 10.4.3.5): *The WMR report as discussed in this section of the amended EIS has addressed the availability of waste in a broader context and demonstrates that trends in waste management. The need to provide signed agreements and arrangement as part of the assessment of an application is unreasonable and unnecessary as these are commercial matters beyond the consideration of the EP&A Act 1979.* Assurances for all feedstock inputs should be provided where the efficient operation of the facility relies on the availability of these inputs. An on-going supply of suitable fuel will not only be vital to ensuring efficiency outputs – the operation of the facility will have significant consequences to the waste market (and diversion from landfill targets) in NSW so this information forms a necessary part of the assessment. However, as outlined in the Appendix LL.1 (page 12 of 19), the waste throughput is required to be tested as part of the POP trials. This measure requires that a guaranteed continuous waste throughput averaged over each 24 hour period is demonstrated throughout the performance testing period (365 days). In addition, the Availability Test will be suspended if stopped due to a shortfall in waste where the plant has to be shutdown. These measures will help to ensure that the required waste throughput is sustained, at least for the short term. **Review of 2017 RtS Updates:** • **In relation to our request regarding further information on projections for future changes to available tonnages of material, TNG have provided further information in Section 4.4 Waste availability, Section 4.6 Updated Technical Reports and Section 6.7 Waste Source availability. Additional detail on projections is also outlined in the Feedstock Review Report (MRA, Appendix J). Relevant sections of this Feedstock Review Report have been highlighted in our review of updates. In addition, greater detail has also been provided on source of data and assumptions in relation to feedstock. This information is contained within Section 4.6 Updated Technical Reports, Section 6.6.2 Waste audits, Section 6.6 Waste Source and Composition and the Feedstock Review Report Appendices.** • **In the Feedstock Review Report, MRA has projected the waste flows over time showing the current and**

Director General Requirements	Jacobs Review: Waste Management Report (2016)
	potential future waste composition and tonnages available in the Metropolitan Levy Area (MLA) market over a 25-year period (up to financial year 2042 [FY42]). The report concludes that 894,100 eligible tonnes of residual waste (MSW, C&I waste and C&D waste) processed and disposed of in FY17 in the MLA could have been recovered. However, it is noted that while MSW is included in the assessment, the proponent intends to secure only C&I and C&D waste via the 'first' pathway. • The 'first' pathway refers to securing residual waste from existing processing facilities that will not require further processing. The 'second' pathway refers to securing residual waste by establishing new processing facilities which will divert waste currently being disposed to landfill. • Tables 6 to 10 of the Feedstock Review Report (MRA, Appendix J) outline eligible tonnes in the MLA in line with EfW policy allowances (Resource Recovery Criteria), with modelling based on more recent data and modelling assumptions stated. While the eligible tonnes generated in the MLA in FY17 from C&D and C&I sources (551,200 tonnes) are not sufficient to satisfy the capacity of Phase 1 of the proposed facility (Phase 1 requires 552,500 tonnes per annum), by FY19 these tonnes are predicted to have increased to an estimated 582,700 tonnes, and may therefore be sufficient to satisfy the capacity of Phase 1. This conclusion holds for all growth scenarios except the -1% Compound Annual Growth Rate (CAGR) scenario. A CAGR of -1% represents a scenario in which there is a negative annual growth rate i.e. the eligible tonnes are lower due to a reduction in the amount waste being produced. • Modelling scenarios tested for the growth model and sensitivity analysis include four growth scenarios (-1%, 2%, 4% and 6.2%) and a business-as-usual (BAU) scenario. The BAU scenario utilises the current growth trends for each stream (MSW, C&I and C&D), according to the NSW State of the Environment 2015 dataset, and forecasts them forward linearly. Projection modelling of separated waste stream tonnages (e.g. wood waste, textiles and tyres) has also been undertaken using historic trend information or growth rates as per the NSW State of the Environment 2015 dataset. However, apart from the potential fluctuation in waste growth rates for the MSW, C&I and C&D waste streams, the modelling does not appear to account for specific diversion of a feedstock types to other recycling pathways in the future (e.g. in the case that tyres, textiles or wood waste are diverted via higher order recovery options). • Mass balance diagrams (Figure 6 and 7, Appendix J) have also been created to demonstrate the flow of waste in the MLA for FY17 for C&I and C&D waste. Sources of data used include State of the Environment (2015) data adjusted for the MLA and forecasted using historical trends, as well as 2013-14

