WMAA Alternative Waste Treatment Working Group

Waste Management Association of Australia

Policy Paper - AWT Implementation in NSW

Final Report

7 February 2006

Report no: NS03076

Hyder Consulting

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Report no: NS03076 Date: 7 February 2006

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1 Summary

The need for Reform

The goal of sustainable development and sustainable communities is common to all spheres of government in Australia and forms part of the vision of this working group of the Waste Management Association of Australia. While sustainable development has been interpreted differently by different actors[1], some authors suggest that the problems of resource depletion and pollution can be assigned to the material throughput of the economy. The waste management industry has an important and unique role to play in retaining materials within the economy by recycling and processing (thereby reducing the resource inputs and waste outputs of the economy); and by treating residual waste (and minimising the environmental harm associated with final flows to nature). These are the principal tenants of a sustainable economy. Specifically, the deployment of Alternative Waste Technologies will reduce the polluting potential (such as Greenhouse Gas and leachate generation) of final wastes and increase material recycling and recovery.

In NSW and throughout Australia, if AWT processes are to fulfil their potential in regard to minimising waste to landfill (in volume and toxicity) and optimising resource recovery, there is a need to reform the policy, regulatory and economic framework within which wastes are managed. Technology uptake throughout Australia has been slow compared with Europe but steady with six facilities operating in the country and contracts awarded to three others.

In NSW, total waste to landfill continues to climb. Per capita, municipal solid waste is falling but waste generation is being influenced by population and economic growth. Commercial and Industrial waste to landfill is continuing to grow both in total and per capita. Based on analysis of waste flow data for Sydney, the working Group holds the view that it is highly unlikely that NSW waste targets will be achieved through the diversion of organic and recyclable materials at source alone. Residual waste processing infrastructure (i.e., AWT) will need to be implemented.

The importance of AWT as part of an integrated waste management solution in NSW is supported by recent correspondence by the Minister for the Environment and the Director General of the DEC. From these letters it is clear that, in addition to encouraging councils to separate recyclables at source, waste policy in NSW is directing Councils away from the practice of landfilling waste without prior treatment and resource recovery. . The AWT WG applauds the NSW Government on this direction provided to councils and encourages NSW Government to continue to send clear signals to councils in this regard.

[1] Hart, R., 2002 Growth, Environment and Culture. Ecological Economics 40 (p. 253)

It is estimated by the AWT Working Group that by 2014 a total of 2.76M t/yr of waste will require some kind of AWT servicing metropolitan Sydney. Sydney, at a cost of close to $100M per annum. Without considering additional infrastructure necessary for processing and recovery of specific waste streams, this would require between 10 and 20 large scale AWT facilities.

Recommended Reform Mechanisms

In order to achieve the required level of AWT processing, strategies for waste management, that span resource recovery through to residual waste treatment, must do the following:

The following recommendations are provided to enhance the likelihood of this infrastructure being established in the foreseeable future:

Infrastructure siting

- Identify and make available sites for waste and recycling facilities, and in particular AWT, where existing waste infrastructure already exists. This includes, in order of preference, landfills, transfer stations, and sewage treatment plants.
- In the Sydney Metropolitan Area, establish waste processing infrastructure at sites in addition to current waste management centres, in particular, in the North-West and in the South-West where much of the future development will occur.
- AWT's can and should be located in industrial areas. There are many examples worldwide and in Sydney of waste facilities operating beside other business and industrial activities.
- State Government to take an active role in planning for AWT infrastructure.
- State Government to develop an efficient new planning instrument (such as a SEPP) for waste and resource recovery.

Strategy implementation

- State Government to develop specific implementation programs and measurable performance indicators for waste minimisation and resource recovery;
- State Government to develop and monitor annual and binding waste diversion targets; and
- State Government to introduce fiscal incentives/disincentives for meeting/failing to meet these targets.

Waste policy

- State Government continue to send clear and consistent messages regarding acceptable and desirable waste management practices to Local Government and industry;

- State Government to intensify education of Councils in relation to AWT as an essential element in sustainable, integrated waste management.

Environmental performance standards

It is recommended that State Government

- Require the same minimum environmental standards such as leachate control and gas capture from all landfill operators;
- Regulate and police poorly performing landfills and other waste facilities (to prevent 'freeloaders');
- Require provisions to be made on balance sheets for landfill post closure monitoring and remediation measures; and
- Apply pricing mechanisms (such as the waste disposal levy) to the entire state.

Regulatory and co-regulatory platform

- It is recommended that the waste industry work closely with the relevant regulator(s) to develop standards, guidelines and or codes of practice to introduce more certainty and foster the establishment of viable markets for products from AWT facilities. The AWT WG is keen to offer industry expertise and be closely involved in the development of any guidelines and regulations proposed by the NSW Government (such as the anticipated '3F Regulation').

Local Government tendering processes

It is recommended that Local Government

- Provide timeframes and mechanisms ensuring MSW continues to be processed/disposed until the new AWT facility is ready for operation;
- Make a site available to all tenderers for the required AWT facility. If Council(s) own a site (or have an option over a parcel of land suitably zoned) then the tender could focus on the required *technology and service*.
- Establish of council groups to achieve economies of scale;
- Ensure such council groups are committed to remain a group for the purposes of waste management, and are able to make joint decisions within a reasonable time frame;
- Key officers involved adequately understand technology, price and risk implications prior to embarking on such a process;
- Is willing to share some of the risks (in particular in relation to waste quantities/composition, and future changes in legislation); and
- It is recommended that the AWT WG to continue organising Local Government Forums foster the debate and improve the understanding of benefits *and* limitations of AWT.

Full Cost Accounting

- All levels of Government to apply full cost accounting principles to all (including regional) landfill operations; and
- All levels of Government to apply Triple Bottom Line assessments to consider the true costs and benefits of AWT in a holistic manner.

