Submission No 164

INQUIRY INTO 'ENERGY FROM WASTE' TECHNOLOGY

Organisation: Alexandria Landfill Pty Ltd

Date received: 26 May 2017

NSW Legislative Council

Committee membership

The Hon Paul Green MLC Christian Democratic Party Chair
The Hon Lou Amato MLC Liberal Party Deputy Chair
Mr Jeremy Buckingham MLC The Greens
The Hon Shayne Mallard MLC Liberal Party
The Hon Matthew Mason-Cox MLC Liberal Party
The Hon Penny Sharpe MLC* Australian Labor Party
The Hon Ernest Wong MLC Australian Labor Party

That Portfolio Committee No. 6 inquire into and report on matters relating to the waste disposal industry in New South Wales, with particular reference to 'energy from waste' technology

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Submission for and on behalf of the Alexandria Landfill Pty Ltd group of Companies.

TERMS OF REFERENCE

That Portfolio Committee No. 6 inquire into and report on matters relating to the waste disposal industry in New South Wales, with particular reference to 'energy from waste' technology, and in particular:

a) the current provision of waste disposal and recycling, the impact of waste levies and the capacity (considering issues of location, scale, technology and environmental health) to address the ongoing disposal needs for commercial, industrial, household and hazardous waste

b) the role of 'energy from waste' technology in addressing waste disposal needs and the resulting impact on the future of the recycling industry

c) current regulatory standards, guidelines and policy statements oversighting 'energy from waste' technology, including reference to regulations covering:
   i. the European Union
   ii. United States of America
   iii. international best practice

d) additional factors which need to be taken into account within regulatory and other processes for approval and operation of 'energy from waste' plants

e) the responsibility given to state and local government authorities in the environmental monitoring of 'energy from waste' facilities

f) opportunities to incorporate future advances in technology into any operating 'energy from waste' facility

g) the risks of future monopolisation in markets for waste disposal and the potential to enable a 'circular economy' model for the waste disposal industry, and

h) any other related matter.

SUMMARY OF RECOMMENDATIONS

The data upon which the NSW Environmental Protection Authority (**NSW EPA**) relies to formulate policy and against which it assesses applications is:

(a) hopelessly out of date; and

(b) uses nomenclature [which though conveniently used as shorthand descriptions within the Industry] are not themselves precise indicators of resource recovery of segregated materials versus mixed waste General Solid Waste (**GSW**).

The recommendations in this Submission are as follows:

1 **Immediately review the current Waste Avoidance and Resource Recovery Strategy (WARR) having regard to the latest data.**

Regular reviews are necessary for:

(a) the NSW EPA to be able to provide relevant up to date evidence against which applicants may formulate commercial decisions regarding recycling, waste disposal and energy from waste projects; and

(b) the NSW EPA to be able to formulate an accurate evidence based policy with which it may properly and lawfully participate in the determination of applications by Energy from Waste (**EfW**) proponents.

2 **The NSW EPA adopt a position that the WARR strategy be otherwise reviewed** whenever there is evidence of significant market change in the waste industry or upon application to it by the representative Industry bodies.

3 **That the NSW EPA issue official 'indicators' at six monthly intervals of the waste disposal/ recycling outcomes in NSW.** [These need not have the level of accuracy for auditing and accounting purposes and could be supplied with appropriate disclaimers].

4 **The indicators should be able to be relied upon by industry participants for the purposes of adjusting commercial decisions and could be relied upon for the purposes of Environmental Impact statements** so as to ensure consistency in available information for the purposes of assessing those applications.

4 **The NSW EPA should immediately implement the proposed Waste Responsibility Levy as outlined in the 'Guide to the operation of the WRL' at Appendix A.**

The Polluter Pays Principle – Converting the s88 Levy into a Pigouvian Tax.

The existing tax of s88 Landfill Levy can be refocused exerting a primary liability for payment of it upon the generator of the waste. In turn this liability can be passed along the chain of responsibility in a manner similar to GST.

Precedents already exist within the Protection of the Environment (Operations) Act (**POEO Act**) for the giving of a statutory Notice which defers potential legal liability for actions which would otherwise breach the Act.

The collection point of the s88 Levy will remain where it is, at the weighbridge of the landfill facility. A full explanation of how this would work is set out in the Guide at **Appendix A**. This approach has been endorsed by Dr. Christopher Birch Senior Counsel[1] at the NSW Bar as an effective measure to re-impose the s88 POEO Act Levy and one which will not breach the Commonwealth Constitution.

5 In order to limit confusion, improve efficiency of assessment, minimise costs and defuse anxiety for the community associated with EfW proposals, **The Parliamentary Committee should**:

(a) **correct the non sequitur inherent in the words**, "Role of energy from waste technology" and "the *resulting* impact on the future of the recycling industry";

(b) recognise that there is no demonstrated *resulting* impact on the future of the recycling industry from EfW; and

(c) recognise that there is no bona fide future for resource recovery in Sydney while landfilling of waste in Queensland remains less expensive than resource recovery in Sydney.

6 Australia should determine a National Policy in relation to EfW.

(a) **In the absence of a National policy, the New South Wales Government should adopt and regulate within the POEO Act, the relevant standards for emissions in respect of EfW facilities.** This can be done by adopting relevant parts of the European Union Industrial Emissions Directives 2010/75/EU (**EU IED**). These standards should be formalised by means of legislation and or regulation, rather than the application of policy. Only regulation will provide the requisite level of certainty.

7 The NSW EPA should publish all of the information requirements and the relevant standards by which Environmental Assessments for EfW proposals will be carried out.

8 NSW Health should specify and publish all of the information requirements and the relevant

[1] Admitted in 1982 and appointed as Senior Counsel in 1999, Dr Christopher Birch S.C holds a University of Sydney BA (Hons), University of Sydney LLB (Hons) and University of Sydney PhD. Dr Birch S.C specialises in commercial, public/administrative, appellate and equity law.

standards by which Human Health Risk Assessments will be made.

9 All Government Agencies should acquire relevant skill levels to assess projects of state significance **considering the magnitude of the application fees which are required to be paid.** Thereafter having regard to the large amounts of money involved, using existing credible scientific evidence from overseas, Government agencies should be required to adopt a response protocol requiring responses within reasonable [but limited] time frames.

10 **The Regulation of EfW facilities remain with the State Government NSW EPA.**

11 **That the NSW EPA be upskilled in resources technology and training.**

12 **That it be mandated that the energy provider make available to the NSW EPA 24 hour online live access to monitoring data.**

13 **That the NSW EPA adopts a local Australianised version of the section and which appears in the EU IED which reads,**

Member States may require compliance with emission limit values and time limits for implementation which are more stringent than those set out in paragraphs 1, 2, 3 and 4 and in Article 10. They may include other pollutants, and they may impose additional requirements or adaptation of plant to technical progress.

14 **That the NSW EPA has been unable to address the interstate transportation and disposal of waste** that Agency should not, for legal and constitutional reasons concern itself with issues of commerciality concerning the disposal of waste on the basis that these are matters beyond its remit.

About this submission

This Submission is divided into 8 sections. Each section will address the matters set out in the published terms of reference.

Reputation of the Authors of this Report

The reputation and public standing of the author of this report has been attacked in public forums by Members of the Committee the Hon Penny Sharpe MLC, Australian Labor Party and Mr Jeremy Buckingham MLC The Greens.

Each named member has:

(a) made speeches to the Legislative Council indicating a pre formed and prejudiced view of the issues to be considered by the Committee; and

(b) indicated in public statements that the reputation of Mr Malouf and his Company is such that either his statements cannot be believed or that he and his companies have a history of serious environmental breaches.

Mr Buckingham has published an inflammatory video on social media attacking EfW technology and The Next Generation application.

Mr Malouf and his executives strongly refute the assertions and imputations previously made by members of the Committee. It is with a significant degree of trepidation that the authors of this Submission place their faith in the fairness, impartiality and objectivity of the Committee.

About the party making this submission- Industry Experience

In 1984 Ian Malouf commenced business in the waste transportation industry and shortly thereafter commenced an incorporated business as Dial A Dump Pty Ltd.

Dial A Dump concentrated almost wholly on the collection and disposal of construction and demolition waste, until by about 1999 recycling and resource recovery became a significant factor in the business.

Transportation of Waste and Use of Premises for Waste Transfer

Dial A Dump held Environment Protection Licences (**EPLs**) for the transportation of waste and the receipt and transfer of waste from premises located at 33 Burrows Road Alexandria between about 1999 until about 2008.

Acquisition and Operation of Landfill

In 2002 Alexandria Landfill Pty Ltd was formed and acquired from the Sydney City Council a solid waste Landfill at 10-16 Albert Street St Peters. The Landfill had approximately 1 million cubic metres of void remaining available for landfilling and was licensed by the NSW EPA to receive and landfill asbestos waste.

Premises Based Environment Protection Licenses

In 2008 the Landfilling EPL 4627 at the Albert Street premises was added to by a Recycling and Resource Recovery EPL No 12594 held by another corporate entity within the Group.

Between 2002 and December 2014 Landfilling and Resource Recovery took place contemporaneously on the same site. The site occupies about 16 Hectares and is located equidistant from the Sydney GPO and Kingsford Smith Airport.

Acquisition of Eastern Creek Land

In 2006 the Proponent's corporate Group acquired approximately 114 Hectares of land immediately south of Minchinbury including a hard rock quarry which, for approximately 60 years had been quarried for road base.

The Quarry had a remaining void of 12million cubic metres.

Planning Approval Eastern Creek Waste Facility – Landfill and Resource Recovery

In 2007 an Application was submitted pursuant to Part 3A of the Environmental Planning and Assessment Act [since repealed] for the conversion of the worked out Quarry into a landfill and parts of the surrounding land into a construction and demolition materials resource recovery and recycling facility.

In 2009 Planning Approval was granted and in December 2012 the Genesis Xero Waste Recycling Facility (**Genesis**) became operational.

State Significant Planning Application for Construction of an Energy from Waste Facility

The Next Generation NSW Pty Ltd (**TNG**) is the Applicant in Planning Application No SSD 6236 for the Construction of an EfW Facility at Eastern Creek, adjacent to the operational Genesis Facility.

TNG is a wholly owned subsidiary of the Alexandria Landfill Corporate Group.

SECTION 1 - REVIEW OF TERMS OF REFERENCE (a)

1.1 Terms of reference (a)

a) The current provision of waste disposal and recycling, the impact of waste levies and the capacity (considering issues of location, scale, technology and environmental health) to address the ongoing disposal needs for commercial, industrial, household and hazardous waste

1.2 Introduction

In this section this submission reviews the Policies adopted by successive NSW State Governments and comments upon the operation and impact of those policies.

The applicable NSW Legislation and policies are displayed on the NSW EPA website and are reproduced in **Appendix B**.

1.3 Correcting Misconceptions

Since the passage of the POEO Act in 1997, successive NSW Governments have promoted a policy of diverting waste from landfill and promoting recycling and resource recovery.

The NSW Government has also more recently committed significant grant funding ($493 Million) through its Waste Less Recycle More Initiative, to further encourage waste minimisation.

The main medium to achieve this has been the imposition of the Landfill Levy pursuant to s88 of the POEO Act.

This Levy based on tonnage has increased the cost of landfilling where resource recovery has not taken place.

Materials which are landfilled are subjected to a POEO Act s88 Levy - [the implications of the levy, how it is applied and from where it is collected are discussed elsewhere in this submission].

The Landfill Levy to be paid by the Landfill Operator is calculated based on the weight of the material. In NSW the Levy currently stands at $135.70 per tonne.

The s88 Levy is the first economic incentive not to carelessly landfill easily recoverable materials of a great mass.

To do so would unnecessarily add to the levy cost of disposal by landfilling.

Rocks, concrete, metals and timbers fall into these categories.

Metal items such as fire extinguishers, gas bottles, copper pipes, stainless steel sinks and car batteries are weighty and are valuable to the Recycler.

Recovered ferrous metals on sale can return $120.00 per tonne and non-ferrous metals up to $5,750.00 per tonne in revenue to the Recycler, a better alternative for the Recycler than incurring costs and a Levy totalling $135.70 per tonne

Paper and cardboard are retrieved and sold for re-use as are gyprock, some tyres and plastics.

Provided that the revenue earned from the sale of recovered resources sale, less the cost of retrieving these materials is lower than the landfilling disposal cost [including s88 levy] these materials are **never** needlessly consigned to landfill.

1.4 Resource recovery as an imperative to lower long term costs associated with Landfilling and expediting land re-use post closure.

An important economic imperative for landfill operators is to exclude from landfilling those materials which are detrimental to good landfilling.

Detrimental materials are those which biodegrade and during that process produce gas and leachate. In this category are timbers, green-waste wood-waste, carpet, paper and cardboard. Other materials inimical to good landfill compaction include plastics which can also have a potential to disrupt internal water flows.

Taken together, these materials reduce optimum compaction and can lead to "poorly compacted landfills" producing gas and leachate and which require extensive post closure management. To a landfill owner intent on rapid post closure re-use of the land, landfilling of these types of materials is best minimised.

Regulations made pursuant to the POEO Act are strictly monitored and subjected to audit by the NSW EPA. The economic imperatives are also clearly in favour of carefully managing the types of material being landfilled.

It is not correct to state therefore that the operator of a licensed [landfill] waste facility with an interest in the land extending post closure, easily or negligently deals with the waste delivered to him.

1.5 2014-2021 WARR Strategy targets

A WARR Strategy is prepared by the NSW EPA every five years.

The strategy sets the following targets for 2021–22:

- avoiding and reducing the amount of waste generated per person in NSW
- increasing recycling rates to
    - 70% for municipal solid waste
    - 70% for commercial and industrial waste
    - 80% for construction and demolition waste
- increasing waste diverted from landfill to 75%
    - managing problem wastes better, establishing 86 drop-off facilities and services across NSW
- reducing litter, with 40% fewer items (compared to 2012) by 2017
- combatting illegal dumping, with 30% fewer incidents (compared to 2011) by 2017.

The new strategy provides a clear framework for waste management to 2021-22 and provides an opportunity

for NSW to continue to increase recycling across all waste streams.

The WARR Strategy is underpinned by the use of the s88 Waste Contributions Levy.

In addition to the strategy, the NSW Government has announced the extension of the Waste Less, Recycle More initiative with a further $337 million over 4 years from 2017-21. This extension guarantees funding from 1 July 2017 until 2021 to continue the work already underway to modernise the waste sector in NSW, deliver waste and recycling services to the community and ensure a clean environment.

In 2013 Sinclair Knight Merz provided modelling results upon which the EPA conducted a review of the WARR. In a series of Tables at p 27 of that Review, International Benchmarking is appraised. The Report titled, 'Modelling and data analysis to inform new waste strategy' is reproduced at **Appendix C.**

1.6 Key Points

1.6.1 Requirement for improved accuracy and timeliness of information for development of Policy

Recycling Rates - C&D and C&I Waste NSW

Information on the current and likely availability of construction and demolition (C&D) and commercial and industrial (C&I) waste steams was obtained from the 'National Waste Report 2013' which was collated by the Commonwealth Department of the Environment [now the Department of the Environment and Energy]. The 'National Waste Report 2013' appears to be the most recent publicly available collection of waste data for these streams. According to this Report:

- C&I waste generation was approximately 5,500,000 tonnes per annum with a resource recovery rate of 60%, which is 1% above the Australian average.
- NSW was targeting a C&I recovery rate of 63% by 2014.
- C&D waste generation was approximately 6,900,000 tonnes per annum with a resource recovery rate of 75% which 9% above the Australian average. NSW was targeting a C&D recovery rate of 76% by 2014.

Therefore based on this data **1,725,000 tonnes per annum** is potentially available for EfW fuel source in NSW.

The above estimate assumes taking a representative 65% (represented NSW population in the SMA) from the figures of the 'National Waste Report 2013'.

In its recent review, TNG's consultants Ramboll considered this to be a conservative assumption as the percentage of construction and industry in the Sydney area would represent a higher ratio to rural and township areas of NSW when compared against the population percentages (greater construction activities, greater density of commercial and industrial waste generators etc).

Even as NSW continues to improve waste recovery rates, there remains an availability of waste to support the operation of TNG. The availability of waste derived from C&I and C&D waste streams is not considered to be compromised as despite improving recovery rates, long term trends indicate that waste generation continues to increase.