Director General Requirements	Jacobs Review: Waste Management Report (2016)
	EPA C&I Audit Disposal Data, licence information for Earthpower Pty Ltd (as the only MLA facility to process organics from C&I waste generators), and the 2016 Recycling and Waste in Queensland report. These mass balance diagrams form the basis of a high level market assessment for eligible tonnes. All source data is dated pre-FY17 so data has been projected to FY17 using State of the Environment 2015 compound annual growth rates. • Generation of separated waste types (waste wood, textiles and tyres) from C&I and C&D sources were calculated using publicly accessible EPA audit data, an audit report by the former DECC and consultants' reports (Hyder report on Tyres). It is assumed that tonnages of waste wood and textiles available to the facility would be comparable to tonnages directly delivered to landfill. Table 5 of the Feedstock Review Report estimates timber and wood will account for 31.16% of proposed feedstock. Annual growth rates were derived from the State of the Environment 2015 report and historical trends analysis (tyres).Figure 4 outlines projections of eligible tonnes from FY17 to FY42 categorised by source of waste generation. The model concludes that eligible tonnes will continue increasing into the future and that sufficient tonnages are available as per the modelling for Stage 1 from FY19 onwards. • The RtS confirms that the SSDA seeks approval only for Stage 1 and that Stage 2 would be managed under a separate provision. • An inconsistency relating to use of treated wood as a feedstock has been noted. The Project Definition Brief (page 14 and 22) and RtS (page 62) notes QA procedures will continue to remove treated wood for disposal to landfill. However, Table 5 of the Feedstock Review Report includes an estimated 5,523 tonnes of Treated wood (CCA treated) as proposed feedstock. It is noted that the 5,523 tonnes of CCA treated wood represents just under 1% of the total tonnage required for Phase 1 (553,500 tonnes). If TNG aims to send all CCA treated wood waste is disposed to landfill it is unclear why this was included in the feedstock modelling and what feedstock type would replace this proportion of the input feedstock. Confusion surrounding the inclusion or exclusion of CCA treated wood waste as a feedstock requires clarification. Appendix J of the RtS provides significantly more information on the potential classes and quantities of waste that may be thermally treated at the facility. However, it is noted that the proposed facility will require an increase of just over 50% to input streams (i.e. increase input streams from 179,397 eligible tonnes in FY16 to 373,103 eligible tonnes) and the building of a processing facility for mixed C&I waste (noting that a $5M grant has been awarded by the EPA for this facility) in order to meet the input feedstock tonnes

Director General Requirements	Jacobs Review: Waste Management Report (2016)
	requirement. This assumes that the tonnes currently received by the Proponent will remain constant and the Proponent is able to attract the additional tonnes via the planned expansions and facilities. There also appears to be a contradiction regarding the use of CCA treated wood as an input feedstock. The Feedstock Review Report mentions the inclusion of CCA treated timber as a feedstock while the RtS and PDB state treated wood will be sent to landfill. Confusion surrounding the inclusion or exclusion of CCA treated wood waste as a feedstock requires clarification.
• Demonstrate that waste used as a feedstock in the waste to energy plant would be the residual from a resource recovery process that maximises the recovery of material in accordance with Environment Protection Authority Guidelines	The report confirms that all material used as fuel would be the residual from the recovery process from authorised facilities. The report is also aligned with the NSW EPA Energy from Waste Policy, released in 2014, and appended to the report as Appendix 1. This policy stipulates the percentage of input to these facilities which is allowed to be processed for energy recovery. The report states that the Genesis MPC achieves a recovery rate of between 75% and 80%. Results from the Genesis MPC audit are not available to confirm this however the EIS states that this data has been provided to the EPA and DPE. The report (Section 5.1.1) states that TNG will request receipt of reports from third party facilities on the percentage of total inputs from each facility that represents the residual waste component, and engage independent Green Star auditors to conduct 'independent audits' to confirm that residual waste fuels are eligible for acceptance using the same criteria as the Green Star reporting scheme (Green Star C&D Waste Reporting Criteria are appended as Appendix 7 to the report.) The report further states that TNG will develop a rigorous procurement process for the management of fuels received from third party facilities. The EIS (page 141, Table 36) states that the "incoming waste materials are accounted for by reference to an EPA mandated descriptive category" and (on page 142) that "Co-mingled wastes containing materials from both the C&D and C&I waste streams are weighed as they enter the site". **Recommendation:** As previously identified for the original EIS, the proponent should confirm how it intends to assess its conformance with the NSW EPA EfW policy where waste from different sources (such as C&I and C&D) is mixed and processed on site. The Green Star reporting scheme does not identify specific measures for monitoring this information. It is not clear from the report how this will be practically assessed, given that this facility receives both waste streams. These can be classified on the way into the facility at the weighbridge, but the recovery rates of these material streams post-processing (when materials are presumably mixed) will be difficult to confirm. As a greater proportion of the input is C&I waste, presumably the facility could fail to meet C&D targets but this wouldn't be flagged if the total

Director General Requirements	Jacobs Review: Waste Management Report (2016)
	facility diversion achieved >75%. **Review of 2017 RtS Updates:** • **Appendix A RtS table states that further detail on procedures for complying with the NSW EPA Energy from Waste Policy are outlined in Section 4.2.1 NSW EfW Policy of the RtS. This section does now provide further clarification on differing nomenclature used for different waste streams in different jurisdictions and notes that a detailed analysis to identify the chemical building blocks of the waste fuel has been undertaken.** • **However, it is still unclear how the recovery rates of the material stream post-processing (when materials are mixed) will be confirmed. Therefore, as highlighted previously, if a greater proportion of the input is C&I waste, presumably the facility could fail to meet C&D targets but this wouldn't be flagged if the total facility diversion achieved >75%.** • **The proponent has identified the following fuel types as the main sources of fuel feedstock: chute residual waste (CRW), general solid waste (non-putrescible), MRF waste, floc waste, commercial and industrial (C&I) waste after resource recovery carried out by Genesis or other qualified facilities, and other specified waste fractions (SWF) compliant with EfW Policy e.g. carpet, insulation etc.** • **The RtS confirms that the proposal does not seek approval for receiving or processing of MSW. (Stage 2 will be addressed under separate provision)** • **The RtS has stated that it will only use residual waste that cannot be further reused or recycled, and any waste which has not be subjected to resource recovery will not be delivered direct to the EfW Facility. It is stated that waste will be classified on entrance to the facility and an appropriate waste screening methodology will be developed prior to commencement of operations. (Minimum requirements for the plan are outlined on p132 of the RtS.)** • **A number of waste audits have been undertaken for CRW, MRF residual and Floc waste to demonstrate the compositions of these waste streams in more detail. The CRW waste stream is identified as residual from mixed C&D processing. The mixed C&I waste stream composition is taken from the NSW EPA's Disposal-based C&I Audit (2015).**