Market Based Instruments

- It is recommended that the level of 'ecoservice recognition' be developed from an initial set of programs for infrastructure funding (mainly of recycling facilities, reprocessing plants and AWT technologies for unrecoverable mixed putrescible waste) to a scheme compensating for the provision of an environmental service based on the actual benefits delivered. This could be paid for through a mechanism similar to the new Council rebate scheme.
- It is recommended to frame the wider eco-benefits delivered by AWT as a greenhouse gas abatement measure with additional macro-economic benefits, as opposed to a "waste measure".

Conclusion

The adoption of reform mechanisms in waste management in NSW, and in Australia, is needed to meet the resource recovery targets established by state agencies and through national agreements (such as exists for packaging and electronics industry sectors). While ever strategies fail to provide substantial implementation detail, and market mechanisms lack the sophistication needed to differentiate solutions beyond waste quantities, the AWT sector will remain uncertain, lacking in investor confidence and not grow at the pace required to meet the ambitious targets set by the NSW Government.

2 The Alternative Waste Treatment Working Group

The Alternative Waste Treatment Working Group (AWT WG) of the Waste Management Association of Australia (WMAA) represents stakeholders in the development and implementation of AWT in NSW. Unofficially, it is also the peak body for AWT interests in the WMAA nationally (in the absence of other bodies engaging in such activities). The AWT WG is a working group of the Waste Management Association of Australia NSW Branch.

Membership of the AWT WG include:

- AWT technology & service providers;
- Local Government users of AWT;
- State Government policy makers for AWT;
- Consultants; and
- Legal advisors.

The group's Vision is **"***Sustainable communities avoiding waste and conserving resources at all levels of production and consumption, having committed to improved environmental outcomes by the technological processing of residues prior to landfill disposal."*

The Mission of the group is *to advance the development of sustainable communities through the implementation of AWT systems.*

3 Alternative Waste Treatment Overview

3.1 Definition of AWT

At present, there is no official definition of AWT. In general, AWT is understood as an 'alternative' to landfilling. More recently, this was understood to mean 'alternative' to landfilling of residual waste. However, this definition is also not entirely correct as any processing of residual waste produces residues in some form or another which do require landfilling.

On 29 of September 2005, the regional group of Councils in the Hunter Region conducted a workshop on AWT under the auspices of the WMAA. During this workshop, attendees agreed on a definition of AWT which is presented below:

AWT processes residual (mixed) waste, usually after (a proportion) of dry recyclables and organics have been separated at source for recovery. The main objectives of AWT are to:

- ***Stabilise residual waste[2] going to landfill;***
- ***Reduce the quantity of residual waste going to landfill; and***
- ***Recover further resources from residual waste.***

3.2 AWT Technologies

Alternative Waste Technologies have been characterised comprehensively by process for the Australian market[3]. There are three basic options available for AWT. These are:

- Mechanical-Biological Treatment (MBT);
- Thermal Treatment (Waste to Energy - WTE); and
- Combination of MBT and WTE.

The following gives a brief characterisation of the principles and types of AWT technologies.

[2] Stabilisation means conversion of putrescible solid waste into non-putrescible solid waste such that the potential for gas formation or pollutant carriage through leachate is minimised.

[3] Public reports include: Alternative Waste Treatment Technologies, Assessment and Handbook, Department of Environment and Conservation (Nolan-ITU, November, 2003). Waste Inquiry - Report of the Alternative Waste Management Technologies and Practices Inquiry, Office of the Minister for the Environment, (Smith, G., Wright, T. and Zoi, C., May 2000). Waste Pre - Treatment / Stabilisation Technology Assessment, Southern Sydney Waste Board (Nolan-ITU, May, 1999).

3.2.1 Mechanical-Biological Treatment (MBT)

MBT is a technology for residual waste stabilisation. This is achieved through mechanical conditioning and biological treatment. Biological treatment can be aerobic, anaerobic (digestion, biogas production) or a combination of both ('Hybrid MBT'). MBT facilities are designed to achieve the following objectives:

- Biological 'Inerting' ('Stabilisation'); and
- Extraction of Remaining Recoverable Materials.

3.2.2 Waste-to Energy (WTE), or Thermal Treatment

WTE is a common AWT method, with several hundred plants operating world wide. Three categories of WTE can be distinguished. These are briefly characterised below.

Incineration is the complete oxidisation of the organic component into carbon dioxide (and water). It is the most common method of thermal waste treatment, and the only one proven in large scale operation for mixed residual waste. Incineration has been practised on a large scale as an alternative to landfilling for over 100 years. Modern incineration plants are very efficient in recovering energy from the feedstock. For the disposal of domestic and similar wastes, grate incineration (mostly) and fluidised bed incineration (much less) are the two technologies used.

Gasification is a well known technology for power generation from coal. One of the major problems with the development and adaptation of this technology for residual (mixed) wastes has been the fact that these plants need a specific and very small input material particle size. Despite decades of development, no commercial scale system is in operation for mixed residual wastes.

Pyrolysis is the thermal decomposition of the organic components of input material under the exclusion of air. Despite decades of development, no commercial scale system is in operation for mixed residual wastes.

3.2.3 Combination of MBT and WTE

For this option, an MBT facility is used to produce two material streams of approximately similar quantity:

- A fraction with a low calorific value (which has been stabilised prior to being landfilled); and
- A fraction with a high calorific value for energy recovery ('Refuse Derived Fuel' (RDF), 'Substitute Fuel' etc.).

Energy recovery from the high calorific fraction commonly occurs through its use in cement kilns, power stations or dedicated RDF plants. This is

common practice in Europe. In Australia, no long term, commercial scale facility is in operation to recover energy from such materials/streams[4].

3.3 AWT Technology Deployment

3.3.1 History

AWT waste processing systems are complex. A wide variety of waste fractions are generated and many types of treatment methods, technologies and equipment are available. Over the last decade, technology uptake has enjoyed strong growth throughout the world. The vast majority of facilities have lived up to (realistic) expectations and millions of tonnes of waste are treated around the world each year. Some technologies have failed. The main causes of failure include:

1 Poor understanding of the properties of a difficult and inhomogeneous feedstock;

2 Disregard for the costs involved and the experience required to establish such facilities;

3 Inadequate planning and lack of understanding of process design, product requirements and emission controls; and

4 Unrealistic expectations of what AWT can deliver.

Two examples (one local, one international) of historic failures are:

Thermoselect, a pyrolysis technology, was established at a commercial scale demonstration facility in Northern Italy. Subsequently, a large scale plant was commissioned to process residual waste from the city of Karlsruhe, Germany. After three years of major technical problems at that plant, the project was aborted and labelled a failure about a year ago.

