Municipal Solid Waste – The Hidden Problem

Introduction

The world is being buried under its own waste. Is this an alarmist statement or a self-fulfilling prophecy?

The consumer society continues to spawn an explosion in the amount of domestic and industrial waste being produced. The waste being generated in developed countries per capita has trebled in the past 20 years. The UN estimates that if current trends continue, the world could see a five fold increase in waste generation by 2025.[i]

This escalation would be reflected across the waste streams and logically include the hazardous and toxic by-products of modern living. This paper therefore looks at one key aspect of the problem, the contamination of the Municipal Solid Waste (MSW) stream and the landfill legacy it is creating. Steps need to be taken to reduce the amount of toxic materials making their way into MSW landfill sites across Australia. This can only be done by using advanced technologies to sort and treat the waste first – to place a buffer between the household bin and the council burial ground.

Those technologies also bring other inherent benefits. An advanced waste sorting/processing system will also avoid the greenhouse gas emissions of putrescible landfilling, a significant feature give that emissions from landfilled waste could otherwise account for most of the likely CO2 allocation for Australia by 2050.

Dump or Divert?

The urgent question continuing to plague and challenge countries, their governments, industries and consumers is what we do with all the waste our society is producing. It is a problem requiring decisions that are having, and will continue to have, a significant impact on issues such as contamination of the environment – whether it be soil, air or water quality – and people's health. (It's estimated that more than 5 million people die each year from diseases related to inadequate waste disposal systems.[ii])

In the debate on hazardous waste and contamination in Australia, MSW hardly registers as society focuses on how industries or governments dispose of the toxic by-products of their endeavours. Is that because we all know what should go into household rubbish collections? There are strict regulations governing what is put into bins for kerbside collection. The problem is they're being ignored. There is a high probability that significant amounts of toxic contaminants are making their way through the MSW stream and into landfill, where they are creating long term contaminated sites and infiltrating the soil, water and air.

The management of MSW has traditionally been viewed as a disposal problem. The solution has been seen in terms of taking the waste to a place where it can be dumped or burned. But we cannot keep this up. Australians produce around 690 kilograms of MSW per person every year, making us the second most wasteful country in the world behind the United States.[iii] The vast majority of this waste – almost three quarters – ends up in landfills on the outskirts of our major cities and towns.[iv]

This process is simply unsustainable as societies run out of suitable locations to dump waste and more is discovered about the greenhouse gas emissions and leachates from landfill. It is interesting to note that, in the debate about climate change and how we tackle it, few seem to recognise that a tonne of waste landfilled today will still be emitting greenhouse gases in 2050 and beyond.

Advanced Waste Treatment (AWT) technology such as that developed by Global Renewables provides an alternative to dumping, and should also be seen as a gatekeeper to help prevent hazardous waste present in MSW from entering landfill.

The Global Renewables approach to MSW is based on the premise that it is a renewable resource that should be collected, sorted and processed. This has resulted in the development of the UR-3R Process® (Urban Resource – Reduction, Recovery and Recycling Process). The UR-3R Process® is currently in operation at the AWT/resource recovery facility at Eastern Creek in Sydney in a public/private partnership with WSN Environmental Solutions (formerly Waste Service NSW). Global Renewables is also set to sign

a contract to process the household waste of up to 1.4 million people in the English county of Lancashire, treating 600,000 tonnes a year.

The $100 million Eastern Creek Facility is designed to process some 175,000 tonnes of MSW a year. It diverts approximately 70% of household waste treated from landfill; uses mechanical and biological waste treatment technology to recover resources (plastic, glass, paper and metal recyclable materials); turns food and garden waste into high quality compost; achieves self sufficiency in recycled water; and processes the organic fraction of the waste to produce biogas to generate power for the Facility.

However, in the more than two years since the Eastern Creek Facility began accepting MSW from Sydney's Fairfield and Blacktown city councils, it has become clear that hazardous materials are consistently present in the waste stream and must be separated to ensure product quality.