Director General Requirements	Jacobs Review: Waste Management Report (2016)
• Procedures that would be implemented to control the inputs to the waste to energy plant, including contingency measures that would be implemented if inappropriate materials are identified	Details of the procedures for checking the appropriateness of waste materials are provided in Section 5. These are to be based on inspection of carrier documentation and visual inspection of the loads at 3 checkpoints. Whilst the flow diagram for this process is incomplete and has issues in terms of the decision path flow, the intent is understood. Practically, the success of this system is based on the vigilance of the operators and these operators being incentivised to report contraventions / contamination. Many loads will arrive at the site covered, and therefore visual inspection will not possible until the vehicle has tipped its load. The amended EIS includes a 42 page 'Spotters Manual' as Appendix 2 for the Alexandria landfill as an example of the type of management plan it would use. The report notes that in the event that a delivery truck presents at the site without authorisation it will either be turned away or diverted to Genesis MPC (depending on the nature of the materials). Unacceptable wastes which may have eluded identification at the weighbridge are identified at this point and rejected either for disposal by landfilling on site or elsewhere. **Recommendation:** Site environmental management plans, when produced, should include detail on load inspection and rejection procedures, and the criteria for acceptance. **Review of 2017 RtS Updates:** • **Section 7.4.2 of the RtS states the, 'EfW Facility will not receive or process hazardous waste materials. As described in Section 6.6 (RtS) Waste Source and Composition, checking and auditing the various fuel forms are an important first step in the control process. Upon arrival at the facility, all fuels will be weighed, visually checked with CCTV and if necessary sampled. Any deviation from the fuel specification will be noted, and if significant, fuel loads will be rejected. During unloading, facility operators will carry out further visual checks of the fuel. Further mitigation measures for waste management is noted in Section 9 of this report.'** • **The Project Definition Brief makes reference to the refined and effective nature of the Genesis procedures for asbestos, PVC and CCA which combined with the Genesis Quality Assurance measures provide a continuing high degree of confidence that unacceptable hazardous materials will be entirely excluded from the fuel waste stream (page 13 and 22). This reference is backed up by the evidence provided in the residue waste stream audits showing an absence of special wastes (asbestos) and hazardous materials from the audited samples (RtS, page 21).** • **TNG state, 'The Quality Control processes to be implemented will main chlorine levels well below 1% and ensure Treated Timber Waste and PVC continues to be sent to landfill i.e. not used as feedstock for**

Director General Requirements	Jacobs Review: Waste Management Report (2016)
	the Facility. **No further information is required at this stage.**
• Details on the location and size of stockpiles of unprocessed and processed recycled waste at the site	No external stockpiles are proposed at this facility. Materials to be taken offsite for further processing will be held indoors / covered silos. If the material received is processed as much as forecast, then these stockpiles will not be significant if regularly collected. **Recommendation**: None No response required.
• Demonstrate any waste material (e.g. biochar) produced from the waste to energy facility for land application is fit-for-purpose and poses minimal risk of harm to the environment in order to meet the requirements for consideration of a resource recovery exemption by the EPA under Clause 51A of the *Protection of the Environment Operations (Waste) Regulation 2005*	No material from the facility will be applied to land for agricultural purposes. The report states that bottom ash (dry and wet) will be disposed of to landfill (see Table 8), while APC residue and boiler ash will be either disposed of to landfill or transported to a facility licensed to receive such wastes. Compositional data for the bottom ash is not available (as the facility is not in operation) so data for the expected composition (based on facilities in Europe which accept putrescible residential waste as well as non-putrescible waste) have been used as a proxy. This has highlighted potential contraventions of NSW EPA guidelines for Nickel and Lead. However, as noted in the report, sources of these elements would be less likely to occur in C&I and C&D waste, and with site checkpoints this impact should be mitigated. Ash monitoring will confirm compliance. A revised assessment of the predicted ash fractions from the Facility has been undertaken by Ramboll and HZI based on the expected Phase 1 residual waste fuel composition (however no references supporting their analysis have been provided). The results indicate the bottom ash can be classified as General Waste, and Boiler Ash and APC residue as Restricted Solid Waste, because of Lead and Cadmium levels. (No discussion is provided on the sources of lead and cadmium, and why they are high). Several times it is suggested that the APC residues will require trucking to a hazardous waste facility. It is also suggested that the waste may be transported interstate (see Section 6.1.3), which is not legal. Information on the storage locations for APC residue and boiler ash has been provided. Further details of expected end uses of residues are also provided. **Recommendation**: The potential treatment of APC and Boiler Ash is mentioned, however there are no facilities nominated where this treatment would occur. Facilities that are capable of treating such wastes should be outlined. Consideration should also be given to APC residues being processed on site, to reduce their EPA classification level prior to transport, and