Brightstar (a comparable technology type) established a facility in Wollongong. After a reported expenditure of over $140m, the facility was dismantled in 2004.

These technologies failed due primarily to technical complexities associated with combustion of a non homogeneous feedstock which challenged process control and environmental performance engineering.

3.3.2 Technology deployment in Australia and NSW

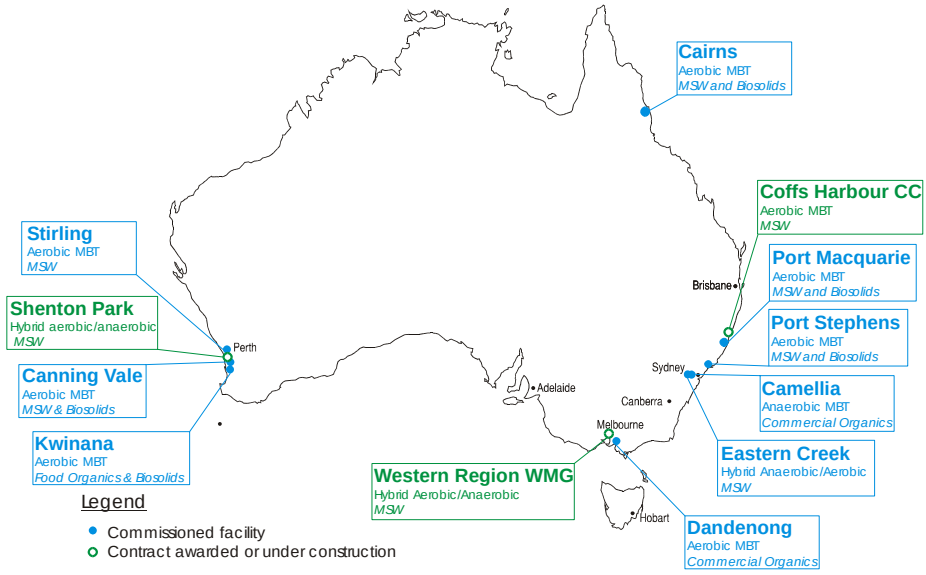
Throughout Australia, six AWT facilities are in operation[5] and three facilities have had contracts awarded. Further developments remain in the pipeline.

[4] Except for untreated wood 'waste'

The establishment of facilities has often resulted from local environmental leadership, as much or more than from logistical management of residual wastes. AWT facilities are illustrated in Figure 3-1 below.

In NSW there are three AWT facilities in operation which process residual wastes: The Bedminster facility in Raymond Terrace, Port Stephens (35,000 t/yr), the Remondis facility in Port Macquarie (20,000 t/yr on the residual waste line), and Global Renewables' UR-3R facility at Eastern Creek, Sydney (175,000 t/yr). Another advanced processing facility worth mentioning is Earthpower's Camellia facility, processing predominantly commercial organics. In addition to the above mentioned, the ArrowBio MBT process has recently been awarded the contract for the Macarthur region of Sydney.

It is worth noting that all four established facilities are operating successfully, i.e. processing quantities in the vicinity of their nominal capacity, and achieving performances (environmental as well as outputs) comparable with the original design intent.



Note: Port Macquarie and Coffs Harbour feature two separate lines: One for residual waste, one for source separated organics

Figure 3-1: Advanced waste processing facilities in Australia (including AWT): Stage, type and feedstock

[5] There are an additional three facilities in operation (also depicted in Figure 3-1) which process source separated organics (as opposed to residual (mixed) waste): Kwinana, Dandenong, Camellia.

4 Waste and Recycling Quantities

The NSW State Waste Strategy has set the following targets for waste reduction by 2014:

Municipal Wastes: 66%
C&I Wastes: 63%

The Progress Report (DEC, 2004) states that, in 2002/03, municipal waste generation in NSW amounted to 3.3 million tonnes. Recovery, mainly of garden organics, paper & cardboard, glass, plastic and ferrous metal, was 1.2 million tonnes, or 35%. C&I waste generation amounted to 4.2 million tonnes, of which 33%, or 1.4 million tonnes, was recycled.

Members of the AWT Working Group have recently estimated the projected waste generation and recycling towards targets for the Sydney metropolitan area6 (see Figure 4-1). Assuming a continuation of current diversion rates, there is a short fall in the targeted waste diversion of more than 180,000 tonnes for municipal wastes and almost 900,000 tonnes for C&I wastes (see Figure 4-2). Note that a continuation of the current waste diversion trend for MSW is unlikely to occur without the implementation of AWT, as those components that are relatively easy to separate (e.g. kerbside recycling and garden organics - 'low hanging fruit') are already largely separated.