As acknowledged by the recent Productivity Commission Inquiry[v], these toxic and hazardous materials can include:

- lead acid batteries;
- mobile phones, televisions and computers that contain toxic and heavy metals;
- pesticide, paint and household chemicals;
- gas cylinders;
- clinical waste from health services; and
- asbestos.

All of these toxic and dangerous materials are ending up in landfill sites across Australia.

A recent audit of waste received at the Eastern Creek Facility from a Sydney Council area revealed hazardous materials made up an average of 3.17 per cent of the household rubbish received over five days.[vi] Materials included batteries, insecticide containers, motor oil, medicines, syringes, tubing used for dialysis, computer equipment and gas cylinders.

Lead Acid Batteries – The Eastern Creek Experience

A 'common culprit' in terms of hazardous waste in MSW is automotive lead acid batteries (LABs) – classified as hazardous waste under Federal law. Used LABs contain lead, lead compounds and sulphuric acid. Compounds of lead are highly toxic for humans, animals and plants.

The potential scope of the problem can be seen in that it is estimated the replacement market for automotive type batteries in Australia is approximately 4.5 million units per year.[vii]

With a key component of the UR-3R Process® being the production of high quality compost or organic growth media (OGM) which conforms to Australian Standard 4454, Global Renewables actively works to mitigate the amount of hazardous materials entering the process. The pre-sort system at Eastern Creek identifies hazardous material such as car batteries and these are removed by hand. Any batteries that may enter into the separation building are captured and recorded in the main sorting cabin. Still, around 50 per cent of the batteries that are removed annually are already broken in the garbage collection trucks, unnecessarily increasing the lead and acid content of the compost.

Statistics maintained by Global Renewables indicate that up to 80 LABs enter Eastern Creek each day, equivalent to an average of 0.08 batteries per tonne. Using these figures, a report by consultants Warnken Industrial and Social Ecology[viii] estimates that, based on an annual throughput of 175,000 tonnes, some 15,000 LABs are being dumped in household garbage within the Eastern Creek catchment area of Fairfield and Blacktown councils. Statistics on LABs recovered during 2006 show these numbers are increasing.

Warnken also estimates that, assuming a constant material composition across Sydney, "up to 150,000 used automotive batteries are disposed of through household garbage collection services (in the city) each year".

These are being dumped in landfill sites that are not set up or designed to take hazardous waste. Their presence increases the risk of toxins leaching into groundwater, while the opportunity to recycle and retain materials from the batteries is also being lost. Each landfill then becomes permanently contaminated land on the basis of lead levels alone. It is a problem that extends across Australia.

What can be done?

Governments around the nation are grappling with the issue of finding appropriate locations to store hazardous or toxic waste. Earlier this year, the Victorian Government abandoned plans to establish such a site at Nowingi near Mildura. The decision came after the Government spent six years and more than $14 million considering four short-listed sites, all the subject of intense community opposition. It will continue to dump hazardous waste in two suburban landfills until 2020.

The Victorian Government has, however, moved to reduce the level of hazardous waste being dumped by announcing that the levy on toxic rubbish will rise from $26 a tonne to $250 a tonne. The Government estimates the tenfold increase will cut the State's hazardous waste that is dumped from 89,000 tonnes to about 40,000 tonnes within two years.

So where will the hazardous waste go? The Victorian Government is pinning its hopes on a yet to be developed technology to reduce toxic waste. However, it is not unreasonable to speculate that at least a portion of this will end up in the MSW stream, thereby increasing the volume of hazardous material that is already present in that stream.

Faced with a levy increase of more than 850 per cent, it is likely that unethical operators will dump increasing amounts of toxic materials into council kerbside collections, thus exacerbating the existing problem.

This likely consequence reinforces the view of Global Renewables that all MSW should be pre-sorted before landfilling to extract hazardous/toxic materials and limit the potential for them to infiltrate the soil, water and air. The difficulty in achieving this is the lack of will in those who control the MSW stream to abandon landfill as the preferred option. Put simply, it is cheaper to dump a tonne of MSW in landfill than to process it at an AWT Facility.