Director General Requirements	Jacobs Review: Waste Management Report (2016)
	then landfilled at an appropriately licensed site. **Review of 2017 RtS Updates:** • **Appendix A RtS table does not appear to clearly address the recommendation to nominate where potential treatment of APC residue would occur. There is still ambiguity in relation to the specific facilities which have been nominated for treatment and disposal of this output.** • **The RtS does mention that APC residues will be collected into sealed storage silos and transported via sealed tanker off-site for further treatment or disposal at landfill. In the event that APC residues exceed the criteria for Restricted Solid Waste, the residue will be taken off site to a Hazardous Waste Treatment facility, in line with relevant hazardous waste legislation. TNG state that this will be the ongoing long term approach to disposal of ash residue from the EfW facility. Page 26 of the Ramboll report notes that APC residues require a general solid waste classification for disposal at the Genesis landfill and a restricted solid waste classification for disposal at the Kemps Creek landfill however Section 6.1.3 of the Ramboll report still outline that APC residue may be disposed interstate depending upon the waste classification. The report also states that other options such as salt cavern storage may be explored.** • **It is noted that Section 7.10.2 of the RtS states that Bottom ash will be stored on site at storage collection bays capable of 5 days' storage capacity and then disposed at the Genesis Landfill.** **It is recommended that further clarification on the specific facilities nominated for the treatment of APC residue is provided to the NSW EPA prior to approval of the submission.**
• Procedures for the management of other solid, liquid and gaseous waste streams	Information is presented on the proposed generation of wastes from the process and the treatment route for each of these, including how they are to be handled on site. The report has been updated to state that no discharge of liquid effluent is expected under normal operating conditions. **Recommendation:** None No response required.
• Describe how waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues,	As per the report, this DGR appears to be covered in other DGRs, including the previous. **Recommendation:** None No response required.

Director General Requirements	Jacobs Review: Waste Management Report (2016)
including current and future offsite waste disposal methods	
• Identify the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2007*	The facility sits within the waste hierarchy, and the aims, objectives and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2007*. Updates to this strategy have in fact included scenarios modelling Energy from Waste within the Sydney region; however, no mention is made of this. It is noted that the EPA forecast two EfW facilities – one of 200,000 tonnes per annum accepting Municipal Solid Waste, and one of 200,000 tonnes per annum accepting C&I waste, with the expansion of an existing C&D facility to handle 100,000 tonnes per annum. These are all significantly smaller than the proposed facility of 1.1 million tonnes per annum. Linking this site with the Genesis facility, and its reprocessing / recycling capability, means that the proposal is able to deal with a range of wastes according to the waste hierarchy. Rather than outright rejection of loads and sending off site, the flexibility of the site allows materials to be further processed prior to being accepted. This means that they maintain the ability to further process waste streams to capture valuable recycle where feasible. **Recommendation:** None No response required.

3.3 Air Quality, Odour, Ozone, GHG and Human Health

Appendix A RtS table provides a generic summary of issues raised in the Jacobs, 2017 review, rather than specifically addressing each review comment. Relevant sections of the RtS are:

- Section 4.6.4 – Air Quality and GHG Assessment: Pacific Environment, November 2017 (Pacific Environment, 2017a)
- Section 4.6.5 – Human Health Risk Assessment: AECOM September 2017 (AECOM, 2017)
- Section 4.6.7 – Odour Report: Pacific Environment, September 2017 (Pacific Environment, 2017b)
- Section 4.6.8 – Ozone Impact Assessment, Pacific Environment, September 2017 (Pacific Environment, 2017c)

Director General Requirements	Jacobs Review: (1) Air Quality and Greenhouse Gas Assessment Report, (2) Odour Assessment Report, (3) Ozone Impact Assessment Report, (4) Human Health Risk Assessment Report
• A quantitative assessment of the potential air quality and odour impacts for the development on surrounding landowners and sensitive receptors under the relevant Environment Protection Authority guidelines	**Comments on 2016 Air Quality and Greenhouse Gas Assessment Report and Assessed Adequacy of 2017 RtS:** • The report in general is considered to have been prepared in accordance with the EPA's *Approved Methods for the Modelling and assessment of Air Pollutants in NSW, 2005*. **2017 RtS: No response required.** • Section 4.3: This section sets out proposed emission limits for the facility including limits set by *the Environment Operations (Clean Air) Regulation, 2010 (CAR,2010)* and the *Industrial Emissions Directive (IED) (2010/75/EU)*. Subject to the development being approved it is recommended that emission limits from these documents be included as conditions in the Environment Protection Licence (EPL) for the facility and require compliance on a continuous basis (100th percentile concentrations with averaging time no greater than 1 hour). This is contingent on the assessment of ambient air quality impacts using these emission concentrations for the basis of assessment. **2017 RtS: No response required.** • Section 4.3: Table 4-3 should include averaging times for all emission limits not NA. Also the reference conditions noted at the bottom of the table should be checked, in particular the oxygen (O_2) content. **2017 RtS: This comment has been addressed – Table 4-3 of Pacific Environment, 2017a.** • Section 5.1: This section presents an analysis of prevailing meteorological conditions using Horsley Park and