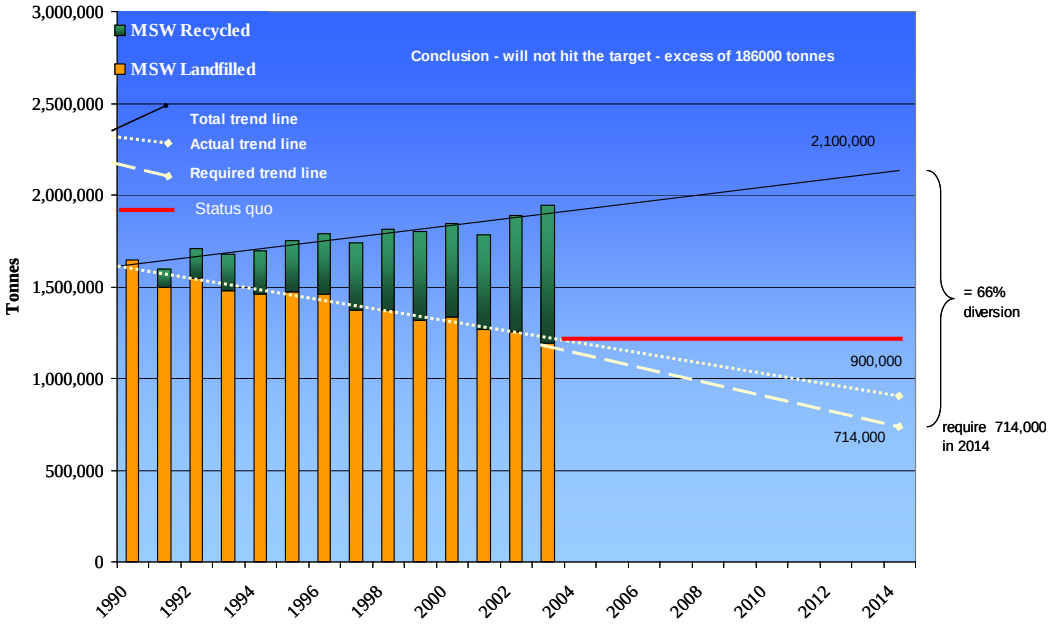


Figure 4-1: Projected municipal waste and recycling quantities for Sydney Metro

[6] Note: Sydney comprises approximately two thirds of the NSW population. Tonnage figures are therefore different from those indicated above (which were for NSW).

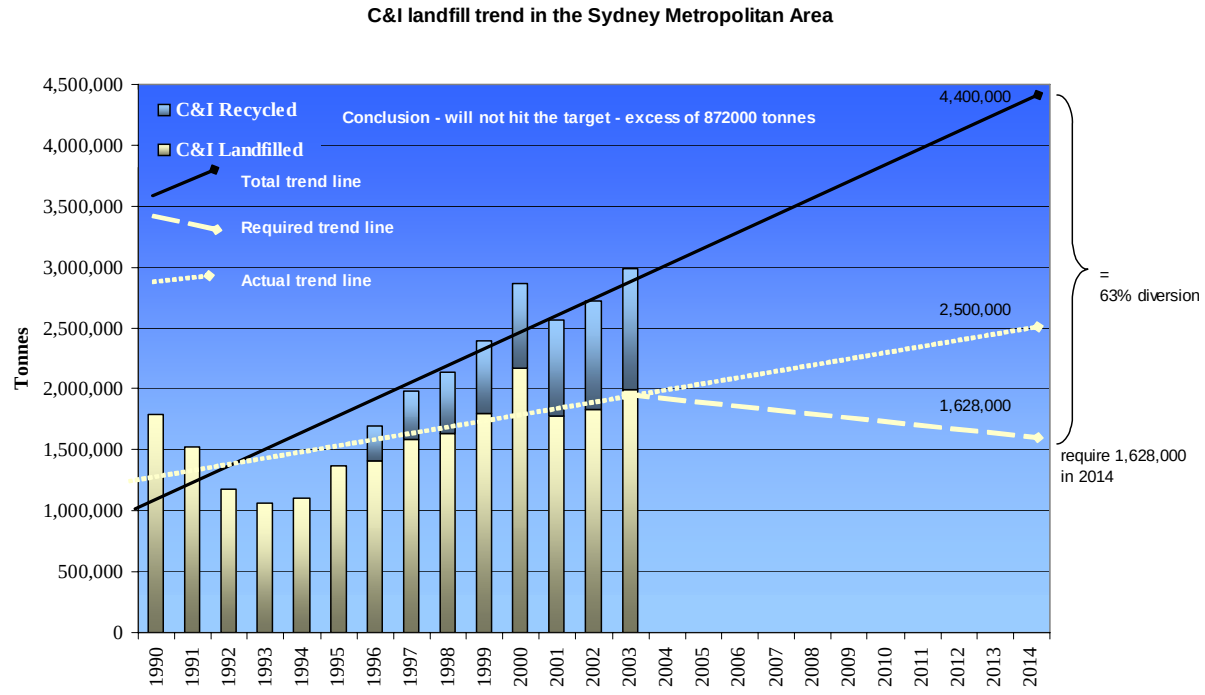


Figure 4-2: C&I waste and recycling projections for Sydney Metro

5 Required AWT processing capacity

In order to achieve the additional diversions from landfill as projected above, substantial new infrastructure is required in the coming years. The AWT WG has estimated the quantities of materials that will require processing by 2014 in order to achieve the waste diversion targets. Table 5-1 lists the waste streams and tonnages required in terms of diversion and processing, and the costs associated with these activities.

The table also shows that it is highly unlikely that NSW waste targets will be achieved through the diversion of organic and recyclable materials at source alone. Residual waste processing infrastructure (i.e., AWT) will need to be implemented.

Currently in Sydney, 175,000 t/yr of Municipal waste are being processed in an AWT facility (Global Renewables under contract to WSN Environmental Solutions, Eastern Creek). This represents around 15% of the total Municipal waste in Sydney, and around 9% of all putrescible waste (including C&I waste containing putrescible materials).

As is shown in Table 5-1, an additional 1.4M t/yr of Municipal waste would require processing (assuming a 60-70% diversion rate), plus 1.26M t/yr C&I waste. From this, it is estimated by the AWT Working Group that a total of 2.76M t/yr of waste will require some kind of AWT, at a cost of close to $100M per annum. Overall costs for processing and recovery infrastructure (for all material streams) was conservatively estimated at $134M per annum based on current disposal costs. The recent announcement of increasing the waste disposal levy by $30/yr within the next five years (plus CPI adjustment) will bring landfill disposal costs much closer to the costs of resource recovery and processing through advanced infrastructure. In other words, the costs estimated in the table will still be incurred however, the increase in the cost of landfilling will amount to almost the same total.