1.6.2 Source Separated Waste NSW

Publicly available information relating to these waste streams is not always readily available. Estimates of waste availability across this stream were established using a mix of public information and the information contained in the DADI confidential report.

In the Waste Management Report (Waste Management Report) in the Amended EIS[2], Ramboll's research concluded based on estimates made using publicly available data there is potentially 3,822,000 million tonnes of waste available within the Sydney Metropolitan Area currently going to landfill that might be utilised for higher and better purposes, such as energy recovery.

TNG acknowledges that due to technological advances and regulatory changes, recycling percentages have increased over time and will continue to increase.

However, despite these continual improvements trend data indicates that waste generation continues to rise in line with population and economic growth, as seen in the three (3) years between 2006/07 to 2010 where waste generation increased 12%.

1.6.3 The WARR Strategy targets issued in 2014 were based upon the latest data noted to have been taken from 2010-2011.

On this basis [even with no consideration of the recent boom in commercial developments] we will not know if the WARR strategy for 2017 has been successful until 2024.

The WARR Strategy cannot have taken into account the effects of the trans-shipment of Waste to Queensland.

As an expression therefore of the aims and policy ideals pursued by the NSW EPA it is a useful reference but its data is now six years old and does not take into account the paradigm shift brought about by interstate transfer of waste.

Each month the NSW EPA receives from all licensed facilities in NSW Reports detailing waste materials received and waste materials landfilled. It is in reliance upon this information that Levy receipts are calculated.

The NSW EPA must therefore have more up to date data available to it than 2010-11.

1.7 Recommendations

The data upon which the NSW EPA relies to formulate policy and against which it assesses applications is:

(a) hopelessly out of date; and

(b) uses nomenclature [which though conveniently used as shorthand descriptions within the Industry] are not themselves precise indicators of resource recovery of segregated materials versus mixed waste GSW.

[2] http://www.dadi.com.au/the-next-generation

The recommendations are:

1.7.1 Immediately review the current WARR.

1.7.2 The NSW EPA adopt a position that the WARR strategy be reviewed whenever there is evidence of significant market change in the waste industry or upon application to it by the representative Industry bodies. This is necessary for:

(a) The NSW EPA to be able to provide relevant up to date evidence against which applicants may formulate commercial decisions regarding, recycling, waste disposal and energy from waste projects; and

(b) The NSW EPA to be able to formulate accurate evidence based policy against which it may properly and lawfully participate in the determination of applications by EfW proponents.

1.7.3 That the NSW EPA issue official 'indicators' at six monthly intervals of the waste disposal/ recycling outcomes in NSW. [These need not have the level of accuracy for auditing and accounting purposes and could be supplied with appropriate disclaimers.]

1.7.4 The indicators could then be relied upon by industry participants for the purposes of adjusting commercial decisions and could be relied upon for the purposes of Environmental Impact Statements so as to ensure consistency in available information for the purposes of assessing those applications.

1.8 Interstate transportation and disposal of waste

A comprehensive discussion of the impact of waste levies must include an in depth analysis of interstate transportation and disposal of waste.

Recent trends for landfill in NSW (i.e. 2012 – 2014) have been hugely influenced by policy changes in Queensland that abolished landfill levies that saw significant volumes of waste transported interstate for disposal, further artificially skewing local data on landfill trends and rates over this period.

The extent of this has not been disclosed by the NSW EPA.

1.8.1 Policy Response

Policy reform in NSW introduced a "Proximity Principle", which made it an offence to transport any waste by road more than 150 km from where it was generated in NSW. This has since been abandoned due to constitutional difficulties discussed in **Section 1.8.3** of this Submission.

1.8.2 Elements in the Commercial Transaction of Waste Disposal

In order to understand the effect of recent developments in the Waste Industry it is important to first understand the transaction steps which take place in waste disposal.

The general process occurs by the following steps:

1 **Mixed Waste** is originated or generated,

2 The Originator or Generator of the waste then contracts a Recycler or Waste Carrier] to dispose of the waste,

3 The Carrier charges a fee which generally includes the projected cost of the s88 levy,

4 The NSW Policy has been that the Carrier is supposed to dispose of the mixed waste at a licensed Facility either for resource recovery or for landfilling [depending upon the waste characterisation].

5 Residue waste, after resource recovery and General Solid Waste (**GSW**) is then disposed of by landfilling.

6 S88 levy is imposed on the residue waste [GSW] at the point of entry of the waste into a licensed landfill facility. In effect the licensed Facility acts as a collector of the tax from the Carrier.

7 The Landfill Facility as the ultimate receiver of the waste then has the responsibility to remit the collected levy to the NSW EPA.

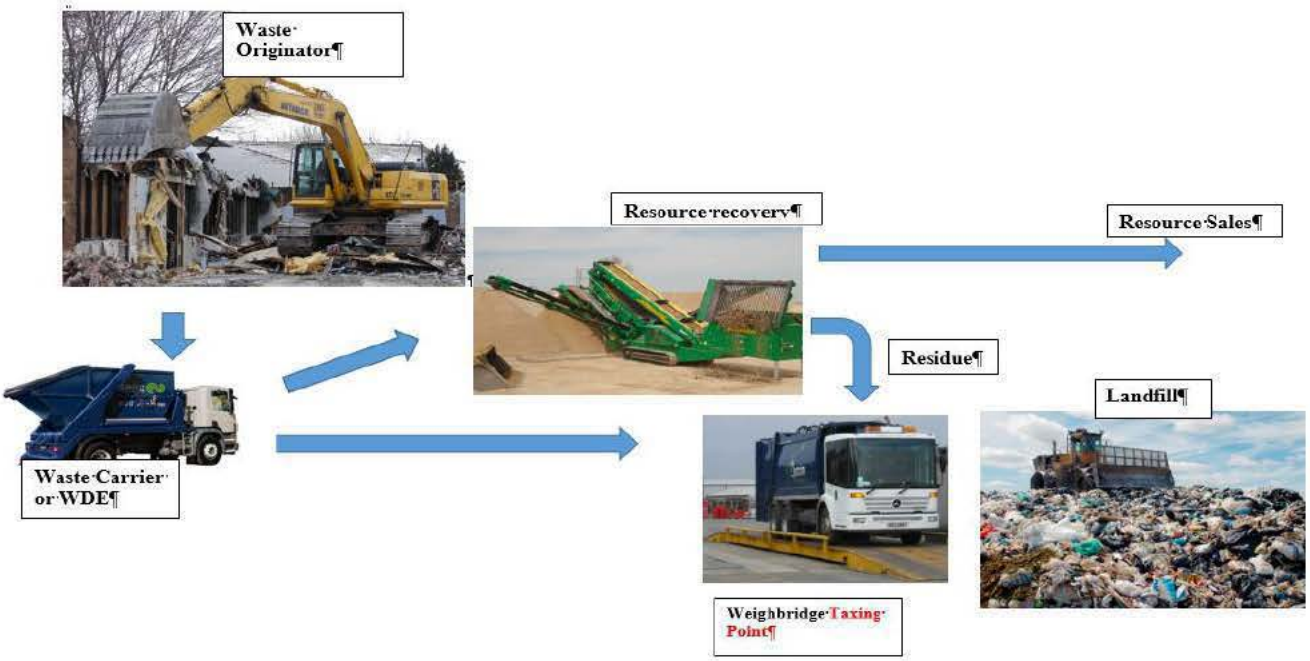

Figure 1: Depiction of commercial transaction of waste

1.8.3 Effect of a Landfill Levy Arbitrage and Avoidance NSW Recycling Policy

In satisfaction of an election commitment, a former Liberal National Government in Queensland abolished the equivalent landfill levy which, until then applied in that state.

Although significantly lower than the NSW s88 POEO Levy the abolition of the Queensland Levy was sufficient to create a favourable arbitrage which has commercially affected the NSW policy to incentivise and aid resource recovery.

This has added to the equation of waste disposal and resource recovery a third destination for NSW generated waste which is interstate [Queensland].

As there is no levy in Queensland, the cost of transportation of waste to that state, when added to the cost of its disposal by landfilling [without resource recovery] is currently lower than the cost of resource recovery and landfilling in NSW [inclusive of the NSW s88 Levy].

It is therefore commercially advantageous for a Waste Disposal Enterprise (**WDE**) and Carrier to transport waste and dispose of it in Queensland.

This is indicated in **Figure 2**.

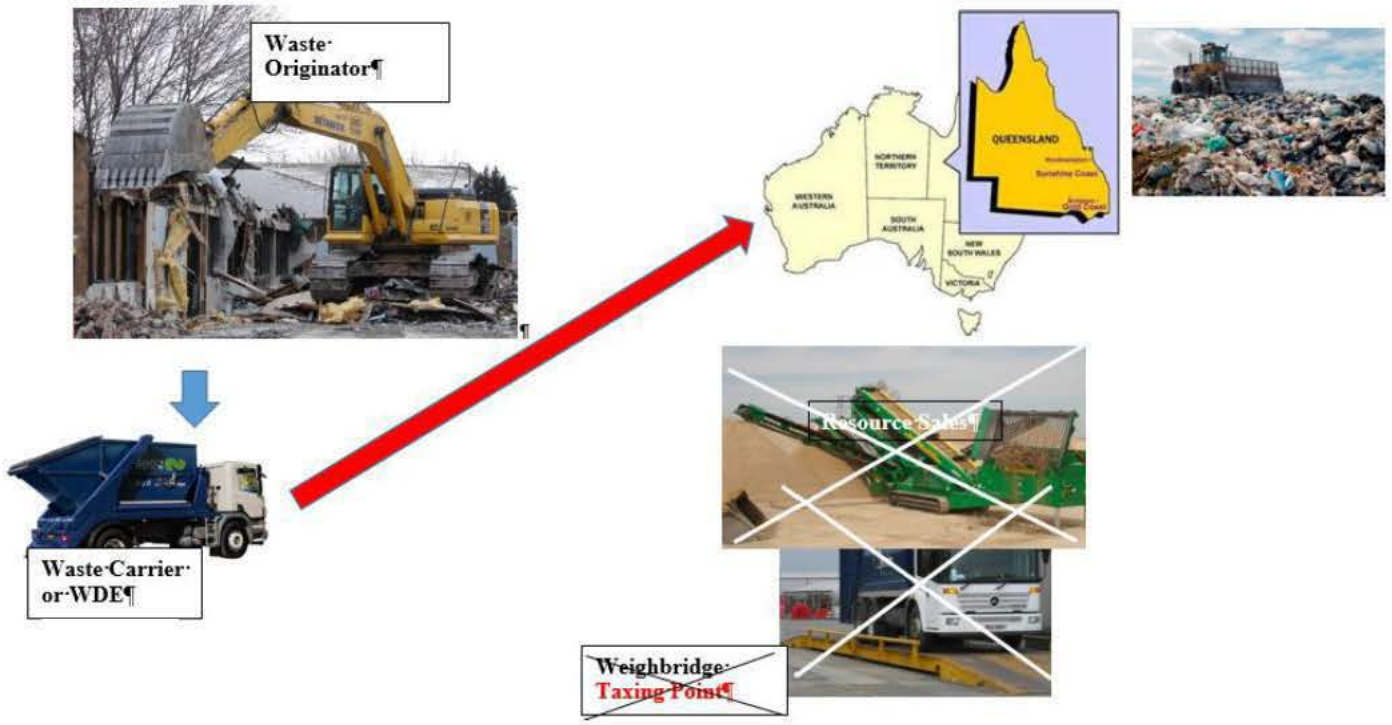

Figure 2: Depiction of commercial transaction of waste

1.8.4 Constitutional barriers to regulating against the interstate trading in waste.

The NSW State Government is effectively prevented by s92 of the Commonwealth Constitution from imposing any effective statutory inhibition on interstate trade whether by regulation or by the imposition of a tax.

On numerous occasions the High Court of Australia has found that various taxation measures applied to goods are in the nature of an excise which is a power which the Constitution limits to the Federal Government.

In addition to this restriction, state government regulations which [even though expressed to be enacted to address some perceived and serious community harm] have been found to breach s92 and therefore to be invalid.[3]

Given the result in Victoria it is highly likely that the foreshadowed regulations[4] in relation to the management of waste which are currently proposed at licensed facilities in NSW will be insufficient to overcome the interstate trade freedom protected by s92.

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[3] Resource Co Material Solutions Pty Ltd & Anor v. State of Victoria & Anor No M32/2016

[4] *New minimum standards for managing construction and demolition waste in NSW* (EPA, 2016)

In many cases the perceived problem can be addressed by regulating that a particular activity or behaviour shall not be permitted or is only permitted if licensed, or by making that activity a criminal offence. Those solutions are not available to the NSW State Government on this occasion because of the overriding effect of the Commonwealth Constitution (s92).

Neither is it permissible for the NSW State Government to tax a commodity in a manner which would have an unfair or discriminatory effect for those persons trading that commodity interstate, [the excise question].

It is important to look to the commercial drivers underpinning the actions complained of. We maintain that the answer to this conundrum lies in identifying the components of the commercial drivers and then examining whether any action is available using existing levers to bring about changes to the behaviour complained of.
We believe there is.

The main commercial driver of course is that it is less expensive for a Carrier to transport waste to Queensland and landfill it there than to engage in resource recovery in NSW and dispose of residue waste in this State and pay the NSW s88 Levy.

It is also less expensive for a Carrier to transport GSW to Queensland for landfilling.

One – so called "easy" solution - would be for the Queensland State Government to re-impose its landfill levy, or for the NSW State Government to reduce its rate of tax. The former is unlikely to happen in the short term due to election commitments and the latter runs counter to the longstanding NSW policy of discouraging landfilling and encouraging resource recovery.

We believe that the answer to the problem lies in the chain of responsibility for the waste which is generated in NSW.

Currently the Waste Generator or Originator contracts with the Carrier who simply takes away the Waste Originator's problem.

The Waste Originator perhaps assumes and expects that the waste will be responsibly disposed of and pays for that service. Most of the time, the Waste Originator doesn't care what happens to the waste after it leaves his care and control.

We believe that this is not compatible with a proper chain of responsibility.

In the case of mixed waste or soil type waste, the Waste Originator is charged by the Carrier an amount for disposal of the mixed waste. Typically this amount includes a provision for the s88 Levy which the Waste Originator expects and assumes will be payable.

Having recovered from the Waste Originator an amount of money including the full rate of s88 levy, it is in the commercial interests of the WDE to then minimise the levy which the Carrier may actually have to pay by disposing of the waste at NSW licensed facility.

In the past this has been done by engaging in resource recovery to reduce the bulk and weight of the residue waste destined for landfill. Now that reduction in disposal cost is being achieved by transporting and disposing the material interstate.

The commercial reality is that in Queensland the waste can be landfilled more cheaply than in NSW and more cheaply than recycling.

1.8.5 The effect of this phenomenon has principally been twofold,

(a) a large and increasing haemorrhage of revenue from NSW EPA as the payment of levy is avoided [estimated as exceeding $100Million per annum]; and
(b) effective avoidance of all recycling strategies pursued by the NSW EPA for the past 20 years.

In the absence of a valid legislative power in the NSW State Government to *prohibit* transfer of waste interstate and the levy arbitrage between States remains then economics dictate that if the cost of transport and disposal interstate is less than the disposal or recycling cost in NSW the waste will be transported *and disposed of without recycling.*

Until or unless Queensland re-institutes a landfilling levy which neutralises the arbitrage, or NSW reduces the NSW levy rate, the practice of interstate transportation can be expected to continue.

Our submission is that the inescapable conclusion must be that unless the interstate transportation of waste is urgently addressed, recycling of construction and demolition waste in Sydney area has no future.

No less important [for being unseen] are other effects:

(a) increased road traffic;
(b) increased fuel usage; and
(c) increased greenhouse gas generation - this time from landfills in Queensland as transported bio-degradable material is landfilled with little or no resource recovery.

The authors of this report are also aware of evidence of fraudulent alteration of Carrier records to falsely indicate that transported waste was properly disposed on in NSW at authorised facilities. The authors of this report have reported one instance of this to the NSW EPA.

The Dial A Dump Industries Group are aware of three recent separate transactions which have called into serious question either the origin of certain waste transported from development sites in Sydney or the real destination/disposal of similar waste.