Director General Requirements	Jacobs Review: (1) Air Quality and Greenhouse Gas Assessment Report, (2) Odour Assessment Report, (3) Ozone Impact Assessment Report, (4) Human Health Risk Assessment Report
	St Mary's meteorological data. For the purpose of air quality assessment, the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, 2005* requires a representative year of meteorological data to be selected from a review of 5 years of data. The air quality report does this using Horsley Park data, but then uses the St Mary's data for assessment purposes. Acknowledging that comparisons are made between the two data sets, for simplicity Jacobs suggested if 2013 St Mary's data is to be used then it should be selected following a review of 5 years of St Mary's data. **2017 RtS: This comment has been addressed – Appendix F of Pacific Environment, 2017a.** • Section 6.5.1: The CO criteria stated in this section are in units of µg/m^3, these should be in mg/m^3. • **2017 RtS: This comment has been addressed – Table 4-4 of Pacific Environment, 2017a.** • Section 7: sets out emissions used for modelling. It states that *2010/75/EU* are generally more stringent than *CAR,2010* limits. In the case of dioxins, the *CAR,2010* sets a 1 hour criteria of 0.1 ng/m^3 (1 hour) and the *2010/75/EU* also sets a criteria of 0.1 ng/m^3 but with a longer averaging time (6-8 hours). In this case the *CAR,2010* criteria is more stringent. **2017 RtS: This comment has been addressed – Table 4-2 and Table 4-3 of Pacific Environment, 2017a.** • Section 7.3: Table 7-4 should include emission rates for all relevant pollutants that criteria are outlined (either in *CAR,2010*, *2010/75/EU* plus those where ambient air quality criteria are specified) as well as including any other pollutants deemed necessary (refer to comments on Section 4.3). Note as an example thallium and Type 1&2 substances aren't listed. An additional comment is that the quoted emission rates appear slightly under estimated – assuming they are calculated using the quoted emission concentration and the flue gas flow rate (Nm^3/s), as quoted in Table 7-8. • **2017 RtS: This comment has been addressed – Table 4-2 and Table 6-7 of Pacific Environment, 2017a.** • Section 7.8: Table 7-8 provides the stack parameters used for modelling. These are quoted as being provided by Ramboll. It is not clear how all parameters have been derived. An initial interpretation is that there are 4 waste lines reporting to 2 exhaust release points (stacks) each with a diameter of 2.2 m. As a check the exhaust velocity can be calculated from the reported stack diameter (m) and the actual stack flow rate (Am^3/s). When velocity is calculated from these parameters based on the above interpretation the value is 43.4 m/s, which is exactly double the quoted velocity of 21.7 m/s. The report needs to clarify if it has modelled 2 stacks each with a velocity of

Director General Requirements	Jacobs Review: (1) Air Quality and Greenhouse Gas Assessment Report, (2) Odour Assessment Report, (3) Ozone Impact Assessment Report, (4) Human Health Risk Assessment Report
	21.7 m/s or 4 flues each with a velocity of 21.7 m/s and with 2 flues per stack. **2017 RtS: This comment has been addressed – Section 6.4 (Table 6-9) of Pacific Environment, 2017a clarify the exhaust parameters from the two boilers reporting to one stack.** • Section 8.1: AERMOD has been used to predict the ambient concentrations of substances emitted to air from the facility. This model is not explicitly listed by the EPA in the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC 2005) so it is recommended that the assessment confirm that the EPA is satisfied with the choice of model. Also, there is a high frequency of calm conditions in the Project area (around 30% according to Figure 5-1) and the assessment should confirm that the EPA is satisfied with the model's treatment of calm conditions. • **2017 RtS: This comment has been addressed – regarding the treatment of calm conditions this is now assessed ion Section 8.2.1 of Pacific Environment, 2017a.** **Odour Assessment Report** • General: The odour assessment report follows the same assessment approach as the air quality report and is in general in accordance with the *EPA's Approved Methods for the Modelling and assessment of Air Pollutants in NSW, 2005*. The same comments made with respect to modelling approach on the air quality report apply to the odour report. **2017 RtS: No response required.** • Section 6: This section discusses odour emissions rates from the Genesis Facility and the proposed EfW plant. It states that fugitive odour may be released from the tipping hall when the roller door is opened to allow access to the facility but this should be minimal as the building will be maintained under negative pressures. Negative pressure infers air will be drawn into the building but there is no discussion in the odour report on how this will be extracted and whether any extraction air will be odorous. The air quality assessment states that combustion air for the furnace will be extracted from the tipping hall, but it is recommended that ventilation be discussed more fully. For example in the event the EfW plant is shut down, how will the foul air from the tipping hall be extracted and treated. **2017 RtS: This comment is not addressed in Pacific Environment, 2017b.**

Director General Requirements	Jacobs Review: (1) Air Quality and Greenhouse Gas Assessment Report, (2) Odour Assessment Report, (3) Ozone Impact Assessment Report, (4) Human Health Risk Assessment Report
	Ozone Assessment Report • The ozone impact assessment is an EPA requirement and not specifically required by the DGRs. As such only brief commentary is provided as part of this review. **2017 RtS: No response required.** • The approach of providing both Level 1 and Level 2 ozone assessment is consistent with EPA policy as set out in *EPA's Approved Methods for the Modelling and assessment of Air Pollutants in NSW, 2005* and the document *Tiered Approach for Estimating Ground Level Ozone Impacts from Stationary Sources* (Environ, 2011). **2017 RtS: No response required.** • There is some inconsistency in NO_X emission rates between the air quality and ozone reports. The air quality report uses a NO_X emission concentration of 188 mg/Nm^3 whereas the ozone report initially quotes an emission concentration of 200 mg/Nm^3, and then says a level of 120 mg/Nm^3 will be achieved. **2017 RtS: This issue is addressed in Pacific Environment, 2017c. Note this report commits the project to an oxides of nitrogen (NOx) concentration limit of 120 mg/Nm^3 (refer to Section7).** • The report also suggests this is that '*the TNG EfW facility is the first development application to operate under the NSW Ozone Procedure, and thus to consider the concept of emissions offsets in this context. In view of lack of any precedent in this area, as well as the significant (contractual, financial, technological, logistical) barriers it is considered that further regulatory guidance should be provided if offsets are to be considered as a practicable scenario.'* In this regard it is noted that other projects have also undertaken detailed ozone assessments and considered emission offsets, for example the Tallawarra B Power Station in the Illawarra, available at the NSW Planning Major Projects website. **2017 RtS: This issue is addressed in Pacific Environment, 2017c (refer to Section 6).**
• A description of construction and operational impacts, including air emissions from the transport of materials	**Air Quality and Greenhouse Gas Assessment Report:** • Section 9.1 and 9.2: These sections show the results of modelling based on emission rates determined from the expected and at limit emissions. This is a plausible approach in the event emission limits prescribed for the facility were set in this manner; that is the emission limits are applied on a continuous basis and are 100th percentile limits with an averaging time of no greater than 1 hour. But if emission limits were to merely state that both the