In summary, it is estimated that between 10 and 20 large scale AWT facilities[7] would be required to service metropolitan Sydney (MSW and C&I). This does not include infrastructure for processing and recovery of other, specific waste/recycling streams.

It is clear that the framework for commissioning, planning, siting and approving this infrastructure in Sydney is not in place.

[7] For MSW and that part of the C&I stream that contains putrescible components. Number of facilities will is depending on individual capacities

Table 5-1: Estimates of additional recycling and processing capacity in the Sydney metro area (million t/yr)

Key Action Areas	Additional amount required to meet the target	Additional processing / diversion required to meet the target	Additional expense to extract these tonnes $/t	$M/yr
C&I Source Separation	2.1Mt more than now	0.84	25	21
C&I AWT & Mixed Sorting	2.1 Mt more than now	1.26	35	44
AWT – MSW	1.4 Mt more than now	1.50	35	53
Kerbside recycling	250,000 t additional recovery	0.25	-	-
Garden Organics	Additional 0.15 Mt/yr	0.15	30	5
National Packing Covenant	Additional 260,000 t	-	-	-
Away from recycling	Additional 50,000 t/yr	0.05	20	1.0
Other minor waste streams – tyres, mobiles…	Additional 40,000 t/yr	0.05	20	1.0
Education	-	3.3 m waste generators (hhlds and businesses)	3 per waste generator (hhld/business)	10
TOTAL	-	-	-	134.0

6 Siting and approval for infrastructure

As highlighted in the previous section, a significant amount of infrastructure will be required if the waste reduction targets are to be achieved.

Experience[8] has shown that it may be impossible to get approval for waste infrastructure even if it provides a state-of-the-art and necessary solution and the zoning is appropriate.

Recent planning reform appears to have brought some unity and improvement into these approval processes[9]. Nevertheless, the industry is still concerned about possible split responsibilities regarding zoning, planning, works approvals and siting through the multitude of Government agencies and various spheres of government that may be involved. These departments include Infrastructure & Planning, Environment, and Local Government.

The siting and approval of waste and resource recovery infrastructure has been and still is seen by industry as one of the greatest barriers to the delivery of (essentially environmental) services as an integral component of achieving any landfill diversion targets.

The identification and approval of sites for waste management infrastructure has historically been a delicate and highly politicised issue. This is not restricted to Sydney or NSW. Indeed, facility siting is one of the greatest challenges in waste management in most countries in the developed world.

Recommendations:

It is well beyond the scope of this report to identify individual sites for waste management and resource recovery infrastructure however, the following principles should be adopted:

- Identify and make available sites for waste and recycling facilities, and in particular AWT, where existing waste infrastructure already exists. This includes, in order of preference, landfills, transfer stations, and sewage treatment plants[10].
- In the Sydney Metropolitan Area, establish waste processing infrastructure at sites in addition to current waste management centres, in particular, in the North-West and in the South-West where much of the future development will occur.

[8] Rethmann aborted plans to establish a much needed resource recovery facility despite initial consent of the Land and Environment Court due to persistent and unreasonable resistance by Botany Council.

[9] Stone, Y. (2005): Presentation to the NSW Waste Conference 2005.

[10] There are plenty of examples of cities with 'waste clusters' i.e. sites that accommodate landfills, AWT's, STP's and other waste and recycling facilities.

- AWT's can and should be located in industrial areas. There are many examples worldwide and in Sydney of waste facilities operating beside other business and industrial activities.
- State Government to take an active role in planning for AWT infrastructure.
- State Government to develop an efficient new planning instrument (such as a SEPP) for waste and resource recovery.

7 The need for a plan

7.1 Implementation and Incremental Targets

The policy setting in NSW is established by governing legislation as well as the Waste Avoidance and Resource Recovery Strategy. While this framework provides a general direction for the sector, it provides little certainty to investors because of the lack of implementation and operational detail. There is no certainty with regard to the mechanisms which govern waste management and which are regulatory or economic in nature.

In NSW, landfill disposal costs are higher than in other states, and therefore AWT deployment is relatively more cost competitive. However, the technology investment platform is not secure and significant reform is required to ensure that sufficient processing capacity is provided in an economically sound and ethical way.

The majority of stakeholders in the waste industry, and in the AWT WG in particular, have formed the view that the NSW Waste Strategy is strong on targets and provides all the right words however, that it is much less strong on what actions are to be implemented in what manner in order to achieve these targets.

At one of the recent technical seminars held by the NSW WMAA, John Cook presented on the UK Landfill Allowance Trading Scheme (LATS). He used the UK example to highlight the importance of *annual and binding targets*, and recommended the introduction of such annual and binding targets for NSW and Australia[11]. The audience, a good cross section of the industry and certainly representative of the mood within the industry, appeared to agree almost unanimously with this recommendation.

In summary, much more emphasis is required on implementation, as well as some measurable performance indicators over time that enable gauging the progress towards these targets.

Recommendations:

- State Government to develop specific implementation programs and measurable performance indicators for waste minimisation and resource recovery;
- State Government to develop and monitor annual and binding waste diversion targets; and
- State Government to introduce fiscal incentives/disincentives for meeting/failing to meet these targets.

[11] http://www.wmaa.asn.au/nsw/AWT_jcook.pdf

7.2 A clear, consistent regulatory framework

7.2.1 Waste policy

Despite the lack of coordination and strategy detail, recent high level actions in NSW demonstrate a clear intent to facilitate the uptake of AWT technologies as part of an integrated strategy for waste management. As shown in sections 4 and 5, it is widely understood that AWT infrastructure processing capacity will need to be expanded significantly to meet state targets. This projected growth of AWT technologies is supported by recent actions of the NSW Environment Minister and Director General of the DEC, in their correspondence with local government regarding the need to avoid long term landfill contracts (limited to five years[12]), and also by the rise in the S.88 waste levy[13].

However, the various regulatory frameworks for waste throughout Australia and in NSW fall short of providing a clear and consistent framework for technology deployment.

Earlier this year, the Director-General of the DEC, Lisa Corbyn, issued a letter[14] to the General Managers of Councils that outlines a clear framework for waste management into the future. Extracts are provided below.