Records had been altered to indicate proper and lawful disposal of asbestos waste at a NSW licensed facility when in fact it was not. This leaves open the possibility that the waste has in fact been transported to Queensland or more dangerously that it has been unlawfully "recycled" and re-used in Sydney.

1.9 Recommendation to resolve issues associated with the transport and disposal of interstate waste

1.9.1 The Polluter Pays Principle – Converting s88 Levy into a Pigouvian Tax

It is unlikely in the short term (due to political constraints) that a landfill levy will be reintroduced into Queensland.

In our view, reliance upon either the Proximity Principle or the Mutual Recognition Act 1992[5] is also unlikely to overcome the effect of the Commonwealth Constitution.

We believe that the issue can be addressed in NSW and almost immediately by relatively minor regulatory changes.

The existing tax of s88 levy can be refocussed exerting a primary liability for payment of it upon the Generator of the waste. In turn, this liability can be passed along the chain of responsibility in a manner similar to GST. Precedents already exist within the POEO Act for the giving of a statutory Notice which defers potential legal liability for actions which would otherwise breach the Act.

The collection point of the s88 levy will remain at the weighbridge of the landfill facility.

1.9.2 An urgent review of WARR must take place immediately having regard to the latest evidence [properly disclosed by the NSW EPA] concerning the transportation of waste to Queensland.

1.9.3 The NSW EPA should implement the proposed Waste Responsibility Levy.

If adopted, this system will:

[5] Act No. 198 of 1992 as amended, taking into account amendments up to SLI 2010 No. 41
An Act to provide for the recognition within each State and Territory of the Commonwealth of regulatory standards adopted elsewhere in Australia regarding goods and occupations.
Administered by Industry, Innovation, Climate Change, Science, Research and Tertiary Education.

(a) Greatly assist in the reduction and potential elimination of illegal dumping in NSW. The NSW EPA has recently announced that it is aiming towards a reduction in illegal dumping of 30%. This target is not ambitious enough and should be 100%.

(b) Address completely the tracking of asbestos contaminated wastes.

(c) Restore the NSW Policy of diversion of waste from landfill and maximise resource recovery.

(d) Return NSW to its pre 2012/13 position regarding collection of the s88 Levy.

SECTION 2 - REVIEW OF TERMS OF REFERENCE (b)

2.1 Terms of reference (b)

(b) the role of 'energy from waste' technology in addressing waste disposal needs and the resulting impact on the future of the recycling industry

2.2 Policy considerations

2.2.1 Economic Growth in Western Sydney

NSW 2021 is a 10 year strategic plan to guide policy and other decisions for the State. The Plan is based on five strategies to rebuild the economy, provide quality services, renovate infrastructure, strengthen local environments and communities, and restore government accountability.

The State Plan contains a number of the strategies and goals that are relevant to the Western Sydney Employment Lands. This includes goals to strengthen local environments and communities, protect the natural environment and enhance cultural, creative, sporting and recreation opportunities. The relevant goals are identified below.

G1 Increased business investment

The proposed development involves over $557 million of investment to bring the site 'on-line' for employment land uses. The development increases the supply of land serviced and ready for development with the proposed subdivision, triggering market activity in the employment area.

G2 Maintain and invest in infrastructure

The development will contribute to regional road works through contributions, and will provide a vital piece of infrastructure for managing waste generation within Greater Metropolitan Sydney.

G3 A reliable electricity supply with increased use of renewable energy

In December 2014, 'A Plan for Growing Sydney' replaced 'The Metropolitan Plan for Sydney 2036'. The Plan states the WSEA will be the single largest new employment space in the Sydney Metropolitan Area. Located on the intersection of the M7 and M4 Motorways near Eastern Creek, it will significantly expand the employment potential in this part of Sydney. The Plan identifies the Western Sydney Employment Lands as an area of strategic industrial importance due to its location close to Badgerys Creek Airport and proposed new transport infrastructure.

These industrially zoned lands are identified as vital in providing increased employment opportunities within Western Sydney and integrating new and existing employment precincts with transport infrastructure that will attract business investment and activity.

The Broader WSEA draft Structure Plan has been developed in line with the goals and priorities identified in NSW 2021 and the now superseded draft Metropolitan Strategy for Sydney to 2031.

The purpose of the draft Structure Plan is to provide a framework for land use, transport and infrastructure planning at a strategic level. It incorporates the findings of a series of technical studies into Transport, Economics, and Utilities and Services.

The draft Structure Plan will provide some 6,300 hectares of additional employment lands. About 57,000 new jobs are expected to be located at the employment area over the next 30 years, with a total of 212,000 new jobs when the area is fully developed beyond 2046, including both office based jobs and those in the industrial sector.

2.2.2 Development of commerce, industry and residential dwellings increases the demand for Waste Infrastructure

Until the phenomenon of the interstate transportation of waste developed, it was considered that there was an increasing infrastructure gap in resource recovery infrastructure and waste generation rates (for both material recovery facilities and EfW facilities).

There are currently approximately 9 NSW EPA approved facilities in the Western Sydney region that can accept non-putrescible (Class 2) General Solid Waste, the waste type to be accepted at the proposed Facility. These are as follows:

- Kimbriki Resource Recovery Centre, Terrey Hills;
- DADI, Eastern Creek;
- Kurnell Landfill, Kurnell;
- Blacktown Waste Services, Marsden Park;
- NSW Investments (Previously called 'Wanless Landfill'), Kemps Creek;
- Erskine Park Landfill, Enviroguard; (relying on differential settlement to keep any airspace);
- SITA Elizabeth Drive Landfill, Kemps Creek;
- SITA Spring Farm Landfill, Spring Farm; and
- Veolia Horsley Park Landfill, Horsley Park (closure Expect 2018).

Some other Class 2 facilities are nearing closure, have recently closed or accept negligible quantities of waste and only from specific sources (e.g. council operations). These include:

- Huntley Heritage Landfill, West Dapto (close to closure);
- Brandown Landfill, Kemps Creek;
- Penrith Waste Services;
- Bankstown City Council Kelso Landfill (closed mid 2014);
- Glenfield Landfill, Glenfield; and
- DADI Alexandria [recently closed due to WestConnex works].

The most recent studies examining Class 2 capacity are:

- The 2009 Hyder 'Australian landfill capacities into the future' Report commissioned by the Department of the Environment, Heritage, Water and the Arts (**The Hyder Report**);
- The Wright Corporate Strategy Report, 'Strategic Review – Putrescible Landfill Demand and Capacity for the Sydney Region' which was prepared by and released by the NSW Government in 2010 (**The Wright Corporate Strategy**); and
- A 2010 independent assessment by MRA.

2.2.2.1 The Hyder Report

The Hyder Report assumed 3.38 million tonnes of C&I and C&D waste deposited in Class 2 landfills for 2006-07. Sydney landfills have a capacity of less than 19 million tonnes. This means Sydney's contingency landfill space would suffice for just over 5.5 years.

This calculation incorporates the Light Horse facility (now known as the Genesis facility) which was granted project approval by the NSW Planning Assessment Commission in 2009. Since it commenced recycling operations, it has partly alleviated the sharp decline in landfill availability in the Sydney Metropolitan area.

2.2.2.2 The Wright Corporate Strategy

The Wright Corporate Strategy assumed landfilling of 2.5 million tonnes annually. However the source of this estimate was not referenced. Nonetheless, at less than 46.5 million tonnes of landfill space (including the Light Horse facility now "Genesis"), Sydney was calculated to have 18.5 years of contingency landfill space remaining in 2009.

2.2.2.3 MRA 2010 Independent Assessment

A 2010 MRA Independent Assessment evaluated whether a capacity of 34.3 to 36.3 million tonnes of landfill void space for Sydney Metropolitan Area was justified. To complete the Assessment, data on Sydney C&I and C&D waste was extracted from the NSW DECCW Waste Avoidance and Resource Recovery Progress Report 2010.

This data suggested that in 2010, Sydney's remaining capacity was calculated to be between 10.1 and 10.7 years. Additional data from the 2009 Hyder Report titled, 'Waste and Recycling in Australia' and the 'National Waste Report 2010' was used to corroborate the findings. Based on the additional Hyder data it was agreed that 4.98 million tonnes of waste is landfilled per annum in NSW.

With Sydney's population comprising 65% of the state total, it was assumed that Sydney contributes 65% of the State landfilled waste. At the current rate of disposal, the 34.3 to 36.3 million tonnes of remaining capacity would last for between 10.6 and 11.2 years.

2.2.3 Effects of interstate waste transportation on demand for waste Infrastructure

There is no doubt that the transportation and landfilling in Queensland has eased the immediate pressure upon landfill infrastructure in NSW. Albeit, at the cost of increased greenhouse gas emissions, additional fuel usage, and heavier road usage.

Twenty years of consistent environmentally sound policies pursued by the NSW governments of every persuasion has been undermined. Whether the landfilling occurs in NSW or at another place in Australia (using NSW originated waste) should not deter NSW from pursuing a policy to minimise landfilling.

Resource recovery and diversion of waste residual away from landfilling is in the national interest in order to minimise greenhouse gas (methane) generation.

Eventually, [and perhaps inevitably] Queensland and other jurisdictions will reintroduce a landfill levy and the commercial considerations will then dictate that the cost of transportation to those jurisdictions will be such that it is no longer economically worth the effort to transport waste in order to landfill it.

While the Industry waits for that to occur the skills, the capital investment and the infrastructure necessary to carry out materials recycling on any kind of commercial scale will be lost.

There will be immediate societal effects of some unemployment but perhaps more importantly the infrastructure built upon 20 years of consistent NSW policy will no longer exist.

Transport costs and levies interstate will eventually cause a return to local landfilling though without intervention it is impossible to see when that will occur.

It should also not be forgotten that the loss of revenue generated by s88 levies [which is largely redirected to waste minimization measures and in assisting local Councils] has significantly increased the burden on consolidated revenue.

2.2.4 Energy Policy

In 2015 the NSW EPA adopted its policy in relation to Energy Recovery Facilities and that policy remains the Current Position NSW[6]

The Policy is reproduced in full at **Appendix D** for convenience.

The Policy was developed in recognition:

(a) of the diminishing available landfill capacity in Sydney; and

(b) that recycling and resource recovery especially in respect of GSW [non putrescible] was approaching rates which, with the use of available technology, could not in the short term be much further improved.

[6] The NSW Energy from Waste Policy Statement (EPA website, 2015)

As indicated earlier in this submission conditions have changed since the EfW Policy was introduced and those changed conditions are not reflected in the most recent and current WARR report.

With appropriate action by the NSW Government or a change in circumstances in Queensland [by reintroduction of a levy] the situation can just as easily and as quickly reverse.

Renewable energy projects and carbon markets are positive steps towards creating a cleaner energy market, but the economic reality is that the once the transportation of waste to Queensland ceases then the s88 Levy will ensure that resource recovery will once again be the order of the day.

The paucity of landfill void space in Sydney make EfW viable and desirable in Sydney and other areas of Australia.

Other renewable energy systems, such as wind, solar and hydro, do not provide continuous and steady supplies of energy as they are vulnerable to environmental conditions. As such, these systems are not as suitable for assisting with peak load time requirements at the grid compared the energy from waste facilities.

Hydropower resources are geographically limited, and have substantial environmental costs. Ecological impacts down and upstream include creation of migration barriers and sediment flow disruption.

Biomass that decomposes in newly created reservoirs releases methane and carbon dioxide. Additionally, the expected increase in unpredictability of rainfall and run-off may limit the capacity of this technology. Given the maturity of this technology, there is little room for improvement in its efficiency.

While the cost of setting up and maintaining wind power infrastructure has reduced significantly in the last 30 years, the main disadvantage of this power is its intermittency. The proportion of electricity wind can contribute electricity to the grid is limited because of this. Further, the windiest places are rarely the most populous.

As such, infrastructure development and transport of the energy is necessary. In terms of density, wind power is low density, and generates few watts per square metre.

According to research by David Keith, Head of the Energy and Environmental Systems Group at the University of Calgary in Canada, a truly large scale deployment of wind power schemes could affect local, and potentially global, climate by altering wind patterns (Keith et al., 2004).

Solar cells do not generate electricity at night, and in places with frequent cloud cover, and at times of prolonged overcast conditions, generation fluctuates unpredictably during the day. Large installations will usually be far from populous areas, therefore distribution of the electricity generated will pose problems. Some advanced photovoltaic cells use rare elements that may be subject to cost and supply constraints.

In terms of cost comparison and efficiency of energy production between energy from waste facilities and other renewable energy systems, energy from waste is the more cost effective source based on 1 MWh of energy produced. According to 'Energie aus Abfall', Band 6 written by Karl J. Thomé-Kozmiensky and Michael Beckmann (2009), it was found that while the initial investment cost (in Euros at the time of publication) of EfW is higher than wind and comparable to solar, the cost per

MWh is much lower.

Further, this publication also provided a comparison of number of hours per annum which the energy from waste ('full load hours'), wind and photovoltaic technology are able to operate and produce energy.

It concluded that EfW technology can produce energy for 470%-1,000% more hours in a year than the alternative technologies. This publication was used to create the below summary table, which demonstrates that cost per hour of operation for energy from waste is lower than other alternative energy sources.

Energy technology	Full load hours p/a	Investment cost (Euros)/MWh
Energy from waste	8,000	~30
Wind	1,700	~40
Photovoltaic	800	~300

Table 1 – Full load hours p/a and Cost comparison of energy technologies per MWh of energy produced

There are a number of alternative technologies available for this type of proposed Facility (including external kilns, fluidised beds, gasification and pyrolysis, plasma gasification and moving grate technology).

The NSW EPA has recognised the importance of the recovery of energy from waste as part of effective waste management, as reflected in *NSW Energy from Waste Policy Statement 2014.*

> *The Environmental Protection Authority (EPA) recognises that the recovery of energy and resources from the thermal processing of waste has the potential, as part of an integrated waste management strategy, to deliver positive outcomes for the community and the environment. Energy from waste can be a valid pathway for residual waste where:*
>
> *Further material recovery through reuse, reprocessing or recycling is not financially sustainable or technically achievable;*
>
> *Community acceptance to operate such a process has been obtained.*
>
> *When the levy arbitrage between NSW and Queensland is eventually removed an energy from waste process will ease the renewed pressure on NSW landfills by diverting waste and utilising it as fuel to produce electricity.*
>
> *As such, the facility reduces the need for primary resources and consumption of fossil fuels. The energy from waste process is overall a cleaner form of energy production compared to burning coal.*

The NSW Government recognises the diversion of waste from landfill, and consequent reduction in potential for methane emissions, and the provision of low carbon, renewable energy, as important contributions for dealing with NSW waste challenges.

It is considered the 'Do Nothing' scenario is not appropriate given the established need for new energy generation, including a need for low carbon generation.

The alternative to EfW proceeding would be continued operation of traditional landfill waste management operations which have been found to be inefficient and undesirable as a long term sustainable solutions to Sydney's expanding population and increasing waste generation.

There is an established need for new energy generation, including a need for low carbon generation. Providing a form of low carbon, renewable energy, is now recognised by Government as making an important contribution to the targets for dealing with waste.

2.3 Recommendations

2.3.1 When the committee considers this term of reference it should first correct the non sequitur inherent in it, "Role of energy from waste technology" and "the *resulting* impact on the future of the recycling industry"

The words used in the term of reference incorrectly proceed upon an assumption that there is an action and a consequence i.e. that the first defines the second.

The words incorrectly assume that there is a "future for the recycling industry in Sydney" which might be [adversely affected] by EfW. As has been indicated, while ever landfilling of waste in Queensland is less expensive than resource recovery in Sydney then there is no future for resource recovery in Sydney.

Only if immediate and effective action is taken which has the commercial effect of preventing the interstate landfilling of waste, which could be the subject of resource recovery, will there be a future for the recycling industry in NSW.

We will demonstrate by empirical evidence in a later submission that under NSW policy EfW is an adjunct to proper resource recovery and not a derogation from it.

SECTION 3 - REVIEW OF TERMS OF REFERENCE (c)

3.1 Terms of reference (c)

(c) current regulatory standards, guidelines and policy statements oversighting 'energy from waste' technology, including reference to regulations covering:

i. the European Union

ii. United States of America

iii. international best practice

3.2 Energy from Waste technology overview

Energy recovery from waste forms part of the waste, resource recovery framework adopted and implemented by the NSW Environmental Protection Authority (NSW EPA).