Director General Requirements	Jacobs Review: (1) Air Quality and Greenhouse Gas Assessment Report, (2) Odour Assessment Report, (3) Ozone Impact Assessment Report, (4) Human Health Risk Assessment Report
	CAR,2010 and *2010/75/EU* limits need to be complied including their respective averaging times which differ in some cases, then some scenarios may not be adequately assessed. As per comments made on Section 7.8, the modelling assessment needs to confirm if 2 or 4 emission release points have been modelled. It is also noted that the assessment excludes some pollutants identified in Section 4.3, notably thallium and Type 1 and 2 substances. • **2017 RtS: Per comments above this issue is addressed in Pacific Environment, 2017a.** • Section 9.1.2 and 9.2.2: These section set out the results of modelling emissions associated with plant upset conditions. The results indicate potential exceedance of ambient air quality criteria for NO_2 and Cd. It is noted that NSW CAR, 2010 and conditions set in Environment Protection Licences (EPLs) require compliance with limits at all times including plant upset conditions. The only exclusion provided is for emissions associated with plant start-up and shut downs. **2017 RtS: Pacific Environment, 2017a provides a more robust assessment of upset conditions compared with the 2016. While there remains a potential Cd exceedance of ambient air quality criteria in the event of an upset, the probability is reasonably assessed as being very low through the adoption of BAT.** • Section 10.3: The report considers the avoided emissions from electricity generation and export and avoided from landfill. For electricity generation as the facility will operate for some years, it would be considered prudent to assume a reduction over time in the carbon intensity of grid electricity. Additionally no comparison is made between the carbon intensity of NSW grid and the carbon intensity of the electricity that will be generated from the TNG facility (or the potential intensity of exported heat). For landfill, calculations for the degradable organic content (DOC) of the waste stream are assumed to be the same as '"garden and green". The figure quoted is a DOC of 0.43, which is incorrect. Garden and green has a DOC of 0.20 within the 2014 (Measurement) Determination. **2017 RtS: Emissions intensity for offset electricity into the future was raised as an issue by the NSW EPA also. This has now been addressed through a simple extrapolation of historical trends. A comparison has also been made between the emissions intensity of the generated electricity and other forms of electricity generation in NSW (albeit limited – they only include fossil power sources). The intensity of the grid exported electricity appears to be quite low – and as calculations for this number are not provided it is difficult to verify (i.e. it is a sum of facility emissions divided by the exported electricity, but it is not clear what sources have been included). Calculations relating to the DOC of waste sent to landfill have been**

Director General Requirements	Jacobs Review: (1) Air Quality and Greenhouse Gas Assessment Report, (2) Odour Assessment Report, (3) Ozone Impact Assessment Report, (4) Human Health Risk Assessment Report
	removed. The issue of DOC was also raised by the NSW EPA. The updated report merely states that the NGER solid waste calculator has been used. Input parameters and assumptions are not auditable. • Section 10.3: Landfill emissions are assumed to be emitted in one year. In reality, it will be some time of continuous landfilling before maximum emissions are reached (70+ years). If this exceeds the proposed life of the TNG facility, then the potential annual offset may be overestimated. It is recommended that a time-series for waste emissions in landfill should be produced, identifying the point at which the facility starts to emit less than the landfill would, and the cumulative balance over the intended life of the asset. Additionally, as Method 1 under NGERS is specified, then this should be used in its entirety (with all defaults for carbon contents and waste composition). **2017 RtS: As above – the calculation has now been updated to reflect usage of the NGER Solid Waste calculator. This is an appropriate approach, but no input parameters or assumptions are provided to verify accuracy.** • Section 10.3: With respect to methane capture or combustion from the landfill it is stated that *"this is not currently the case at the Genesis facility and would not form part of the future operations for the site (and has therefore not been considered)"*. Modern landfills would be expected to install and run either a landfill gas engine or flare to reduce emissions. This is especially the case for putrescible landfills, where methane generation rates support their use. It is assumed that the material sent to the TNG facility would not be sent to a putrescible landfill as the waste types are likely to be non-putrescible. However, as the material would be pre-sorted to remove recoverable materials, there is potentially a degradable component that would support methane capture (wood, textiles, paper and card, vegetation). This should be considered to ensure that the emissions offset from landfill are not overestimated. • **2017 RtS: This issue was also raised by the NSW EPA. The report continues to state that "this is not currently the case at the Genesis facility and would not form part of the future operations for the site and has therefore not been considered". This report needs updating to reflect the fact that offset emissions from landfill need to take into account state average landfill capture and combustion rates, partially as the waste feedstock to the plant doesn't all end up at Genesis landfill at the moment, and partially as this is a much more robust and conservative assumption.** **Generally – although the GHG aspect of the report has been updated to address a couple of residual issues – there is a general lack of detail or clarity in calculations to determine the magnitude of GHG**