Most councils in NSW will contribute to meeting the overall State target by:

- *maintaining kerbside recycling systems and increasing their yield through adoption of best practice services with supporting and sustained community education;*
- *implementing best practice source-separated garden organics collections, where organic waste comprises a major component of council's mixed waste stream; and*
- *moving to technological processing of residual mixed wastes, with landfill being retained only as a disposal option for final residue or where volumes and distances make reprocessing impractical.*

There is reliable evidence that effective waste processing for residual waste provides a substantial environmental benefit over landfill. The final design of an integrated resource recovery system will be based on a number of factors, but should be based on the premise that landfill is the option of last resort.

The Department of Environment and Conservation is of the view that councils should avoid contracts for landfilling where the term is longer than 5 years, and where alternative waste treatment is likely to be available

[12] Letters from the Environment Minister, Bob Debus, to NSW Council Majors, and from the Director General of DEC, Lisa Corbyn, to Councillors, both dated 22 February, 2005.

[13] http://www.environment.nsw.gov.au/waste/waste_regulation.htm

[14] Ibid

within the near to medium term. Alternative waste technology may provide significant benefits in reducing the residual waste stream going to landfill. ***Extended landfill contracts will frustrate the introduction of waste technologies that could boost recovery of materials from the waste stream and reduce the use of landfill.***

At the same time, the Environment Minister, Bob Debus, wrote a letter of similar nature to the Mayors. The letter stresses the following:

- *… long term landfilling contracts will reduce our ability to achieve waste reduction targets and will result in a poor environmental outcome for the community as a whole.*
- *While this [restricting the period of landfilling] most clearly relates to councils in the Sydney, Newcastle and Wollongong areas, it is notable that major regional centres may provide sufficient material to justify alternative treatment plants particularly where they can combine with adjacent councils in areas of high growth.*
- *The community has an expectation that it will have the opportunity to participate in a user friendly and environmentally sound recovery service.*

From these letters it is clear that waste policy in NSW is directing Councils away from the practice of landfilling waste without prior treatment and resource recovery. The AWT WG applauds the NSW Government on the clear direction provided to Councils and encourages NSW Government to continue to send clear signals to councils in this regard.

The AWT WG fully agrees with Government's position on source separation. The Working Group recognises AWT as a treatment option for residual wastes (see Section3.1).

Recommendations:

- State Government continue to send clear and consistent messages regarding acceptable and desirable waste management practices to Local Government and industry;
- As evidenced at the last Local Government Seminar on AWT (refer Section 7.3), the AWT WG urges State Government to intensify education of Councils in relation to AWT as an essential element in sustainable, integrated waste management.

7.2.2 Lack of enforcement of environmental performance standards in NSW

The AWT WG believes that the enforcement of the licensing conditions for the operation of waste management facilities (in particular landfills), needs to be strengthened to ensure that operators meeting the required environmental standards are not competitively disadvantaged.

Recommended State Government action includes:

- Requiring the same minimum environmental standards such as leachate control and gas capture from all landfill operators;
- Regulating and policing poorly performing landfills and other waste facilities (to prevent 'freeloaders');
- Requiring provisions to be made on balance sheets for landfill post closure monitoring and remediation measures; and
- Application of pricing mechanisms (such as the waste disposal levy) to the entire state.

7.2.3 Regulatory and co-regulatory platform

Throughout Australia and in NSW, the regulatory and co-regulatory framework for AWT technology is immature and needs to be researched and scientifically and technically advanced. There is considerable uncertainty relating to:

- The feasibility and performance of, substitute fuels[15] and, hence, associated costs for its production and utilisation (State jurisdiction);
- Criteria determining the required degree of stabilisation of output from MBT facilities to 'inert' landfills (State jurisdiction);
- Disposal requirements for special residues from AWT facilities (e.g. wastes from thermal processes, or processes utilising substitute fuels (RDF) (State jurisdiction);
- Recognition of AWT as a significant Greenhouse Gas abatement measure (Federal jurisdiction);
- Recognition of the environmental benefits of AWT, through:
  a) Reduced landfill impacts; and
  b) Credits through recovery of materials (avoided impacts of conventional extraction and production of materials) (State and Federal jurisdictions).
- In relation to the organic output (compost) from MBT facilities, it is noted that the AWT DORF group, in association with the NSW Department of Environment and Conservation (DEC) and the WA EPA are working to improve the technical platform for management of organic waste streams by commissioning a study looking into potential contaminants in mixed waste derived composts. The objective of the study is to provide a platform for an informed debate into the need or otherwise of establishing appropriate standards and guidelines for the application of such products with a view to minimise the risk of damage to human health and the environment.

[15] Also referred to as Refuse Derived Fuels (RDF)

Recommendation:

- It is recommended that the waste industry work closely with the relevant regulator(s) to develop standards, guidelines and or codes of practice to introduce more certainty and foster the establishment of viable markets for products from AWT facilities. The AWT WG is keen to offer industry expertise and be closely involved in the development of any guidelines and regulations proposed by the NSW Government (such as the anticipated '3F Regulation').

7.3 Local government tendering

Local Government is the primary client for the provision of AWT processing services. As presented earlier in this report, a number of Councils have taken the initiative and embarked on a process for the provision of environmentally and socially enhanced waste management services through AWT facilities. While this is applauded by the AWT industry, it is also noted that many tender processes did not lead to the award of a contract.

From this experience over the last five to ten years, some key issues causing concern have been identified. These are discussed below.

7.3.1 Contract commencement

The tendering of AWT contracts may result to disadvantage some competing proponents. This is the case where there is a gap between commencement of the contract for waste management services and operation of new technologies such that management and disposal during the development phase must remain with existing service providers (themselves competitors in the AWT marketplace). By not allowing sufficient time until commencement of such contracts, AWT technology providers may fail to meet contract requirements if they cannot negotiate commercially viable services with existing infrastructure operators in the intervening period.