The Next Generation (**TNG**) Energy from Waste Facility is proposed to be delivered as part of a broader and integrated waste management operation that includes:

- Recycling and Resource Recovery through the Genesis MPC; and
- Waste Disposal and Landfill: the current (and only current solution) to chute waste residual, representing the waste fraction that cannot be recovered for reuse, from Genesis and other processing facilities. [7]

As well as providing a means of diverting CRW from MPC away from landfill TNG will also accept suitable and eligible waste fuels from authorised third parties.

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[7] **Disclosure**

The ultimate corporate owner of the Proponent

The Next Generation (NSW) Pty Ltd (TNG) is wholly owned by Alexandria Landfill Pty Ltd (ALF) ABN 26 098 849 971

ALF wholly owns Dial A Dump Industries Pty Ltd ABN 75 131 565 583 and Dial A Dump EC Pty Ltd ABN 76 115 345 769

These entities together with their forerunner Dial A Dump Pty Ltd have operated in the Waste and Recycling market in Sydney since 1984.

The Principal shareholder of Alexandria Landfill Pty Ltd is Ian Raymond Malouf.

- EPL No. 20121 relates to the recycling and resource recovery arm of the operation; and
- EPL No. 13426 relates to the management and regulation of the general solid waste (non-putrescible) landfill operation.

Important Notice.

This submission is not made as a replay of or in substitution for the Planning Application presently being dealt with by the appropriate agencies pursuant to the Environmental Planning and Assessment Act. Specific details of that application, and the technology proposed to be used are able to be viewed on the Proponent's website or on the Department of Planning and Environment websites 'State Significant Developments' page.

This information is provided as an overview and an aid to understanding one form of technology which is proposed.

3.2.1 EfW Technology

The EfW Facility proposed by TNG will utilise moving grate incinerator technology fed by up to four (4) combustion lines and associated boilers, utilising air cooled condenser (ACC) units, flue gas treatment systems (optimised SNCR) and associated residue and reagent storage silos and tanks, emissions stacks and associated emissions monitoring systems and steam turbines and generator housed within a turbine hall powered by two auxiliary diesel generators each of up to 2.4MWe output.

Moving grate technology has been selected based on its capacity to handle a wide range of fuel types. While other elements of the technology have been selected to respond to achieve the highest possible level of environmental performance.

The capacity of the Facility cannot be treated in a single stream combustion system as single stream facilities of the required size cannot be supplied.

Rather, the Facility will be configured as a four (4) stream system. That will be implemented over two (2) primary phases.

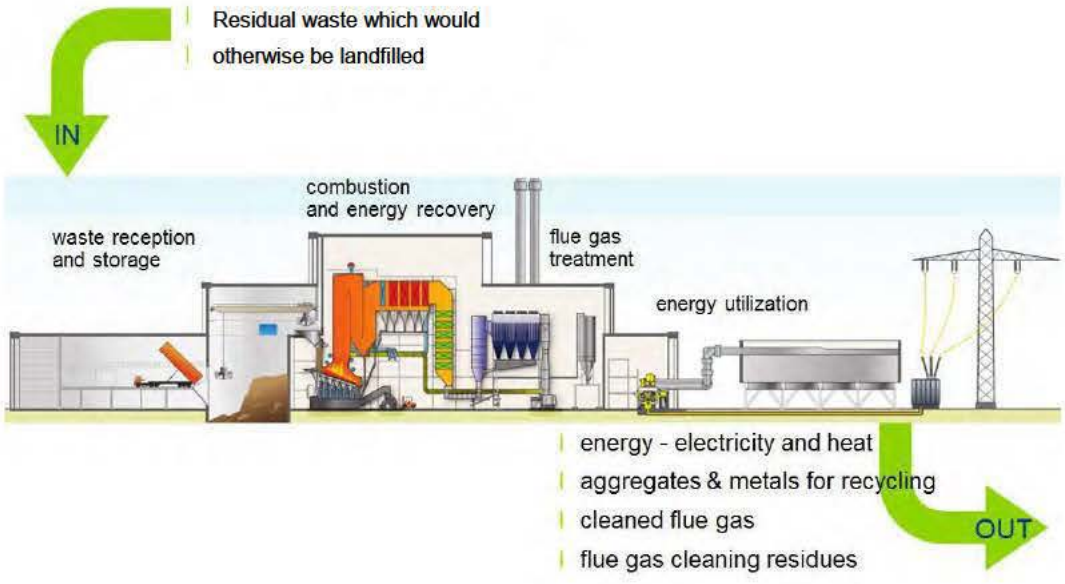

Figure 3: Overview of EfW process (source: HZI; 2016)

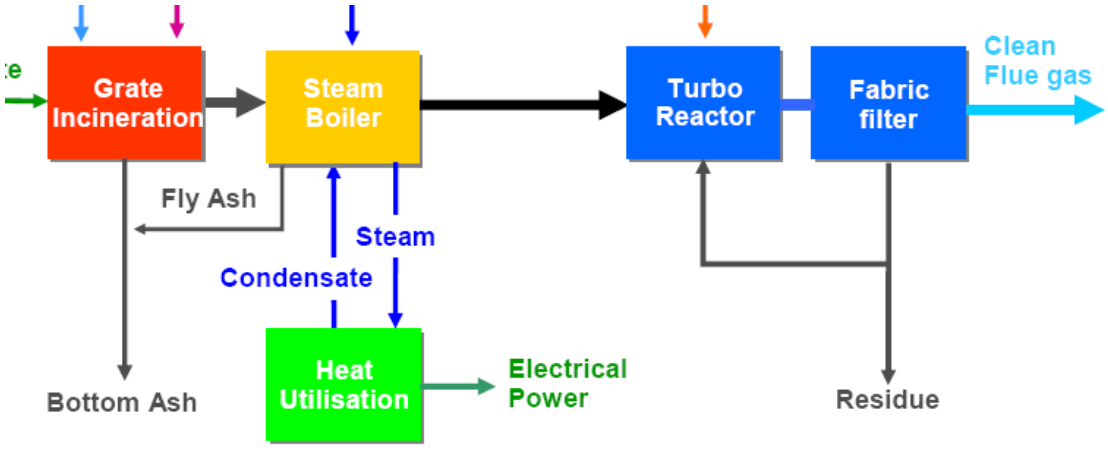

Figure 4: Schematic Process Diagram for a single stream of processing

3.2.2 Design fuel mix

In order to determine the best technology a preliminary design fuel mix is carried out

	Units	CRW	C&D	C&I	Floc waste	Paper Pulp	Glass Recovery	GO Residual	AWT Residual	MRF Residual	Design Fuel Mix
Fuel Mix	%	**23.37%**	**28.69%**	**16.84%**	**14.43%**	**4.81%**	**1.72%**	**2.06%**	**6.87%**	**1.20%**	100
Compositional Analysis											
Paper/Card	%	4.30	14.05	22.44	3.93	78.40	62.00	30.00	21.05	38.54	16.75
Plastic Film	%	10.20	6.37	10.90	10.90	21.60	3.80	2.50	20.00	26.94	10.47
Dense Plastic	%	0.00	6.37	10.90	10.90	0.00	34.20	2.50	21.05	0.00	7.32
Textiles	%	5.30	0.00	12.89	0.18	0.00	0.00	0.00	10.53	0.00	4.16
Glass	%	0.00	0.00	1.81	0.00	0.00	0.00	4.00	0.00	8.50	0.49
Vegetation	%	8.30	0.00	1.70	0.00	0.00	0.00	35.00	3.16	0.00	3.16
Other combustibles	%	0.00	0.00	0.00	70.40	0.00	0.00	0.00	0.00	0.00	10.16
Metal	%	1.80	1.12	0.37	0.00	0.00	0.00	5.00	0.00	7.59	1.00
Fines	%	0.00	0.94	0.18	0.00	0.00	0.00	0.00	11.58	0.00	1.10
Wood	%	58.20	43.90	21.53	0.85	0.00	0.00	0.00	4.21	0.00	30.24
Combustibles	%	0.00	0.00	2.84	2.84	0.00	0.00	0.00	2.11	0.00	1.03
Non-Combustibles	%	4.50	0.00	0.00	0.00	0.00	0.00	21.00	1.05	0.03	1.56
Hazardous	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gyprock	%	2.40	6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.42
Other	%	5.00	20.75	14.44	0.00	0.00	0.00	0.00	5.26	18.40	10.14
Total	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 2: A Design Fuel Mix: Phase 1 was determined for TNG (Source: Ramboll, PDB; 2016)

3.2.3 Design fuel: Typical profile

Using the design fuel mix a typical profile has been developed. For phase 1, the typical profile is shown in Table 3.

	Units	CRW	C&D	C&I	Floc waste	Paper Pulp	Glass Recovery	GO Residual	AWT Residual	MRF Residual	Design Fuel Mix
Chemical Analysis											
Carbon (C)	%	31.34	27.02	35.00	29.65	42.90	41.01	16.98	38.96	32.63	31.44
Hydrogen (H)	%	4.21	3.51	4.29	3.80	5.84	4.63	2.12	4.98	4.84	4.07
Nitrogen (N)	%	0.34	0.06	0.59	0.18	0.00	0.00	0.12	0.47	0.00	0.26
Sulphur(S)	%	0.42	1.04	0.05	0.11	0.12	0.09	0.06	0.04	0.06	0.43
Chloride (Cl)	%	0.09	0.66	1.15	1.78	0.19	3.27	0.26	2.18	0.23	0.88
Oxygen (O)	%	21.11	21.50	17.50	7.04	24.64	26.69	12.58	13.77	12.11	18.06
Water (H2O)	%	28.47	21.51	21.68	22.62	22.58	20.81	36.20	18.40	15.20	23.38
Ash	%	14.03	24.70	19.74	34.82	3.73	3.50	31.68	21.20	34.93	21.49
Total	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
NCV	**MJ/kg**	11.95	9.97	13.84	12.59	17.22	15.24	5.67	16.33	14.23	**12.30**

Table 3: Design Fuel Mix Typical Profile (source: Project Definition Brief, Ramboll, 2016)

The design fuel supplied to the Facility is thoroughly mixed in the bunker and fed by crane. The cranes feed the independent lines, in semi-automatic or automatic operation mode. Once in the feed hopper, the fuel load is pushed onto the grate by a ram feeder.

The grate itself has a water-cooled zone to protect the grate against excessive heat when using high caloric Residual Waste Fuels. When the Residual Waste Fuel is completely burnt, the remaining ash falls into the bottom ash extractor, where the bottom ash is quenched by water and then transported to its dedicated hall with a storage capacity of 5 - 7 days.

The TNG proposal has been considered against the 68 basic requirements in Chapter 5.1 and 5.2 documented in the "Reference Document on the Best Available Techniques for Waste Incineration (August 2006)" (in short BREF) to determine the suitability of the design, emissions and energy efficiency, that concludes the TNG facility fulfils the BREF requirements and therefore demonstrates BAT.

3.2.4 Incineration Design

The combustion grate is capable of treating a wide range of residual waste fuels including municipal household waste, industrial waste as well as solid recovered fuel (SRF) or biomass. The specific thermal and static surface loads are important design parameters of a combustion unit, which is expected to demonstrate low wear and long life expectancy.

The furnace is designed for continuous waste combustion in the range between 60 and 100% of the thermal design load. Short-time peaks caused by the non-homogeneity of the waste are absorbed by the system up to 110% of the design load. In case of very low power and heat requirements even sub-load operation at 60% of the thermal load may be

conducted.

In case the temperature in the secondary combustion chamber drops below minimum temperature of 850°C, oil or gas fired support burners automatically start operation. Experience shows that such activation occurs very rarely depending on the fuel. Predominantly the burners remain in a stand-by position.

Should support burners be required, gas is preferred. Discussions with private gas supplier Jemena Gas Networks and state owned electrical distribution network Endeavour Energy have indicated that sufficient gas supply will be available to the Site in time for operational commencement.

3.2.5 Incineration and Boiler

The water-cooled grate, combined with the 5-pass heat recovery boiler form the basis of this Facility. The features of the technology are provided in the **Figure 5**.

Full details of comparative fuel profiles, design fuel chemical analysis, wood waste fractions and chloride ranges for all reference facilities is contained in the Ramboll Technical Memo in the Amended EIS.

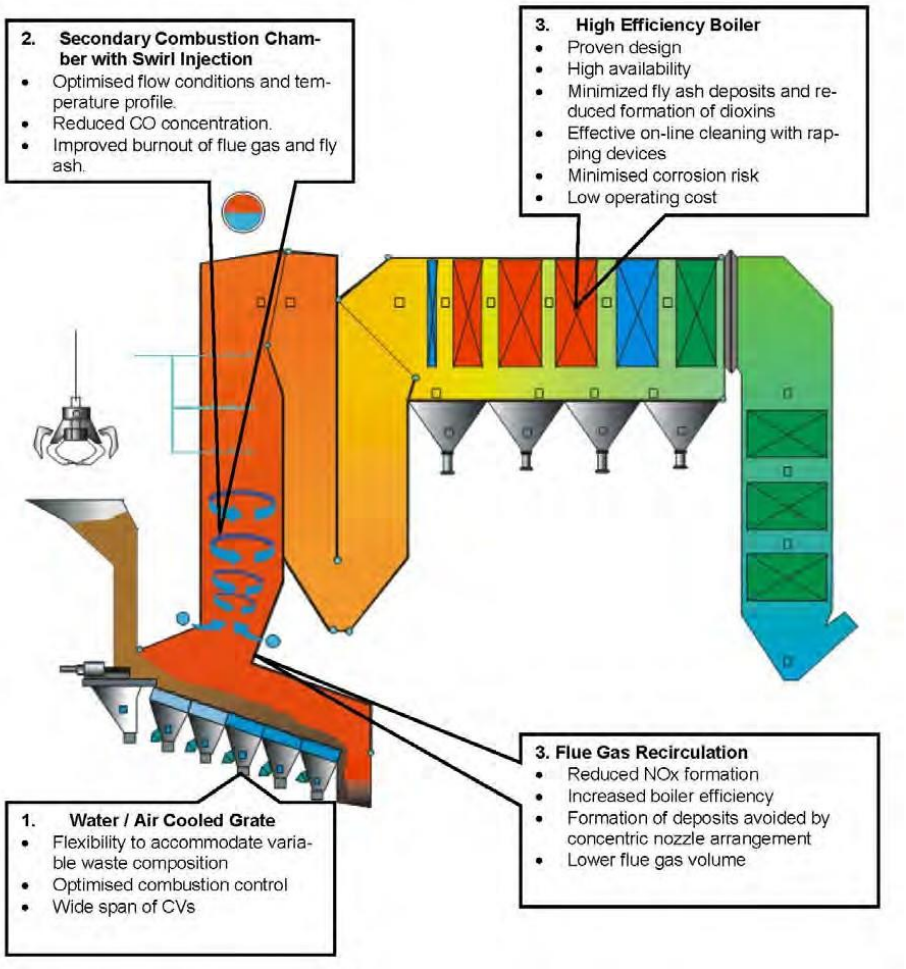

Figure 5: Incineration and Boiler (Source: Urbis; 2016)

3.2.6 Combustion Control System

Given the thermal output increases with greater waste throughout (**Figure 6**), a cooling system is used to condense the steam from the turbine exhaust for re-use. Large variations of the calorific value (CV) may require an adaptation of the parameters of the different control loops. The adaptation of all control parameters is executed manually by the adjustment of one single input value. This is the so called 'CV- correction'; a feature that is fully integrated in the control system. The CV-correction effects an automatic adjustment of up to ten parameters of the combustion control system.