Director General Requirements	Jacobs Review: (1) Air Quality and Greenhouse Gas Assessment Report, (2) Odour Assessment Report, (3) Ozone Impact Assessment Report, (4) Human Health Risk Assessment Report
	emissions. Greater detail should be presented on calculation methods. In particular, the specific assumptions regarding DOC content and fossil carbon % of specific feedstocks could be presented to make clear the assumptions used in the calculation process.
• A human health risk assessment covering the inhalation of criteria pollutants and exposure (from all pathways i.e., inhalation, ingestion and dermal) to specific air toxics	**Human Health Risk Assessment Report** • Section 1.2: The Human Health Risk Assessment (HHRA) Report is generally in accordance with the 2012 enHealth document *Environmental Health Risk Assessment – Guidelines for assessing human health risks from environmental hazards* with some exceptions as discussed below. **2017 RtS: No response required.** • Section 3.4: Table 7 outlines the stack parameters used in the assessment. It is noted these are the stack parameters used in the original EIS. They are different to the stack parameters used in the Amended EIS as outlined in Table 7-8 of the Air Quality and Greenhouse Gas Assessment Report. **2017 RtS: This issue is addressed in AECOM, 2017 (refer to Section 3.4, Table 7).** • Section 4.2: Table 9 outlines the emissions scenarios included in the HHRA. With respect to the "normal operation conditions" scenario it says these are where emissions are at IED limits, i.e. those set out in *2010/75/EU*. This needs to be confirmed as this scenario as assessed in the Air Quality and Greenhouse Gas Assessment Report is based on expected emissions from a review of international literature which is some cases differ from the IED limits. **2017 RtS: This issue is addressed in AECOM, 2017 (refer to Section 3.4).**
• Details of any pollution control equipment and other impact mitigation measures for fugitive and point source emissions	**Odour Assessment Report:** • The EIS contains only discussion on fugitive odour emissions. These are managed mainly through the waste delivery area being maintained under negative pressure. As discussed earlier it is suggested that in the context of fugitive odours more information be provided with respect to building ventilation. For example, in the event the EfW plant is shut down, how with the foul air from the tipping hall be extracted and treated. **2017 RtS: Per comments above this comment is not addressed in Pacific Environment, 2017b.**
• A demonstration of how the waste to energy facility would be operated in accordance with best practice measures to manage toxic air emissions with consideration of the European	• **2017 RtS: Refer to Section 2.11 of this report for a further discussion of "best practice".**

Director General Requirements	Jacobs Review: (1) Air Quality and Greenhouse Gas Assessment Report, (2) Odour Assessment Report, (3) Ozone Impact Assessment Report, (4) Human Health Risk Assessment Report
Union's *Waste Incineration Directive 2000* and the Environment Protection Authority's draft policy statement *NSW Energy from Waste*	
• An examination of best practice management measures for the mitigation of toxic air emissions; and details of the proposed technology and a demonstration that it is technically fit for purpose.	• **2017 RtS: Refer to Section 2.11 of this report for a further discussion of "best practice".**

3.4 Noise

Appendix A RtS table provides a generic summary of issues raised in the Jacobs, 2017 review, rather than specifically addressing each review comment. Relevant sections of the RtS are:

- Section 4.6.6 – Noise and Vibration Assessment: Pacific Environment, August 2017 (Pacific Environment, 2017d)

Director General Requirements	Jacobs Review: Noise Impact Assessment Report
• Description of all potential noise sources such as construction, operational, on and off-site traffic noise	• The noise goals the Eastern Creek Precinct Plan (Stage 3) (BCC 2005) are marginally lower than the INP amenity noise goals, but are above the Intrusiveness criteria which sets the limits for the project. The BCC noise goals have been omitted from Table 4.6, however this does not affect the adopted project specific noise goals. **2017 RtS: No response required.** • Noise sources for the proposal have been well documented and described in the noise impact assessment. Consideration of construction activities against several scenarios has been provided including an outline of typical plant and equipment for each scenario. **2017 RtS: No response required.** • Operational noise impacts have been assessed against a single scenario only but include the effects of adverse winds and temperature inversions for the site. A single operational scenario is expected to be sufficient given the static nature of day to day operations. **2017 RtS: No response required.** • The road traffic noise impacts for offsite vehicle movements have been assessed against surrounding roads and motorways. The assessment of these impacts is somewhat superficial, but considered to be adequate in regards to the level of impact expected from the additional traffic generated by the proposal. **2017 RtS: No response required.**

Director General Requirements	Jacobs Review: Noise Impact Assessment Report
• A quantitative noise impact assessment including a cumulative noise impact assessment in accordance with relevant Environment Protection Authority guidelines	• A quantitative assessment of construction and operational impacts has been undertaken for the proposal. The assessment has considered the cumulative impacts from both existing Genesis Xero Waste Facility and the recently approved but unbuilt Hanson Development, in conjunction with the predicted impacts from the proposed EFW facility. **2017 RtS: No response required.** • The construction noise impact assessment has included consideration of both standard and Outside Standard Hours (OSH). The request for works OSH scenarios 1-5 are not sufficiently justified in accordance with ICNG guidance to warrant approval of works during these times. It is recommended that standard construction hours are adopted unless it can be demonstrated that these works would be inaudible at the nearest receiver locations. **2017 RtS: This aspect of the noise assessment is unchanged and the above comment remains.** • With respect to operational noise the Amended EIS now includes an assessment of low frequency noise (LFN) impacts. Where LFN impacts of dB(C) minus dB(A) exceed 15 dB the EPA's Industrial Noise Policy (INP) (EPA, 2000) requires 5B(A) to be added to measured noise levels before comparing with project specific noise criteria. The assessment states that the EPA LFN criteria is not triggered, and therefore no noise penalty is applied in the assessment. However, no detail – for example 1/3 octave noise spectra for significant is provided so as to critically consider the LFN impacts. It is noted that the EfW facility is proposed to include 24 air cooled condenser (ACC) units each with a sound power level of 102 dB(A). This is a significant source of noise and ACCs can have dominant low frequency components. In summary further assessment of LFN is recommended, particularly as the noise modelling shows compliance with project specific noise levels is marginal. **2017 RtS: This aspect of the noise assessment is unchanged and the above comment remains.**