7.3.2 Land/site availability

A second major concern for industry is the (un)availability of sites: In most instances during an AWT tender process, no sites are identified and/or provides for the establishment of such a facility. On the other hand, tenderers are generally not in a position to acquire a site and obtain the necessary approvals without a bankable contract. The two downsides of this situation are:
1) Tenders which are either not comparable, or are non-committal i.e. uncertain in terms of timing and siting; and/or
2) Companies with existing sites for waste facilities are the only ones able to respond to the tenders.

A related issue in this context is the distance between waste generators and (future) AWT facilities. In many instances, waste transfer stations are required to minimise transport costs. In the Sydney Metropolitan Area, access to existing transfer stations is considered a barrier to market entry by many in the industry.

7.3.3 Other issues

Some issues requiring improvement at the Council level include lack of understanding of technological challenges; lack of commitment in terms of providing feedstock security; wrong price expectations; lack of recognition of a need for long term contracts; and unwillingness to share risks.

Apart from the issues indicated above, the AWT WG is concerned that the majority of NSW councils still perceive AWT as an exotic, unproven and unnecessary 'disposal option' as was evidenced in discussions at a Local Government seminar organised by the AWT WG in November this year. A oft stated attitude was a 'wait and see'[16]. This should also be of concern to the NSW Government as a majority of councils do not appear to have recognised the need of AWT as an essential element of integrated and sustainable waste management.

7.3.4 Recommendations

The AWT WG is of the view that there is significant scope to improve these tender processes. Factors that could lead to such improvement include but are not limited to:

- Provision of timeframes and mechanisms ensuring MSW continues to be processed/disposed until the new AWT facility is ready for operation;
- The availability of a site for the required facility to all tenderers. If Council(s) own a site (or have an option over a parcel of land suitably zoned) then the tender could focus on the required *technology and service*.
- Establishment of council groups to achieve economies of scale;
- Ensuring such council groups are committed to remain a group for the purposes of waste management, and are able to make joint decisions within a reasonable time frame;
- Adequate understanding of technology, price and risk implications amongst key persons involved prior to embarking on such a process;
- Willingness to share some of the risks (in particular in relation to waste quantities/composition, and future changes in legislation); and

[16] A typical comment at the seminar was: Industry should build a few of those things and then we will have a look and decide whether we want this'.

- The AWT WG to continue organising Local Government Forums foster the debate and improve the understanding of benefits *and* limitations of AWT.

7.4 Full Cost Accounting

7.4.1 Financial

In metropolitan Sydney landfill pricing is controlled by private companies and the State-owned Corporation, WSN Environmental Solutions, with the landfill prices setting the benchmark for waste disposal prices. However, a number of AWT projects have been established in areas outside of Sydney. These projects were implemented as they were benchmarked by full costing accounting against the alternative of setting up new landfill capacity. This demonstrates that AWT is competitive over the long term on a purely financial basis if and when Full Cost Accounting of landfilling is undertaken i.e. all factors such as siting, state-of-the-art construction, gas control, leachate control, actual operating costs, post closure costs and environmental bonds are considered.

7.4.2 Externalities

From a (wider) economic viewpoint, there is policy value in attempting to identify and define external costs i.e. costs that are currently not accounted for in current market prices. Increasingly within policy-making in Australia, as throughout the developed world, the externalised environmental costs are being systematically calculated and factored into the decision making process[17].

The externalities (environmental impacts) associated with various integrated waste management options have been calculated during the past decade by the consulting firm Nolan-ITU and RMIT's Centre for Design[18], using Life Cycle Assessment and valued in monetary terms using the Nolan-ITU Environmental Economic Valuation model. Expressed in

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17 European Commission (2000): ExternE – the External Costs of Transport and Energy Systems Summary Report.

Eunomia Research & Consulting (2003): Economic Analysis of Options for Managing Biodegradable Municipal Waste, prepared for the European Commission.

OECD, 2001, Full Cost Pricing of Transport and other Systems, France DG XVII

18 National Packaging Covenant Council (2001): Independent Assessment of Kerbside Recycling in Australia.

Nolan-ITU (2004): Global Renewables Limited -National Benefits Study

RMIT & Nolan-ITU (2003): Life Cycle Assessment of Waste Management Options in Victoria.

NSW DEC (2004): Getting more from our recycling Systems – Assessment of Domestic Waste and Recycling Systems

NSW DEC (2005): TBL Assessment of Garden Organics Management

"ecodollar" terms, the environmental benefits of AWT over landfilling of untreated waste are estimated between $200 and $400 per tonne.

These approaches are generally known as cost-benefit assessments and, in combination with consideration of potential additional social impacts/benefits, form the basis of Triple Bottom Line Assessments. The vast majority of such assessments - locally and overseas – have shown AWT to be preferable over the landfilling of untreated waste.

Recommendations:

- All levels of Government to apply full cost accounting principles to all (including regional) landfill operations; and
- All levels of Government to apply Triple Bottom Line assessments to consider the true costs and benefits of AWT in a holistic manner.

8 Market Based Mechanisms for Reform

The integration of environmental policy into overall governmental policies is gathering momentum in OECD countries. There is an emerging shift from an essentially regulatory approach towards a "governance" approach, which to date has included negotiated (voluntary) agreements and now the increased use of more market based economic instruments. In waste policy, economic instruments and market based instruments have become frequently used terms. There is a general acceptance that they are policy levers that can create incentives to alter behaviour and reduce environmental impacts.

Whilst the quantity of waste for disposal and recycling is the focal point for MBI implementation in NSW and Australia, application of instruments to encompass upstream economic activities and advantage solutions with the greatest environmental return should also be an important part of an overall framework.

Increases in the Section 88 Levy are one component of an MBI however, the levy alone is a “catch all” instrument for reform. The Total Environment Centre has reported that, “landfill levies have resulted in greater recovery … of construction and demolition materials, however the overall flows of Municipal Solid Waste and Commercial and Industrial waste have not been greatly impacted[19]”.