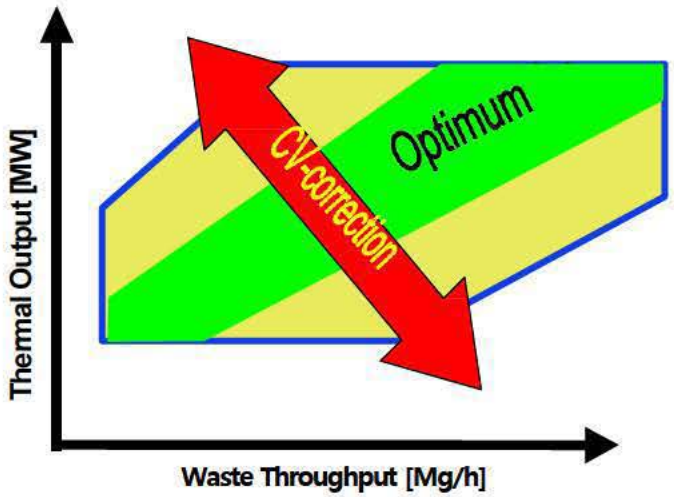

Figure 6: Combustion Control System

3.2.7 Flow Optimised Secondary Combustion Chamber

The geometry of the Secondary Combustion Chamber (SCC) is designed for optimal flow conditions. The arrangement of the secondary air nozzles creates a swirl in the SCC which homogenises the temperature, velocity and concentrations of the flow. Peaks in temperature, velocity and concentrations are minimised to:

- Improve burning-out of the flue gas;
- Provide a uniform temperature profile across the SSC;
- Reduce CO-concentrations;
- Minimise risk of corrosion of unprotected heating surfaces;
- Improve burn-out of fly ash;
- Reduce the amount of fly ash; and
- Reduce the formation of dioxins.

3.2.8 Flue Gas Cleaning

The flue gas will be cleaned in the Flue Gas Treatment plant to control emissions of acid gases, particulates, dioxins and furans and heavy metals.

The semi-dry flue gas cleaning process is designed to remove acidic gaseous contaminants by chemical absorption with hydrated lime. Heavy metals and organic contaminant compounds (i.e. dioxins and furans) are reduced by adsorption on activated carbon. Features of this system are shown below

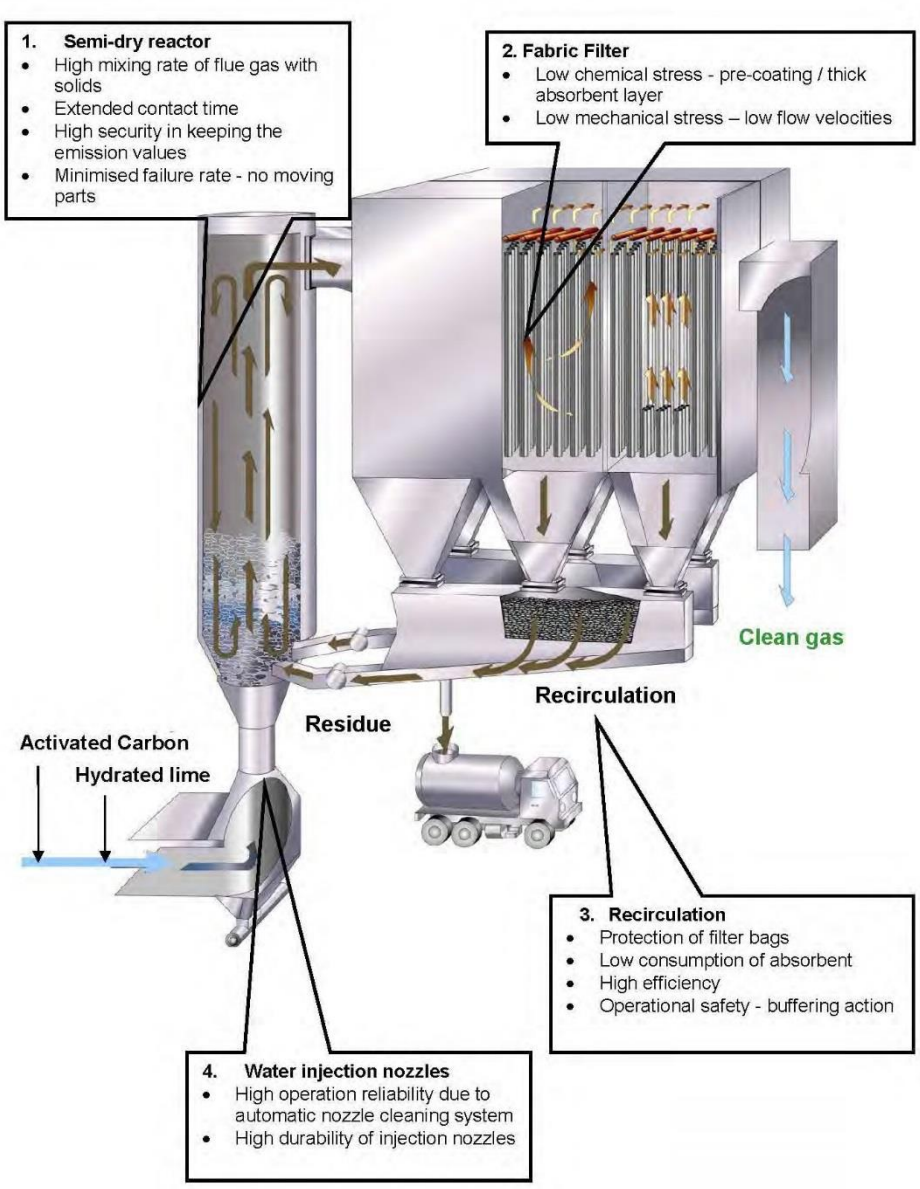

Figure 7: Semi Dry Flue Gas System

In this process the flue gas and solids move turbulently through the semi-dry reactor with partial inversion of the solid flow. The pollutants react with the injected hydrated lime and the activated carbon at a temperature of approximately 145 °C. The separation of solids from the flue gas takes place in the fabric filter downstream of the reactor.

Precautions are considered for water contacted parts, generally water-proof insulation is applied. All maintenance and inspection areas are encased in order to protect against rain during maintenance work. The flue gas cleaning process is characterised by the following features:

- Flexible to load changes and changes in gas contaminant concentrations;
- Efficient use of adsorbent and minimised residue quantities;
- Designed for high Hydrogen Chloride (HCl) and Sulphur Dioxide(SO2) inlet concentrations;
- Dry injection of Calcium Hydroxide (CaOH2) and Powdered Activated Carbon (PAC);
- Separate injection of water for conditioning and reactivation of recycled lime particles;
- Compact design; and
- Low manpower requirement.

3.2.9 Nitrogen Oxide (NO_X) Removal System

The NOx Removal system is a selective non-catalytic reduction, SNCR.

With an SNCR system, ammonia water is injected into the first pass of the boiler at a temperature level of approximately 900°C.

Here the chemical reaction takes places, converting NOX to harmless N2 and water. The system requires 2-3 levels of injection nozzles in the first pass of the boiler and a system based on water or air to atomize ammonia water into the boiler.

With a SNCR system the requirement of 200 mg/Nm^3 NOx can be comfortably reached.

The SNCR technology can be optimised to reach 120 mg/Nm^3 for a sophisticated SNCR (as daily average). The increased efficiency comes with a modest increase of CAPEX and additional consumption of ammonia and reduce NOx emissions.

3.2.10 Turbine and Waster Steam Cycle

By means of a pressure controlled steam extraction, low pressure steam is taken for internal consumers in the plant. The expanded steam is then led to an air-cooled condenser to completely condensate the steam. Also part of this cycle are general steam and condensate systems, water treatment and feed water preparation systems as well as a closed-loop cooling system for all general cooling purposes of the plant.

3.2.11 Reference facilities

Moving grate technology is tried and proven and has capacity to treat a wide range of residual waste materials. In selecting and designing the Facility a number of operating plants were reviewed for their performance in relation to feedstock, outputs (ash and residue) and emissions profiles (refer to Ramboll Technical Note of the Amended EIS).

These reference facilities utilise a grate system and process Residual Waste Fuels from Construction and Demolition (C&D); Commercial and Industrial (C&I); some Municipal Waste/general wastes (MSW) and wood wastes.

A summary of the reference facilities reviewed for the purpose of the project is provided in **Appendix E.** TNG has been included in the list for comparison reasons.

No two (2) plants are *exactly* the same in terms of the volumes of waste treated or typical profile they are nevertheless comparable.

The European experience with EfW has been that pre-processed waste materials received from external sources has usually been sorted prior to arriving at the facility and information relating to its waste declaration/identification is "lost".

It is therefore inaccurate and unhelpful to characterize that waste fuel in comparison European Facilities as Commercial and Industrial (**C&I**) or Construction and Demolition (**C&D**).

Similarly, mixed "General Solid Waste" as it is known in NSW under the POEO Act [discussed in detail later,] after processing and resource recovery is no longer accurately described as C&D or C&I residuals.

The comparison between a NSW proposed EfW and an operating European Facility should rely on the physical and chemical characteristics of the proposed fuel for an accurate comparison.'

It is possible by this method to demonstrate that TNG would operate well within the range of comparable facilities, namely the listed reference plants.

3.2.12 European Industrial Directive

Chapter IV and Annex VI of the Industrial Emissions Directive (IED) (Directive 2010/75/EU)

for waste incineration and co-incineration plants.

This refers to a directive by the European Parliament in respect of the incineration of waste in connection with the generation of electricity.[8]

It establishes the mandatory standards for operation, fuel, technology and emissions to the environment.

Each Nation State within the European Union then has the obligation to comply with the directive and to manage and enforce its regulations.

In England and Wales the Department for Environment, Food and Rural Affairs (**DEFRA**) has this responsibility. A copy of the 'Environmental Permitting Guidance the Large Combustion Plants Directive for the Environmental Permitting (England and Wales) regulation 2010 is provided at **Appendix F**.

NSW has adopted [by reference] the same standards applicable in the EU IED.

3.3 Constitutional responsibility in Australia for environmental matters

3.3.1 Nationalising environmental protection in Australia: The International dimensions[9]

ciesin.org

BY DONALD K. ANTON, JENNIFER KOHOUT, AND NICOLA PAIN

Which was presented 18 June 1991, at the Powerhouse Museum in Sydney, to a conference on the establishment and role of a national environmental protection agency which the Australian Government is presently considering. The authors argue that a federal environmental protection authority, equipped with enforcement powers, is necessary if Australia is to fulfill its international obligations to environmental protection.

The authors note that the High Court of Australia has recognized that environmental treaties ratified by Australia may impose international duties at a national level[10] A federal Environmental Protection Authority with appropriate regulatory powers should be established to ensure that Australia maintains compliance with its international environmental obligations.

[8] Directive 2010/75/EU

[9] Anton, D. K., J. Kohout, and N. Pain. 1993. Nationalizing environmental protection in Australia: The international dimensions. *Environmental Law* 23: 763-83.

[10] Commonwealth v. Tasmania, 158 C.L.R. 1 (1983) (Austl.). *See generally* B. Martin Tsamenyi, *Implementing International Environmental Law in Australia*: Queensland v. The Commonwealth, 2 J. ENVTL. L. 108 (1990).

There are now more than one thousand treaties that serve as sources for international environmental obligations.[11] Although Australia is not party to all of them, it has sizeable international commitments through treaties it has signed or implemented.

The Australian Constitution splits legislative authority between the Commonwealth and State governments. Under constitutional tradition, the Commonwealth government has been accorded the power to enter into treaties[12] and regulate foreign affairs.

Even so, depending on the specific subject area covered and the constitutional division of powers, the states may still retain legislative jurisdiction over the subject area of a particular treaty.[13] This has important implications in the area of international environmental treaties. Foremost, it has the potential to limit the ability of a federal EPA to engage in effective domestic regulation.

The Australia Constitution contains scant reference to environmental concerns[14] and does not expressly confer jurisdiction of environmental issues on the federal government.[15] Therefore, in theory, environmental regulation should be subject to exclusive state control, because powers not specifically set forth in the Constitution are reserved to the states.[16] This has, however, not been proven to be true.

A trilogy of cases decided by the High Court of Australia during the 1980s,[17] approving the use of the foreign affairs power to implement international environmental

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[11] Many of these treaties, however, contain only a few provisions concerning the environment. ALEXANDER KISS AND DINAH SHELTON INTERNATIONAL ENVIRONMENTAL LAW 96 (1991).

[12] *See supra* notes 2 and 3 and accompanying text. *See also* P.H. LANE. LANE'S COMMENTARY ON THE AUSTRALIAN CONSTITUTION section 22(3)-(4) (1986) [hereinafter Lane].

[13] *See* LANE, *supra* note 19, section 22(7).

[14] The Australia Constitution does address the "use of the waters of rivers for conservation." This provision, however, appears to be the only instance an environmental matter is mentioned in the Australia Constitution. AUSTL. CONST. ch. IV, section 100. Section 100 forbids the use of the trade and commerce power to abridge a state's reasonable use of a river for conservation or irrigation. In R. v. Burgess *ex parte* Henry, 55 C.L.R. 608 (1936) (Austl.). Justices Evatt and McTiernann accepted that the foreign affairs power contained in section 51 (xxix) is subject to overriding provisions, citing section 100, among others, as an overriding provision. *Id.* at 687.

[15] The Constitutional Commission Committee issued a report recommending against any amendment that would enlarge federal power over the environment. *See* 2 *Final Report of the Constitutional Commission* 757-67 (1988). On the other hand, the Committee did not recommend limiting existing federal power.

[16] The Constitution provides that states retain "[e]very power of the Parliament of a Colony which has become or becomes a State...unless it is...exclusively vested in the Parliament of the Commonwealth or withdrawn from the Parliament of the State...." AUSTL. CONST. ch. V, section 107.

[17] Commonwealth v. Tasmania, 158 C.L.R. 1 (1983 Austl.); Richardson v. Forestry Commission 164 C.L.R. 261 (1988 Austl.); Queensland v. Commonwealth 167 C.L.R. 232 (1989 Austl.). All three cases involved the

agreements, appears to have conclusively resolved the issue regarding the general power to legislate on such agreements in favour of the Commonwealth. *Commonwealth v. Tasmanian Dam*[18] held that the Commonwealth has the power under Section 51(xxix) to enact legislation implementing international environmental obligations binding on Australia.

Richardson v. Forestry Commission[19] established that the federal government can take reasonably necessary interim action while determining the extent of a treaty obligation.

Queensland v Commonwealth[20] held, in the context of the UNESCO Convention for the Protection and Preservation of the World Cultural and Natural Heritage 1972, that the federal government has the power to evaluate and submit property it believes to be world heritage for inclusion in the World Heritage List, and that the status of a property so listed is not reviewable by a court as a question of fact.[21]

The article canvasses the need for a federal EPA flows from the proposition that the states within a federation lack international personality and the capacity to enter into international treaties.[22] International obligations undertaken by the Nation *qua* Nation should be administered at a national level.[23]

D. Substantive Areas of International Environmental Law

application and interpretation of the UNESCO Convention for the Protection of the World Cultural and Natural Heritage and the Commonwealth's implementing legislation and regulations. See the regulations adopted under section 69 of the *National Parks and Wildlife Conservation Act, 1975 and the World Heritage Properties Conservation Act* 1983, Acts of the Parliament, Commonwealth of Australia 11 (1983).

[18] *Tasmania* 158 C.L.R. at 1.

[19] *Richardson*, 164 C.L.R. at 261.

[20] *Queensland*, 167 C.L.R. at 232.

[21] The broader implication of *Queensland* concerns the degree of control the foreign affairs power confers on the federal government over administrative decision making related to the implementation of environmental treaty provisions. For example, in administering a framework convention-protocol system of environmental regulation, the federal government may have the power to promulgate concrete regulations touching on the general obligations set forth in the framework convention before the specific protocols have come into effect.

[22] *See* H. Burmester, *The Australian States and Participation in the Foreign Policy Process,* 9 FED. L. REV. 257 (1978). The states still assert a limited competence to conclude informal agreements with foreign nations, primarily in the areas of trade and cultural exchanges. *Id.* at 272-74. *See also* HOWARD, *supra* note 6 at 492; LANE, *supra* note 6 at 100.

[23] A federalized international environmental program should nevertheless allow State governments some involvement in administration. This would ensure that state and regional interests could take part in the regulatory process.

Three important international environmental regimes in which Australia participates, together with the conventions that bind Australia, provide an illustration of the need for a national environmental protection authority.