Director General Requirements	Jacobs Review: Noise Impact Assessment Report
• Details of noise mitigation, management and monitoring measures	• Construction noise management discussion details general measures for limiting noise impacts • It is recommended that operational noise impact mitigation measures outlined in the report should be adopted for the proposal. In addition to the report details, it is further recommended that a noise management plan be developed for the site outlining measures and protocols for minimising noise emissions. • Specific noise monitoring measures for operational compliance were noted in the report, which detailed initial quarterly monitoring. This section of the report also outlined monitoring procedures, record keeping and investigation of non-compliances. Construction monitoring is mentioned, however, detailed monitoring recommendations for this phase of work are not included in the report. **2017 RtS: No response required.**

3.5 Plume Rise Assessment

Appendix A RtS table provides a generic summary of issues raised in the Jacobs, 2017 review, rather than specifically addressing each review comment. Relevant sections of the RtS are:

- Section 4.6.2 – Plume Rise Assessment, Ramboll September 2017 (Ramboll, 2017a).
- Appendix L1 – Plume Rise Assessment Letter, Ramboll September 2017 (Ramboll, 2017b).

Director General Requirements	Jacobs Review – Plume Rise Assessment - Energy From Waste Facility (Ramboll Environ 2015)

• The DGRs did not require an assessment of plume rise for aviation safety, but rather it was requested following review of the original EIS. Ramboll Environ, 2015 states *"The Department of Infrastructure and Regional Development (DIRD) provided a submission as the responsible agency for the Western Sydney Airport, proposed at Badgerys Creek, approximately 14km southwest of the EFW site. The submission raised the issue of aviation safety, both in terms of physical obstacles to aircraft and the potential for plume rise from the exhaust stacks to cause hazards to aircraft operations. Further assessment was recommended to determine if proposed structures might intrude into declared airspace and whether plume rise from the exhaust stacks might pose a hazard to aircraft approaching from the northeast."*	Jacobs has reviewed this report and provides the following comments by exception:
	• Section 2.2 notes the existence of 2 stacks each with 2 ducts.
	• In Section 2.4 the buoyancy enhancement associated with the 4 ducts is calculated using an approach from Manins et al. 1992. There are two errors in the application of this approach.
	  • Firstly, given each stack has 2 ducts which are immediately adjacent to one another, the exhaust will in fact be a merged plume immediately above the point of release and would be more accurately modelled as a single release point, with an effective diameter equivalent to the duct diameters of 2.2 m, while retaining the 21.7 m/s velocity.
	  • Secondly the term N_E in Equation 2 is incorrectly interpreted as the effective number of stacks instead of the buoyancy enhancement factor.
	  • Each of these errors would underestimate the buoyancy of the plumes from each of the 4 ducts and the errors also compound one another.
	2017 RtS: Ramboll, 2017a provides a revised assessment for 1 stack with 2 ducts consistent with the Stage 1 only project development.
	Ramboll, 2017a is a letter that specifically addresses Jacobs, 2017 comments above. It acknowledges that the stack could have been modelled as single stack (as advised by Jacobs, 2017) but modelling two ducts separately and applying a buoyancy enhancement factor (BEF) is also valid. The letter further states that they disagree with Jacobs approach and state:
	Manins et al (1992) clearly defines NE as the effective number of stacks. Rise enhancement is defined

Director General Requirements	Jacobs Review – Plume Rise Assessment - Energy From Waste Facility (Ramboll Environ 2015)
	in Manins et al (1992) as the ratio of the rise of the combined plume to the rise of a single plume and the rise enhancement factor (EN) is then taken as the lesser of NE1/3 or N1/3 (where N is the number of stacks). Manins et al (1992) also notes that the maximum rise enhancement factor for N stacks would be N1/3, if all the emitted buoyancy were to be completely combined. ***Therefore, following the approach in Manins et al (1992), NE should be raised to the power of 1/3 to derive the rise enhancement factor (which we use as the buoyancy enhancement factor) and not, as suggested by Jacobs, used directly as the buoyancy enhancement factor.*** **Jacobs have previously sought advice from Dr Peter Hurley, the CSIRO developer of the TAPM model which is used by Ramboll for plume rise modelling. In an email received by SKM (now Jacobs) dated 10 September 2008, on this matter he states:** ***TAPM needs the Buoyancy Enhancement Factor (In Manins Notation: NE=(N+S)/(1+S) which is the effective number of stacks, and not the Rise Enhancement Factor (REF) (In Manins Notation: EN=NE^(1/3)) that under the assumption of plume rise under stable condition as will then be one third power of NE. (BEF or NE) multiplies the plume buoyancy and assumes nothing about ambient conditions. REF (or EN) multiplies final plume rise height and makes assumptions about ambient conditions and about the formula for calculating plume rise (and so REF or EN is not useful for TAPM, as TAPM uses more general plume rise algorithms than other dispersion models.*** **This is a potentially material error as in Jacobs experience the approach advised by Hurley, 2008 email would result in a buoyancy enhancement factor of approximately 2 for two adjacent and identical ducts, which is higher than 1.3 calculated by Ramboll.** **In summary the Jacobs, 2017 comments remain.**