The potential for MBI application should be comprehensively reviewed including trading schemes and externality pricing. It is noted that the level of subsidies provided in Australia to virgin material usage greatly exceeds support for recovered materials. A ‘combination MBI’ with a whole-of-life focus as well as ‘ecoservice recognition’ could be trialled in NSW and, over time, expanded into a national model.

The waste management and resource recovery sector certainly has significant potential for the effective use of market based instruments. However, it would be an over-simplification to assume that MBIs and the creation of markets can completely solve the challenges that the waste management industry confronts.

The practicalities of implementation and the lack of full trading markets suggest that an instrument "package", involving more sophisticated regulation combined with negotiated agreements and well designed MBIs, is likely to be the most effective framework to meet the range of stakeholder objectives in the sector.

[19] Workshop on Market Based Instruments and Sustainable Resource Recovery (March, 2005), organised by Total Environment Centre. It is noted that significant progress towards landfill diversion targets has been made in the Municipal sector however, additional waste diversion to achieve the State targets will require AWT services.

Recommendations:

- It is recommended that the level of 'ecoservice recognition' be developed from an initial set of programs for infrastructure funding (mainly of recycling facilities, reprocessing plants and AWT technologies for unrecoverable mixed putrescible waste) to a scheme compensating for the provision of an environmental service based on the actual benefits delivered. This could be paid for through a mechanism similar to the new Council rebate scheme[20].
- The notion of environmental – or 'eco' – service provision is relatively new. It comprises a number of environmental improvements in areas such as air, water, health, vegetation etc. and is still difficult to 'sell'. As a first stage, it is therefore recommended to frame the wider eco-benefits delivered by AWT as a *greenhouse gas abatement measure*[21] with additional macro-economic benefits, as opposed to a "waste measure". A communications program aimed at securing the support of policy influencers (such as key local government and NGO personnel) would also be required.

[20] NSW Department of Environment and Conservation (2005): City and Council Environmental Restoration Program, p. 9 (published December 2005).

[21] A number of recent reports document the substantial GHG savings achievable through AWT, e.g. AEA (2001) Waste Management and Climate Change, for the European Commission. RMIT and Nolan-ITU (2003): LCA of Waste Management Options (including Waste-to-Energy), for EcoRecycle Victoria.

9 Summary of Recommendations

Achievement of NSW waste targets would require between 10 and 20 large scale AWT facilities servicing metropolitan Sydney. The following recommendations are provided to enhance the likelihood of this infrastructure being established in the foreseeable future:

Infrastructure siting

- Identify and make available sites for waste and recycling facilities, and in particular AWT, where existing waste infrastructure already exists. This includes, in order of preference, landfills, transfer stations, and sewage treatment plants[22].
- In the Sydney Metropolitan Area, establish waste processing infrastructure at sites in addition to current waste management centres, in particular, in the North-West and in the South-West where much of the future development will occur.
- AWT's can and should be located in industrial areas. There are many examples worldwide and in Sydney of waste facilities operating beside other business and industrial activities.
- State Government to take an active role in planning for AWT infrastructure.
- State Government to develop an efficient new planning instrument (such as a SEPP) for waste and resource recovery.

Strategy implementation

- State Government to develop specific implementation programs and measurable performance indicators for waste minimisation and resource recovery;
- State Government to develop and monitor annual and binding waste diversion targets; and
- State Government to introduce fiscal incentives/disincentives for meeting/failing to meet these targets.

Waste policy

- State Government continue to send clear and consistent messages regarding acceptable and desirable waste management practices to Local Government and industry;
- State Government to intensify education of Councils in relation to AWT as an essential element in sustainable, integrated waste management.

[22] There are plenty of examples of cities with 'waste clusters' i.e. sites that accommodate landfills, AWT's, STP's and other waste and recycling facilities.

Environmental performance standards

It is recommended that State Government

- Require the same minimum environmental standards such as leachate control and gas capture from all landfill operators;
- Regulate and police poorly performing landfills and other waste facilities (to prevent 'freeloaders');
- Require provisions to be made on balance sheets for landfill post closure monitoring and remediation measures; and
- Apply pricing mechanisms (such as the waste disposal levy) to the entire state.

Regulatory and co-regulatory platform

- It is recommended that the waste industry work closely with the relevant regulator(s) to develop standards, guidelines and or codes of practice to introduce more certainty and foster the establishment of viable markets for products from AWT facilities. The AWT WG is keen to offer industry expertise and be closely involved in the development of any guidelines and regulations proposed by the NSW Government (such as the anticipated '3F Regulation').

Local Government tendering processes

It is recommended that Local Government

- Provide timeframes and mechanisms ensuring MSW continues to be processed/disposed until the new AWT facility is ready for operation;
- Make a site available to all tenderers for the required AWT facility. If Council(s) own a site (or have an option over a parcel of land suitably zoned) then the tender could focus on the required *technology and service*.
- Establish of council groups to achieve economies of scale;
- Ensure such council groups are committed to remain a group for the purposes of waste management, and are able to make joint decisions within a reasonable time frame;
- Key officers involved adequately understand technology, price and risk implications prior to embarking on such a process;
- Is willing to share some of the risks (in particular in relation to waste quantities/composition, and future changes in legislation); and
- It is recommended that the AWT WG to continue organising Local Government Forums foster the debate and improve the understanding of benefits *and* limitations of AWT.

Full Cost Accounting

- All levels of Government to apply full cost accounting principles to all (including regional) landfill operations; and

- All levels of Government to apply Triple Bottom Line assessments to consider the true costs and benefits of AWT in a holistic manner.

Market Based Instruments

- It is recommended that the level of 'ecoservice recognition' be developed from an initial set of programs for infrastructure funding (mainly of recycling facilities, reprocessing plants and AWT technologies for unrecoverable mixed putrescible waste) to a scheme compensating for the provision of an environmental service based on the actual benefits delivered. This could be paid for through a mechanism similar to the new Council rebate scheme.
- It is recommended to frame the wider eco-benefits delivered by AWT as a greenhouse gas abatement measure with additional macro-economic benefits, as opposed to a "waste measure".