1. Hazardous Waste

The intractable nature of hazardous waste makes it an especially dangerous threat to the environment.[24] It was recognized as an international problem in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.[25] The Basel Convention acknowledges "the growing threat to human health and the environment posed by the increased generation and complexity, and transboundary movement of hazardous wastes."[26]

Australia responded to the Basel Convention at the national level, with passage of the Hazardous Waste (Regulation of Exports and Imports) Act 1989.[27] To import or export hazardous waste, as defined in the Basel Convention, a person must apply to the responsible Minister for a permit. The Minister considers whether the waste will be disposed of safely and will not "pose a significant risk of injury or damage to human beings or to the environment.[28]

2. Atmospheric Protection

Ozone depletion, greenhouse gases, and atmospheric pollution are increasing global problems. Effective control requires a concerted effort by all nations. The Vienna

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[24] Initially, Australia's involvement in the international hazardous waste problem was through its membership in the Organization for Economic Cooperation and Development (OECD). The OECD adopted several decisions and recommendations regarding the export of hazardous waste, directing its members to control the movement of hazardous waste. Although the recommendations do not specify details, some form of tracking documentation would be appropriate, similar to the waste manifests used in the United States or the EEC consignment notes. *See* D. Hackett, *An Assessment of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal,* 5 AM. U. J. INT'L L. & POL'Y 291, 308 (1990).

[25] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, *opened for signature,* Mar. 22, 1989, S. TREATY Doc. No. 5, 102d Cong., 1st Sess., 28 I.L.M. 649 (1989) (4 U.N. Doc. UNEP/IG 80/3) [hereinafter BASEL CONVENTION].

[26] *Id.* at 657.

[27] *Hazardous Waste (Regulation of Exports and Imports) Act* 1989, section 3. [hereinafter WASTE ACT]. To conform with the Basel Convention, the Act provides that its object is "to regulate the export and import of hazardous waste to ensure that exported or imported hazardous waste is disposed of safely so that human beings and the environment, both within and outside Australia, are protected from the harmful effects of the waste."

[28] *Id.* section 17.

Convention for the Protection of the Ozone Layer[29] and the Montreal Protocol on Substances that Deplete the Ozone Layer[30] are the landmark international agreements on protection of the ozone layer.

As a party to that Protocol, Australia has an obligation to work toward effective compliance. In order to satisfy this obligation the Commonwealth passed the Ozone Protection Act 1989. In fact, the legislation goes beyond what is required of Australia as a signatory to the Protocol.[31] Generally, the Act is designed to restrict the use of (and ultimately phase out) five types of chlorinated fluorocarbons and three forms of halons that are known to cause ozone depletion.[32]

3. Marine Pollution

The dumping of wastes in the oceans was recognized as an international problem in the 1972 London Dumping Convention.[33] This treaty prohibits the deliberate disposal of dangerous wastes, including plastics and other persistent synthetic materials, that float or remain suspended in marine waters.[34] For less harmful substances, a license must be obtained. The purpose of the Convention is "to promote effective control of all sources of marine pollution."

3.4 Commonwealth Acts relevant to establishing an Energy from Waste Facility

3.4.1 The *Environment Protection and Biodiversity Act 1999* (EP&BC Act)

The EP&BC Act is the primary Commonwealth Legislation directed to protecting the environment in relation to Commonwealth land and controlling significant impacts on matters of national environmental significance.

The EP&BC Act requires assessment and approval of actions that either will significantly affect matters of national environmental significance, or are undertaken by a Commonwealth agency or involve Commonwealth land and will have a significant effect on the environment.

The EP&BC Act requires the approval of the Commonwealth Minister for the Environment for actions on Commonwealth land or those that may have a significant impact on matters of national environmental significance, which are: World heritage areas, national heritage

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[29] 26 I.L.M. 1516 (1987).

[30] *Id.* at 1541.

[31] *See* M. Tsamenyi & J. Bedding, *The Australian Legislative Framework for the Protection of the Ozone Layer,* 7 ENVTL. & PLAN L. J. 3, 6 (1990).

[32] *Id.*

[33] Convention on the Prevention of Marine Pollution and the Dumping of Wastes and Other Matter, Mar. 13, 1975, 26 U.S.T. 2403.

[34] *Id.* at annex I, para. 4.

places, wetlands of international importance, threatened species and ecological communities listed in the EP&BC Act, migratory species listed in the EP&BC Act, nuclear actions, and actions affecting the Commonwealth Marine Environment. The matters of national environmental significance are addressed in the table below.

Matters of National Environmental Significance
World Heritage Property
National Heritage Places
Ramsar Wetlands of International Significance
Listed Threatened species and ecological communities
Listed Migratory species
Nuclear actions
Commonwealth Marine Area

Table 4: EPBC Matters of National Environmental Significance

3.5 NSW Acts relevant to establishing an Energy from Waste Facility

3.5.1 Legislative framework and planning instrument

Framework Level	Planning Instrument
Legislative Acts and Regulations	• Environment Protection and Biodiversity Conservation Act 1999 (Cth); • Environmental Planning and Assessment Act 1979; • Environmental Planning and Assessment Regulation 2000; • Protection of the Environment Operations Act 1997; • Protection of the Environment Operations (Clean Air)

Environmental Planning Instruments – State	• **State Environmental Planning Policy (State and Regional Development) 2011;** • **State Environmental Planning Policy (Infrastructure) 2007;** • **State Environmental Planning Policy (Western Sydney Employment Area) 2009;** • **State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;**
State policies and guidelines	• **EPA Energy from Waste Policy Statement;** • **NSW State Rivers and Estuary Policy (1993);** • **NSW State Groundwater Policy Framework Document (1997);** • **NSW State Groundwater Quality Protection Policy (1998);** • **NSW State Groundwater Dependent Ecosystems Policy (2002);** • **Aquifer Interference Policy (2012);** • **Department of Primary Industries Risk Assessment Guidelines for Groundwater Dependent Ecosystems (2012); and** • **Guidelines for Controlled Activities (2012).**
Environmental Planning Instruments – Local	• **Blacktown LEP 1988.**
Local Planning Policies	• **Blacktown DCP 2006.**

Table 5: Legislative framework and planning instrument

3.5.2 Environmental Planning and Assessment Act 1979 and Regulations 2000 (EPA Act)

The EPA Act and accompanying Environmental Planning and Assessment Regulation 2000 (the Regulation) establish the legislative planning framework for NSW. An application for an EfW is lodged under the State Significant Development provisions of the EP&A Act 1979.

Classification of Development

Under Schedule 3 of the Environmental Planning and Assessment Regulation 2000, 'Electricity generating stations' are listed as Designated Developments.

3.5.3 Protection of the Environment Operations Act 1997 (POEO Act)

The POEO Act seeks to manage pollution impacts from various premises and non-premises based operations in NSW.

Classification of Development

Clause 17 of Schedule 1 – Electricity generation triggers the criteria for a scheduled activity under this Act for *general electricity works with a capacity to generate more than 30 megawatts of electrical power.*

Clause 18 of Schedule 1 – Energy recovery triggers the criteria for a scheduled activity under this Act for *energy recovery from general waste involving processing more than 200 tonnes per year of waste (other than hazardous waste, restricted waste solid waste, liquid waste or special waste.*

Given the above, an Environment Protection Licence is required for the operation of an EfW Facility as a premises-based scheduled activity.

3.5.4 Protection of the Environment Operation (Clean Air) Regulations 2010

The POEO (Clean Air) Regulations provides regulatory measures to control emissions from wood heaters, open burning, motor vehicles and fuels and industry.

An EfW for the thermal treatment of residual waste materials is subject to the provisions of Division 4 Group 6 Treatment Plants and as a minimum must demonstrate capability to achieve the emissions targets set by the Regulation as well as those matters set out in clauses 49 -52.

A summary of the POEO Regulation emissions targets relevant to the proposed development is provided below.

No emission limits are prescribed for NH3 or PAHs under the Australian or European legislative framework.

In accordance with clause 56 of the Clean Air Regulation, power station emissions during start-up and shut down periods are exempt from the in-stack concentration limits. In addition, clause 57A of the Clean Air Regulation states that emergency generators are also

exempt if the generators are used no more than 200 hours per year.

3.5.5 Miscellaneous NSW legislation

Miscellaneous NSW legislation must also be examined and complied with by the Proponent.

Typical examples include

- Threatened Species Act 1995
- Heritage Act 1977
- National Parks and Wildlife Act 1974
- Rural Fires Act 1997
- Water Management Act 2000
- State Environmental Planning Policy (State and Regional Development) 2011
- Land use zone and permissibility
- Zone Objectives
- State Environmental Planning Policy (Infrastructure) 2007
- State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

3.5.6 Best Available Technology (BAT) Policy

The EPA EfW Policy, with respect to air quality, requires demonstration of the implementation of BAT in the thermal treatment of waste materials and that as a minimum the emissions targets of the *Protection of the Environment (Clean Air) Regulation 2010* are attained to ensure the protection of amenity and human health.

The Regulators consider BAT to be in line with European Standards set by the European Industrial Emissions Directive (EU, IED), noted to be a more stringent control than the NSW POEO Regulation Standard.

Optimised Selective Non-Catalytic Reduction (SNCR) to further reduce emissions of oxides of nitrogen (i.e. NOx)

Pollutant	Standard (mg/Nm³)	Source	Activity
Solid Particles (Total)	50	Electricity generation	Any activity of plant using liquid or solid standard fuel or non-standard fuel
HCl	100	General standards	Any activity or plant
HF	50	Electricity generation	Any activity of plant using liquid or solid standard fuel or non-standard fuel
SO_2	No applicable standard		
NO_2	500	Electricity generation	Any boiler operating on a fuel other than gas, including a boiler used in connection with an electricity generator that forms part of an electricity generating system with a capacity of 30 MW or more
Type 1 & 2 substances (in aggregate)	1	Electricity generation	Any activity of plant using non-standard fuel
Cd or Hg (individually)	0.2	Electricity generation	Any activity of plant using non-standard fuel
Dioxins or furans	$1x10^{-7}$ (0.1 ng/m³)	Electricity generation	Any activity of plant using non-standard fuel that contains precursors of dioxin or furan formation
VOC	40 (VOC) or 125 (CO)	Electricity generation	Any activity of plant using non-standard fuel
Cl_2	200	General standards	Any activity or plant
H_2S	5	General standards	Any activity or plant

Reference conditions defined as dry, 273.15 K, 101.3 kPa and 7% O_2 for all air impurities when burning a solid fuel, with the exception of dioxins and furans where the required O_2 concentration is 11% for waste incineration.

Table 6 – POEO (Clean Air) Regulation Targets (Source: Pacific Environment, AQA; 2016)

3.6 State Significant Development Applications – The Planning Process

3.6.1 Environmental Planning and Assessment Act

Submission

Threshold requirements for State Significant Applications - State Significant Development under State Environmental Planning Policy (State and Regional Development) 2011 include the provision of the following details:

- Details of the Applicant
- Outline and Description of the Proposal e.g. The proposed Facility comprises an *Electricity Generating Works*
- Statutory and Planning Considerations
- Environmental and Technical issues
- A Request is then made for "Director General's requirements" setting out the matters to be investigated and addressed in an Environmental Impact statement

- A preliminary assessment is made by the department as to whether such an application would constitute a State Significant Development (SSD). The project has Capital Investment Value (CIV), as defined under clause 3 of the *Environmental Planning and Assessment Regulation 2000*,

In the case of TNG's application the DGRs for the EfW application included the following requirements for environmental assessment of waste management for the proposed development:

- a description of the classes and quantities of waste that would be thermally treated at the facility;
- demonstrate that waste used as a feedstock in the EfW plant would be the residual from a resource recovery process that maximises the recovery of material in accordance with Environment Protection Authority Guidelines;
- 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 on the location and size of stockpiles of unprocessed and processed recycled waste at the site;
- demonstrate any waste material (e.g. biochar) produced from the EfW 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;
- procedures for the management of other solid, liquid and gaseous waste streams;
- 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, including current and future offsite waste disposal methods; and
- 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 TNG proposal did satisfy the requirements of clause 3 of the Environmental Planning and Assessment Regulation 2000, and in such a case the NSW Department of Planning notifies all government agencies relevant to the application and they are asked to specify what matters they would require to be addressed in the EIS.

The Proponent is then asked to prepare and submit an EIS.

Following submission of the EIS by the Proponent the Department of Planning and Environment together with all other engaged government bodies then begin an assessment of the information which has been submitted in order to determine its adequacy for public exhibition.

If the project is novel the process may be iterative whereby a government agency [notably the EPA] may require additional information or may add to its list of requirements for the provision of information.

Requests for more information may be numerous and ultimately when the document as submitted is considered by the Department of Planning to be adequate it will be publically exhibited for a minimum statutory period.

During the exhibition period members of the community, stakeholders and the government agencies [which have already commented] may make submissions [to which the Proponent will have an opportunity to respond].

The responses to submissions ordinarily will address any shortfalls in information, any new matters which had not been previously addressed and details of Environmental Management Measures.

The Proponent will also be required to make an offer in respect of Planning Contributions to roads and infrastructure and to provide a Statement of Commitments outlining any other additional measures which are relevant to the assessment and determination of the Proposal.

During this process the Proponent is required to engage with the community by the provision of information and by attending displays and public forums.

Normally, before any approval is given, the NSW EPA would indicate the consent conditions which it would expect to apply to any approval. This can be done by a draft Environment Protection Licence [EPL] which would indicate the terms upon which any approved facility would operate.

Any other statutory bodies which may wish to impose site specific requirements in respect say, of water, or conservation areas would also indicate their proposed conditions. If the Proposal is subsequently approved the approval conditions would incorporate all of these ancillary requirements the Proponent is also required to provide a Justification & Benefits of the Proposed Development.

As typical example in the TNG application these were listed as below

- It will deliver a net positive Greenhouse Gas effect, eliminating approximately 3 million tonnes of CO^2 per annum.
- The proposed Facility will complement the existing waste disposal and recycling facility adjacent to the proposed Facility.
- The proposed development is permissible within the zone and complies with the development standards and objectives of state and local policies.
- The proposed Facility represents best practice to minimise the discharge of emissions. Best practice accountable, real time emissions monitoring technology is proposed to be installed to constantly demonstrate that there are no harmful emissions to the environment, air, soil or water.
- The waste sourced as input is genuine Residual Waste Fuel that cannot feasibly be reused or recycled. The proposed fuel will not be putrescible waste. The proposed fuel directly meets the eligible fuels criteria of the *NSW Energy from Waste Policy Statement 2014* (as detailed within the Waste Management Assessment of the Amended EIS).
- The specific effects on human health of the Proposed Facility have been considered (further detailed in **Section 17** of this amended EIS) and it was found that the proposed Facility will not lead to any adverse health effects from dioxins and furans, and will not have any non- carcinogenic or carcinogenic effects.

The SSDA will also result in the following net benefits by contributing towards:

- Energy security and diversity by providing additional low carbon, renewable electricity generating capacity.
- Maximising energy recovery from waste in accordance with the *NSW Energy from Waste Policy Statement 2014.*
- 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).
- Complimenting recycling initiatives by accepting waste after the process have been carried out, thereby forming part of an integrated waste management system. Supporting the positive use of the waste materials that would otherwise be disposed of in landfill, saving valuable landfill space and also reducing greenhouse gas emissions

(including methane) that would otherwise have been generated from the breakdown of the waste material had it gone to landfill (discussed further in the Local Air Quality and Greenhouse Gas Assessment Report prepared by Pacific Environment in the Amended EIS)

- Providing the State of NSW with the world's leading technology to break reliance on landfilling in the future.
- Providing the technology and infrastructure to Sydney and the State of NSW to explore the possibility of prohibiting combustible wastes from landfills completely at an appropriate time in the future.
- The preservation of landfill space for more contaminated wastes that cannot be thermally treated such as contaminated soils and asbestos.
- Providing electricity generating capacity at an existing related waste infrastructure site located in close proximity to the National Electricity Grid for connection and export of the electricity produced.
- The proposed development will create in the order of 500 direct on site construction jobs during the construction and commissioning phase. 55 new jobs will be created when the Facility is operational, plus several hundred indirect jobs. Further detail on employment generation is provided in the section below.
- Overall, the works subject to the SSDA are considered to represent orderly and economic development of the precinct in line with established project objectives.

3.6.1 Amending an Environmental Impact Statement

Amending an EIS during an assessment process is not uncommon and may be required to abate confusion which can arise from the submission of supplementary documents and additional data relevant to the assessment.

An application for approval of an Electricity Generating Facility under s89D(1) of the *Environmental Planning and Assessment Act 1979* was lodged by TNG 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.