In the short term, the answer lies in Government leadership, that is policy and lawmakers accepting that the cost of utilising AWT is easily outweighed by the benefits. For example, the UR-3R Process® increases recycling rates by over 100 per cent, diverts at least 70 per cent of waste from landfill, reduces greenhouse gas emissions by around one tonne of carbon per tonne of MSW, generates renewable energy and is self-sufficient in energy and water.

For example, the European Union has introduced a landfill directive that will progressively increase the tax paid for MSW sent to landfill with local governments set a series of targets for diversion.

Here in Australia, there is no uniformity in landfill charges. Queensland and Tasmania have none at all, while the majority of States have levies that range between $3 and $6 per tonne. New South Wales is the exception; the State Government there has imposed a levy that, combined with the gate fee, makes the price of AWT competitive to landfill. The appropriate pricing does not have to be in the realm of Victoria's impending $250 toxic waste levy to make facilities like Global Renewables Eastern Creek UR-3R Facility (ignoring the environmental and resource recovery benefits) commercially more attractive.

At present, no landfill levy in Australia adequately reflects the true cost of landfilling – that is, the cost to the environment of unnecessary methane and leachate emissions, the cost to society of lost resources and embodied energy and the opportunity cost of land for which usage will be restricted for more than 100 years after its closure. Landfills are often justified as a means of rehabilitation of old quarries but, in reality, they cannot operate without a licence to pollute and, when closed, they leave behind a contaminated site.

In a 2004 study, Nolan ITU estimated the additional environmental cost of landfilling a tonne of waste in Australia over the environmental cost of AWT processing as $230 per tonne.[ix]

A higher gate fee for landfilling MSW would also act as a disincentive for those seeking to avoid the hazardous waste levy by dumping their toxic materials in the municipal stream.

The revenue collected from a higher landfill gate fee could also be used to help fund the roll-out of UR-3R type AWT infrastructure – providing obvious benefits such as diversion from landfill and reduced greenhouse gas emissions, but also installing a safety net to remove hazardous waste that is not caught by dedicated hazardous waste systems.

Our household waste systems must be redesigned as closed loop resource recovery systems and this requires systems to detoxify household waste streams. We need AWT infrastructure to deliver the technology based solution followed up with a campaign to educate and encourage people not to use their domestic waste collection as a repository for hazardous materials. This could involve specific household hazardous waste collections, the establishment of drop-off locations and retail take-back schemes with suppliers accepting returns of products such as lead acid batteries.

Conclusion

If Australia truly wants to get dinkum on contamination from hazardous waste then it needs to confront the problem from a number of angles, including the household waste stream.

The accelerated take-up of Advanced Waste Treatment technologies such as the UR-3R Process® through supporting funds derived from increased landfill levies/gate fees would:

- reduce the amount of toxic contaminants making their way through the MSW stream, into unsustainable landfills leaving a toxic legacy, infiltrating the soil, water and air;
- expose significant tonnages of MSW to a pre-sort process that creates a gatekeeper to help restrict the amount of hazardous materials ending up in landfill;
- increase the opportunity to retain and recycle these materials;
- provide a cost disincentive for unethical operators; and
- provide quality recycled organics, paper, metals and plastics that radically improve Australia's sustainability.

The landfilling of hazardous materials in MSW is literally a hidden problem; the question is how long can we afford to ignore it?

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[i] The United Nations Centre for Human Settlements
[ii] The UN Development Programme
[iii] OECD Environmental Data Compendium
[iv] Hyder Consulting, Waste and Recycling in Australia 2006
[v] Productivity Commission Report No. 38, Waste Management, October 2006
[vi] Waste Audit and Consultancy Services, Global Renewables Waste Audit Report , October 2006
[vii] Industry information supplied by Alan Hyde, Executive Officer of Australian Battery Industry Association. Numbers should be viewed as indicative only.
[viii] Warnken Industrial and Social Ecology, Battery Stewardship: Removal of Automotive Batteries from Municipal Solid Waste
[ix] Nolan ITU, National benefits of Implementation of UR-3R Process® A Triple Botton Line Assessment, 2004