In an updated Application lodged by TNG a revised EIS was accompanied by additional technical, engineering and scientific assessments prepared by acknowledged and reputable experts in the relevant disciplines.

The amendment to the EIS and SSD, DA was made in accordance with clause 55 of the *Environmental Planning and Assessment Regulation 2000* and provide a response to submissions 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.

The amendment was made not because the original EIS was incorrect or inadequate as it had previously been assessed as adequate for the purposes of public exhibition.

Rather it was an acknowledgment of the iterative nature of the assessment process and the depth and detail of the information required by the Regulators and provided by the proponent.

In the TNG EIS detailed documents were submitted addressing the following matters. These are not included as Appendices to this submission

Appendix A Site Survey

Appendix B Director General's Requirements

Appendix C Architectural Drawings

Appendix D Concept Landscape Plan

Appendix E Civil Infrastructure Works

Appendix F Concept Plan of Subdivision

Appendix G Flora and Fauna Assessment

Appendix H Visual Impact Assessment

Appendix I Capital Investment Value Report

Appendix J Waste Management Assessment

Appendix K Local Air Quality and Greenhouse Gas Assessment

Appendix L Odour Assessment

Appendix M Ozone Assessment

Appendix N Human Health Risk Assessment

Appendix O Noise and Vibration Assessment

Appendix P Soil and Water Assessment

Appendix Q Traffic Impact Assessment

Appendix R Aboriginal Archaeological Technical Report

Appendix S Aboriginal Cultural Heritage Assessment Report and ACHAR Addendum

Appendix T Aboriginal Heritage Test Excavation Report

Appendix U Cultural Heritage Impact Statement

Appendix V Contamination Assessment

Appendix W Community Consultation Report

Appendix X Correspondence with the Department of Infrastructure and Regional Development and NSW Health

Appendix Y Preliminary Hazard Analysis and Fire Risk Report

Appendix Z Flood Report (Brown Consulting)

Appendix AA Bushfire Assessment

Appendix BB Construction Environmental Management Plan

Appendix CC Project Definition Brief

Appendix DD Ramboll Technical memos

Appendix EE Airspace Operations

Appendix FF Plume Rise Assessment

Appendix GG Emails from Department of Infrastructure and regional Development

Appendix HH Response to Submissions 2015

Appendix II Ongoing Community Consultation Strategy

Appendix JJ Confidential Source of Waste Report

Appendix KK Best Available Technology: Assessment Matrix

Appendix LL Proof of Performance (trials) framework

What is described as an "iterative process" during a State Significant Project Environmental Assessment is often in reality just a polite way of saying that a technical consultancy [and sometimes the Regulator] is merely gaining expertise and experience at the cost of a Proponent. This is especially the case when a State Significant Project is novel and the Regulators have no prior experience or expertise in that area.

At least one prominent independent consultancy briefed by an opponent of the TNG project during the TNG assessment has privately conceded that they were lacking in prior experience in the particular technical area upon which it had been asked to report and that the content of their report to their client in turn had been misrepresented against their express wishes.

The iterative process can be time consuming, expensive and uncertain with different technical or scientific consultancies often developing different views about what should be included or excluded from any assessment, what reference documents and standards or acceptable values should be used.

This can occur even though consultation may take place between technical or scientific experts engaged by the Proponent and also others engaged by the Regulators.

Members of the community then find it difficult to determine "who is telling the truth" because with a lack of technical understanding it can be easy to conclude [or to represent] that one side or another has been "wrong" when in fact they have been simply refining and defining the data.

3.6.2 Particular Examples

Particulate and chemical Emission rates for modelling are estimated based on the EfW Facility meeting the more stringent limits prescribed in the EU IED.

The emission limits prescribed by the IED are expressed as both daily averages and half hourly maximums. Although the limits are based on the IED, the facility will be licenced under the NSW POEO Clean Air Regulation, which uses standards of concentration expressed as a 1 hour block (or the minimum sampling period in the relevant test methods).

Dispersion modelling is therefore based on the higher short term limits (where available), regardless of the averaging period for assessment of impact on ground level concentration (GLCs). In other words, even though the ambient assessment criteria for PM10 are expressed as 24-hour and annual averages, the half hourly IED limit is used for all modelling, not the daily average so as to provide worst case emissions scenario.

In the main, the emission rates (g/s) adopted for modelling of each stack presented in Figure 7 below, are derived from the concentration limits (mg/Nm^3) and flue gas flow rate per stack (Nm^3/s) and further explained in the 'Air Quality Impact and Greenhouse Gas Assessment' in the Amended EIS.

Emission Parameter	In-stack concentration during normal operations (mg/m³) (a)	Mass emission rate used to model normal operations (g/s)
Oxides of Nitrogen (NO_x expressed as NO_2)	188	24
SO_2	27	3.4
CO	23	2.9
PM	1.0	0.1
HCl	9.0	1.1
HF	4.0	0.5
Cd	0.009	0.001
Hg	0.004	0.001
Dioxins and furans	0.000000010	0.000000001
TOC (as benzene)	0.015	0.002
NH_3	2.0	0.3
H_2S	5.0	0.6
PAH (as benzo(a)pyrene)	0.0005	0.00006
Cl_2	9.0	1.1

Notes: (a) Reference conditions defined as dry, 273.15 K, 101.3 kPa and 7% O_2 for all air impurities when burning a solid fuel.

Table 7: Instack emissions during normal conditions (Source: Pacific Environment, AQA; 2016)

Where emission limits are not available as part of the EU IED the emission limits from the Clean Air Regulation have been adopted, as in the case for H2S.

In the case of Cl2, the Clean Air Regulation limit (200 mg/m^3) is considered inapplicable (overly high) to be used to estimate the mass emission rate of this compound. Rather, the EU IED limit for HCl (60 mg/m^3) is considered a more appropriate in-stack concentration upper limit for Cl2.

Lack of clarity and consistency in the applicable standards increases complexity and cost.

3.6.3 Ozone

The NSW Environment Protection Authority (NSW EPA) provided 'Agency Requirements' for the Environmental Assessment of the proposed The Next Generation (TNG) Energy from Waste facility (EfW) at Eastern Creek, including a photochemical smog assessment, as follows

> *Include a quantitative photochemical smog assessment in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005).*

Ozone (O3) is a secondary pollutant formed in a chemical reaction when emissions of NO2 and Volatile Organic Compounds (VOCs) react in the presence of sunlight. Ozone in the upper atmosphere is good for human health preventing ultraviolent radiation from reaching the earth's surface. However, ozone in lower atmosphere can have negative health effects and it is this atmospheric level ozone that is the focus of this assessment. Ozone is the principal component of photochemical smog, which is typically formed several hours after the precursors (NO_X and VOCs) are emitted. The highest concentrations of ozone normally occur on summer afternoons in areas downwind of major sources of the precursors. The dominant ozone precursor released from the facility is NO_X.

At present, there are no regulatory documents or policies in the public domain that prescribe the preferred methodology for ozone impact assessment in NSW.

At present the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (The Approved Methods; (NSW EPA, 2005)) state that advice should be sought from the EPA prior to undertaking a quantitative photochemical smog assessment.

Pacific Environment has consulted with the EPA and NSW Office of Environment and Heritage (OEH). An overview of process and outcome is provided below.

Agency	Date	Discussion Point / Outcome
NSW EPA (Air Policy)	28/02/2014	The EPA Level 1 screening tool for ozone assessment was not publicly available. The project was likely to need a Level 2 detailed assessment (based on Western Sydney being an ozone non-attainment area and the emissions threshold being exceeded).
NSW EPA (Air Policy)	6/03/2014	The Level 2 assessment requirements were discussed and formal consultation (teleconference between EPA, OEH and Pacific Environment) was arranged to discuss the approach to the assessment
OEH (Climate and Atmospheric Science Branch)	20/03/2014	Detailed discussion of approach to the assessment. Agreement on the use of TAPM-CTM with CB05 chemical mechanism, 2008 emissions data from EPA GMR air emissions inventory, and methodology to select scenario days. It was suggested by OEH that a method paper is prepared for review by CSIRO
NSW EPA (Air Policy),	17/2/2015	Preliminary discussion of the reported results. EPA indicated that OEH should also be given opportunity to provide additional comment.
NSW EPA (Air Policy), OEH (Climate and Atmospheric Science Branch) and CSIRO	10/03/2015	Discussion around additional analysis of NO_2 and NO_x predictions prepared by Pacific Environment, in consultation with CSIRO, in advance of this meeting. Discussion identified that an updated version of TAPM-CTM and OEH emission inventory inputs files had become available since the original modelling and should be incorporated into the modelling.
NSW EPA (Air Policy), OEH (Climate and Atmospheric Science Branch) and CSIRO	1/04/2015	Teleconference to discuss outcomes of revised modelling incorporating the above updated model inputs.
CSIRO	10/04/2015	Completion of CSIRO peer review role, as summarised within letter report provided as **Appendix F**.

Table 8 – Assessment Framework for Ozone Assessment established with EPA (Source: Pacific Environment, OIA; 2016)

The TNG project is understood to be the first project in NSW to be assessed under the ozone assessment framework.

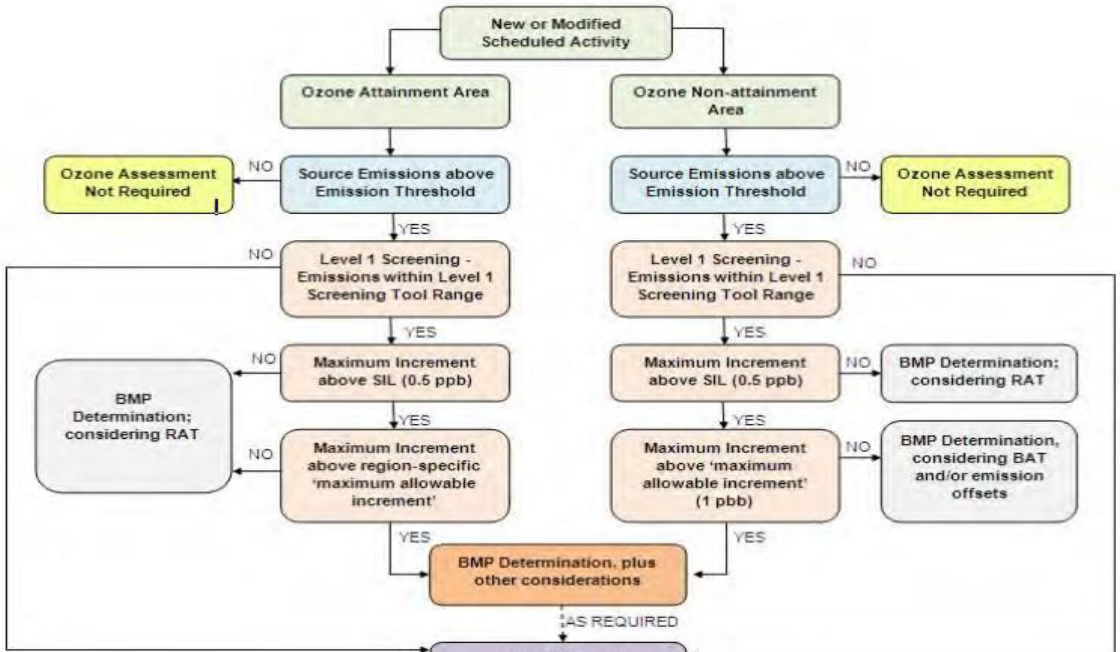

Figure 8: Overview of Ozone Requirements

In recognition of the potential health effects associated with ozone formation and the contribution of the EfW facility to ozone within the Sydney Region, TNG integrated BAT in the form of Selective Non-Catalytic Reduction **(SNCR)** in the treatment of flue gas to limit NOx emissions.

Adoption of SNCR technology reduces the in-stack concentration of NOx to 120mg/m3 (based on a whole year operation) and was demonstrated to meet the NSW EPA's Level 1 screening tool to comply with the NSW EPA's 0.5 ppb screening investigation level (SIL).

AECOM have considered the potential for human health impact against the relevant criteria and resolved the human health arising from ozone is low and acceptable.

The process for assessing the risk of ozone formation and the measurement of its effects were best described as confusing for professionals and incomprehensible for the lay person.

3.6.4 Greenhouse Gases

The DGRs for the EfW application include the following requirements for environmental assessment of Greenhouse Gas for the proposed Development:

- A full greenhouse gas assessment including an assessment of the potential scope 1, 2 and 3 greenhouse gas emissions of the project, and an assessment of the potential impacts of these emissions on the environment; and

- A detailed description of the measure that would be implemented on-site to ensure that the project is energy efficient.

The legislative framework for the assessment of Greenhouse Gas Emissions is:

- National Greenhouse and Energy Reporting Act 2007;
- National Greenhouse and Energy Reporting Regulations 2008 (NGER);
- Sustainable Development Greenhouse Gas Protocol (the GHG Protocol);
- National Greenhouse and Energy Reporting (Measurement) Determination 2008 (the "NGER Measurement Determination"); and
- National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2012 (No. 1).

The Greenhouse Gas Assessment uses the following criteria and standards for assessing the existing conditions, and modelling the impacts of the proposed Development:

- AGO Factors and Methods Workbook (AGO); and
- Guidelines for Energy Savings Action Plans (DEUS, 2005).

The environmental assessment considered the following requirements with regards to air quality and greenhouse gas emissions:

- The Australian Government has committed to reduce its emissions by between 5 and 25% below 2000 levels by 2020. It has also committed to a long-term emissions reduction target of at least 60% below 2000 levels by 2050;
- The *National Greenhouse and Energy Reporting (NGER) Act 2007* requires corporations to register and report emissions, energy consumption or production that meets certain thresholds every year. For GHG emissions, thresholds are currently set at 25,000 tonnes carbon dioxide equivalent (tCO2e) for a facility under a corporation and 50,000 tCO2e for a corporation as a whole for 2010-2011 (DCC 2008);
- The NSW Department of Infrastructure, Planning and Natural Resources - Department of Energy, Utilities and Sustainability Guidelines for Energy and Greenhouse in EIA provides guidance on the consideration of energy and greenhouse issues when developing projects and when undertaking environmental impact assessment; and the Greenhouse Gas (GHG) emissions requirements have been considered in the context of the *'State and Territory Greenhouse Gas Inventories for 2008'* which outlines targets for GHG emissions in based on the Kyoto accounting. The assessment of GHG emissions considers emissions generated from key components of developments including transport, waste and manufacturing and construction.
- GHG policy seeks to minimise the emissions of particular gases, such as Carbon Dioxide, Methane, Nitrous Oxide and Fluorinated gases. Reduction in GHG emissions will slow the greenhouse effect which is contributing to global warming

The GHG Protocol defines three (3) scopes for developing inventories leading to reporting of emissions. These scopes help to delineate direct and indirect emission sources, improve transparency, and provide a degree of flexibility for individual organisations to report based on their organisational structure, business activities and business goals.

A revised Greenhouse Gas Assessment for the TNG application was prepared in October 2016 and was lodged by the Proponent and publically exhibited. It was not until May 2017 that the NSW EPA advised the NSW Department of Planning of the further explanations which the EPA required.

Resourcing is a universal challenge across the industry and government. In the instant case the NSW EPA have been in possession of the GHG/AQA Report in its current form since November 2016, when they were provided a copy for test of adequacy.

This is almost 7 months for the review an assessment of one document. This period of time [often replicated across all Crown departments and in respect of the multitude of issues to be reported upon by a Proponent] is a significant barrier to development approvals in NSW.

3.7 Recommendations

In order to limit confusion, improve efficiency of assessment, minimise costs and defuse anxiety for the community, it is recommended that:

3.7.1 Australia should determine a National Policy in relation to EfW.

3.7.2 In the absence of a National policy New South Wales Government should adopt and regulate for, within the POEO Act, the relevant standards for emissions in respect of EfW facilities.

3.7.3 The NSW EPA should publish the information requirements and the relevant standards by which Environmental assessments for EfW proposals will be carried out

3.7.4 NSW Health should specify and publish all of the information requirements and the relevant standards by which Human Health risk assessments will be made.

3.8 Up front requirements

Examples of "Up Front" requirements which should be specified for environmental assessments by the NSW EPA.

3.8.1 Specifying requirements for air quality modelling based on stack concentrations, dispersion rate and areas and specifying operating values or the values proposed as licence limits as the case may be.

3.8.2 Specifying the amount of information required about volatile organic compounds (both chemicals included and the contribution they make); and persistent and bio accumulative chemicals.

3.8.3 Specifying the appropriate toxicity reference values and screening guidelines, health standards and assessment methodology. Specifying the specific scenarios which are required to be assessed to consider the potential human health risks these include including emissions at the IED limit; emissions at the project specific limits and emissions at upset.

Examples of "Up Front" requirements which should be specified for Human Health Risk Assessments include those similar to the:

3.8.4 Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards. Department of Health and Ageing and enHealth Council, Commonwealth of Australia (enHealth, 2012a update) as provided in **Appendix G.**

3.8.5 Australian Exposure Factor Guide, Department of Health and Ageing and enHealth Council, Commonwealth of Australia (enHealth, 2012b).

3.8.6 National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM) 1999, National Environment Protection Council (NEPC), as amended and in force on 16 May 2013 (ASC NEPM, 2013).

3.8.7 Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Office of Solid Waste, US Environmental Protection Agency (US EPA, 2005).

Additionally,

3.8.8 the HHRA was consistent with the NSW Environment Protection Authority (EPA) Guidelines for the NSW Site Auditor Scheme (2nd Edition) (NSW EPA, 2006).

3.8.9 The assessment methodology is set out in Section 1.4 of the AECOM report, and follows the enHealth (2012a) and ASC NEPM (2013) guidance notes.

3.9 Overview of proposed residual waste fuels in connection with EfW

3.9.1 Understanding General Solid Waste [GSW]

The Genesis Resource Recovery Facility is licensed pursuant to EPL 20121 to accept the following material types:

- Wood waste
- Garden waste
- Building and demolition waste
- Waste tyres
- Soils
- General solid waste (non-putrescible)

Colloquially within the Waste Industry this type of Waste is often described as Construction and Demolition waste. It is one of the broadest categories or waste descriptions to be found in the POEO Act and it is in these types of Waste Management that the Alexandria Landfill Group has over thirty years of experience.

The Genesis Landfill operates pursuant to EPL 13426 and is licensed to accept
General Solid Waste

These types are more closely defined by reference to Part 3 Definition of Division 1 Waste Classifications.

Part 3 - Definitions

Division 1 Waste classifications

49 Definitions of waste classifications

(1) In this Schedule:

general solid waste (non-putrescible) means waste (other than special waste, hazardous waste, restricted solid waste, general solid waste (putrescible) or liquid waste) that includes any of the following:

(a) glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal,

(b) paper or cardboard,

(c) household waste from municipal clean-up that does not contain food waste,

(d) waste collected by or on behalf of local councils from street sweeping,

(e) grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices or stormwater management systems, that has been dewatered so that it does not contain free liquids,

(f) grit and screenings from potable water and water reticulation plants that has been dewatered so that it does not contain free liquids,

(g) garden waste,

(h) wood waste,

(i) waste contaminated with lead (including lead paint waste) from residential premises or educational or child care institutions,

(j) containers, having previously contained dangerous goods, from which residues have been removed by washing or vacuuming,

(k) drained oil filters (mechanically crushed), rags and oil absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids,

(l) drained motor oil containers that do not contain free liquids,

(m) non-putrescible vegetative waste from agriculture, silviculture or horticulture,

(n) building cavity dust waste removed from residential premises, or educational or child care institutions, being waste that is packaged securely to prevent dust emissions and direct contact,

(o) synthetic fibre waste (from materials such as fibreglass, polyesters and other plastics) being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste,

(p) virgin excavated natural material,

(q) building and demolition waste,

(r) asphalt waste (including asphalt resulting from road construction and waterproofing works),

(s) biosolids categorised as unrestricted use, or as restricted use 1, 2 or 3, in accordance with the criteria set out in the Biosolids Guidelines,

(t) cured concrete waste from a batch plant,

(u) fully cured and set thermosetting polymers and fibre reinforcing resins,

(v) fully cured and dried residues of resins, glues, paints, coatings and inks,

(w) anything that is classified as general solid waste (non-putrescible) pursuant to an EPA Gazettal notice,

(x) anything that is classified as general solid waste (non-putrescible) pursuant to the Waste Classification Guidelines,

(y) any mixture of anything referred to in paragraphs (a)–(x).

3.9.2 Understanding GSW within Genesis Recycling Facility

In 2009 planning approval was granted for the Genesis Facility which became a new paradigm for the recycling of Construction and Demolition Waste.

Figure 9: Genesis Recycling Facility East to West, Eastern Creek

The combined Genesis Facility [Landfill and Recycling] is licensed to receive up to 2 million tonnes of waste per annum. It is one of the most sophisticated and innovative waste management facilities in the world.

It is distinguished by a high level of capital investment in automated sorting equipment. Automated sorting equipment enables the recovery of materials from mixed waste which could otherwise not be achieved [except by hand but this would be exorbitantly expensive].

No composting takes place on the site in order to avoid odour.

The site and its operations are subject to independent environmental audited every two years, it fulfils its obligations for environmental monitoring the results of which are reported to the Regulators and published for public display on its website.

The Planning Conditions applicable to the facility are located on the DADI website, in addition to all Environmental Management Plans.

A copy of the 'Operational Guidance Plans for the Management of Wood Waste and Special Waste' will be shortly lodged with the current updated TNG Application.

Of the wastes meeting the criteria of General Solid Waste [non putrescible] particular attention in the DADI context is drawn to Item (q) *building and demolition waste* of the Waste Classifications as outlined in **Section 3.9.1** of this Submission.

Segregated building and demolition materials and excavation materials entering the Genesis Facility may broadly be categorised into the following:

- Brick, concrete, asphalt, wood, waste, timber; and
- Segregated excavation materials. [Sand, soil and rock].

These materials delivered in large quantities are usually source separated.

Crushing and Screening may be required to produce a homogenous sized re-usable material for use in building or landscaping. Recovered materials are required to be independently laboratory tested and certified to be suitably free from contaminants to permit resale.

Figure 10: Machines in the crushing and screening yard at Genesis Recycling Facility

Figure 11: Recovered Aggregate stockpiled at Genesis Recycling Facility ready for sale

Figure 12: Recovered wood-waste material in the crushing and screening yard at Genesis Recycling Facility (Aggregates, sands, mulch)

3.9.3 Waste processing

The Facility operates to strict waste classification management standards including the screening loads by weighbridge camera and then spotters at various positions throughout the Facility. This will not change under this proposed Development.

The Genesis MPC has the approval to accept and process up to two (2) million tonnes of waste per annum.

3.9.4 Materials receipt and processing: Genesis MPC

In accordance with approved environmental management strategies for the Genesis Xero Waste Facility, mixed or comingled general solid waste is transported by truck to the MPC where it is unloaded for pre-sorting and screening. Following this, further processing of the mixed waste material takes place within the MPC.

The MPC is a large building containing fixed plant atop a cast concrete slab within a steel and Colorbond building typical of the surrounding industrial buildings within the Precinct.

The fixed plant, shown in the figures below, comprises a large and complex piece of machinery involving up to 52 interconnected electrically driven conveyors and a range of magnets, graders, screens, sieves and hand sorting stations.

Figure 13: Inside the Material Processing Centre (MPC) sorting and screening process at Genesis Recycling Facility

Figure 14: Trucks inside the MPC used for the sorting and screening process at Genesis Recycling Facility

3.9.5 Materials Receivable

Waste materials are currently delivered to the MPC by a combination of light, medium and heavy vehicles, with loads typically varying from approximately one to 40 tonnes (t) in weight. 13 provides an indication of the types of waste processed at MPC.

DADI has developed specific processing and inspection procedures for receiving and checking waste that is directed to and processed by MPC. Broadly these include:

- Preliminary classification of waste is based on advice from the carrier, inspection of the carrier's documentation prepared in accordance with the EPA (2008) Waste Classification Guidelines and verification of this information by visual inspection using the weighbridge camera (**Check Point 1**);
- Mixed loads are directed to tip at the MPC work floor after a physical visual inspection at the specially designed spotter station (**Check Point 2**); and
- Loads are further inspected by trained staff working on the floor at the time of opening the tailgates and again when the load is tipped out on the floor (**Check Point 3)**.

3.9.6 Sorting and Separating

Mixed loads delivered to the MPC undergo initial a pre-sorting process to remove larger items that may impede the production of the plant. These wastes are segregated by material type and placed in designated bays and bins for transport to appropriate areas for recycling, landfilling or off-site (as required). This is when most hard plastics and PVC are removed from the waste stream.

After pre-sorting the waste is introduced to the recycling plant extending the full length of the MPC, commencing with the primary shredder which reduces the mean size of the waste to ease separation throughout the rest of the plant. Waste is then transported through the plant by a series of electrically driven conveyors, upon which the separation and sorting of various the waste types takes place automatically.

Ferrous and non-ferrous metals recovered through the sorting process (generally by use of a magnet and eddy current separators) as well as plastics, paper and cardboard are sorted, placed into bays and bins and stored until sold or transported from site for recycling by others.

Figure 15: Electrically driven conveyors with sorting and screening technology at Genesis Recycling Facility

Timber wood waste is recovered from the mixed materials during the separation sorting process and is processed for resale as woodchip or for use as fuel by others.

Metals, soil, aggregates and rubble are sorted by the same processes and deposited outside of the western wall of the MPC. They are then further processed for resale.

The residual wastes from the recycling plant are transported by a continuous conveyor that runs through the plant and exits at the rear of the MPC which is then weighed for EPA compliance and connects to the chute which deposits the residual waste at in the base of the landfill as can be seen in Figure 16.

Figure 16: Chute system transporting waste from MPC to landfill

Figure 17: Aerial of MPC

Specific environmental management procedures have been developed in accordance with best practice to maximise resource recovery and minimise biodegradable material from being landfilled in accordance with relevant legislative requirements.

3.9.7 Skip bin waste – General Solid Waste (GSW Recycling)

This category of mixed waste often described as skip bin waste and most generally comprises building and demolition materials, garden waste, metals, tiles, plastics paper and cardboard.

The Genesis automated facility is able to recover from the mixed bin waste ferrous and non-ferrous metals, larger timbers, brick and concrete aggregates of varying sizes, soils and gravels. These are separated by size, weight and properties into the constituent categories.
The residue from this extensive process is currently transferred via a conveyor and chute to the adjoining landfill. This residue is denoted as Chute Residual waste (**CRW).**

Figure 18: Residue or CRW waste

3.9.8 General Solid Waste (GSW Landfilling)

These materials may be broadly described as lightly contaminated soil or gravel type material which often has mixed into it a variety of other bin waste types of materials.
In this context "lightly contaminated" is a descriptive term and not a technical description. This material will have been pre-classified in accordance with the waste classification guidelines *before* it enters the Genesis Facility by an independent consultant as being waste requiring landfilling.

Large items of timber or concrete or steel may be able to be recovered where these are present.

Residue wastes from third party Materials Recycling Facilities (MRF) are currently also landfilled.

3.9.9 Special waste – Asbestos

This Asbestos or Asbestos contaminated soils must be landfilled and special requirements are present in the POEO Act for its receipt management landfilling and covering.

Division 2 - Other definitions
50 Other definitions

(1) In this Schedule:

Asbestos	means the fibrous form of those mineral silicates that belong to the serpentine or amphibole groups of rock-forming minerals, including actinolite, amosite (brown asbestos), anthophyllite, chrysotile (white asbestos), crocidolite (blue asbestos) and tremolite.
Asbestos waste	means any waste that contains asbestos

3.9.10 Floc Waste

One type of general solid waste which is not separately categorised for the purposes of the POEO Act is "floc" waste.

This is the waste residue left over from the stripping, shredding and crushing of motor vehicles.

The constituent materials of CRW and of floc waste are relevant to the question of the regulation and operation of EfW facilities and are addressed in further detail later in the submission.

3.9.11 Waste fuel: Sourced from authorised third parties

TNG will also treat residual waste fuels from either the adjacent MPC or authorised external operators.

3.9.12 Characterising the Residual Waste Stream

No doubt coloured by childhood memories of a visit to the Council municipal tip thirty or forty years ago much has been said recently about the residual waste stream.

Pejorative catch phrases such as "EfW robs recycling" and hyperbole such as "the waste companies will not recycle because once an EfW is built they [the waste companies] will have to *feed the beast*".

These and slogans like them are simplistic, stupid and wrong. They do a grave disservice to the community which deserves better.

There have also been wild allegations that car batteries or other hazardous materials might be surreptitiously included in the fuel waste stream and we trust that we have shown that [independently of any regulation] there are strong commercial reasons why one would not do that. These include:

- Recovery of metals from the waste stream is one of the easiest and most lucrative ways of a recycler making money.
- Waste being transported to Queensland and landfilled is what is destroying a proud 20 year tradition of resource recovery in NSW.
- The content of the residual waste stream [EfW fuel] has nothing to do with EfW and we can demonstrate why.

3.9.13 Waste audits

Recently the DADI Group commissioned three separate audits to be carried out by independent and NSW EPA accredited Waste Auditors.

Under conditions established by themselves and in accordance with Waste Audit Guidelines the Audit firms intercepted waste to be landfilled.

This waste fell into three categories:

1. Chute Residual Waste [Genesis General Solid Waste after resource recovery];

2. MRF Residual Waste [Third party] General Solid Waste after resource recovery; and
3. Floc Waste residual resulting from the shredding of Motor vehicles.

The results of those audits provided empirical data on the compositional contents of those waste streams supplemented by chemical analyses.

The Audit results provided useful information for the purposes of the TNG EIS but perhaps just as importantly absolutely laid to rest the suggestion either that the waste was susceptible of further resource recovery [it was not] or that it contained hazardous materials [it did not].

SECTION 4 - REVIEW OF TERMS OF REFERENCE (d)

4.1 Terms of reference (d)

d) *additional factors which need to be taken into account within regulatory and other processes for approval and operation of 'energy from waste' plants*

4.2 Recommendation

Nil Recommendations

SECTION 5 - REVIEW OF TERMS OF REFERENCE (e)

5.1 Terms of reference (e)

e) the responsibility given to state and local government authorities in the environmental monitoring of 'energy from waste' facilities

5.2 Observation

During the Assessment process of the TNG application the local municipal authorities have shown themselves to be lacking in objectivity, and scientific and technical skills.

5.3 Recommendations

5.3.1 The Regulation of EfW facilities remain with the State Government NSW EPA

5.3.2 That the NSW EPA be upskilled in technology and training

5.3.3 That the NSW EPA be provided by the energy provider with 24 hr online access to monitoring data.

SECTION 6 - REVIEW OF TERMS OF REFERENCE (f)

6.1 Terms of reference (f)

f) opportunities to incorporate future advances in technology into any operating 'energy from waste' facility

6.2 Recommendations

6.2.1 That the NSW EPA adopt a version of the section and which appears in the EU IED which reads,

Member States may require compliance with emission limit values and time limits for implementation which are more stringent than those set out in paragraphs 1, 2, 3 and 4 and in Article 10. They may include other pollutants, and they may impose additional requirements or adaptation of plant to technical progress.

SECTION 7 - REVIEW OF TERMS OF REFERENCE (g)

7.1 Terms of reference (g)

g) the risks of future monopolisation in markets for waste disposal and the potential to enable a 'circular economy' model for the waste disposal industry, and

7.2 Observations

7.2.1 The NSW EPA is empowered by its legislation to consider matters relating to the environment. It would be ultra vires its governing legislation if the EPA was to concern itself with markets and monopolies.

7.2.2 Market power, monopolies and commercial effects are matters properly reserved under the Commonwealth Constitution to the Federal Government [Corporations Power].

7.2.3 The Commonwealth Government has enacted the Australian Competition and Consumer Commission Act and in so doing has "covered the field" Section 52 of the Constitution provides that in such a case the Commonwealth will have exclusive power virtue of Section 51(xx).

7.3 Recommendations

7.3.1 The NSW EPA has been unable to address the interstate transportation and disposal of waste and should not for constitutional reasons concern itself with issues of commerciality concerning the disposal of waste which are matters beyond its remit.

SECTION 8 - REVIEW OF TERMS OF REFERENCE (h)

8.1 Terms of reference (h)

h) *any other related matter*

8.2 Recommendation

Nil Recommendations