RECYCLING AS A WEAPON AGAINST CLIMATE CHANGE

LOW COST, LOW RISK ABATEMENT

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1. Overview

1.1 Summary

Including landfill diversion and recycling in the Australian Emissions Trading Scheme will directly assist on the prevention of up to 2 billion tonnes of greenhouse entering the atmosphere over 50 years.[1] This can be done at low cost using existing proven technology.

Recycling in Australia today results in a total greenhouse benefit of over 8.8 million tonnes of CO2(e)[2] per annum. As an emissions reduction activity, it provides a significant contribution to the stabilisation of emissions and is greater than the average annual emission abatement achievements across all sectors throughout Australia reported from the base year of 1990 to 2005 (Australian Greenhouse Office, 2006), equivalent to taking 1.8 million cars off the road annually.

Increased recovery and recycling could contribute to reducing Australia's greenhouse emissions by more than 10%. Analysis by Warnken ISE shows a potential abatement in Australia of 37.8 million tonnes of CO2(e) and a maximum abatement of 56 million tonnes CO2(e).[3]

Overall, landfill emissions capture systems currently capture less than 30% of methane emissions (AGO 2007).. Significant abatement will be achieved if materials are kept out of landfill in the first place.

The avoidance of disposing waste to landfill and recycling are key weapons in the fight to avoid dangerous climate change. The application of appropriate policies to promote such activity will result in real and measurable reductions in Australia's greenhouse emissions.

With the exact details of the Emissions Trading Scheme (ETS) still to be determined, it is important for policy makers to recognise the legitimacy of landfill avoidance activities and the role they play in reducing greenhouse gases and fighting climate change.

The Australian Government should consider including the disposal of waste to landfill as a covered sector under the ETS.

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[1] Potential for Greenhouse Gas Abatement from Waste Management and Resource Recovery in Australia – Warnken ISE, Sydney Australia 2007

[2] Australian Recycling Values – a net benefits assessment. Hyder Consulting / Australian Council of Recyclers January 2008

[3] Potential for Greenhouse Gas Abatement from Waste Management and Resource Recovery in Australia – Warnken ISE, Sydney Australia 2007

Consideration should also be given to recycling and other activity not being covered by the ETS but rather they should be acknowledged as greenhouse gas abatement and offsetting activities, in which emissions credits can be accrued and traded under the ETS.

While matters such as measurement of net greenhouse gas abatement for avoided landfill and the energy savings through recycling need to be better accounted, such work is underway and such matters should not stop inclusion of landfill in the ETS.

The proposed approach will reduce greenhouse gas emissions through the uptake and expansion of the following measures:

- Reduced emissions by avoided landfill;
- Embodied energy savings from recycling;
- Recycling carbon in organics back to soil;
- Generation of energy from waste and;
- Improved landfill gas capture and use.

1.2 Waste to landfill

Biologically active materials disposed of to landfill such as food, garden, paper and wood waste products generate and emit greenhouse gases, including methane. Some of this methane can be captured through landfill gas capture systems, however that which is not, will still be a greenhouse problem in 50 to 70 years time.

Landfill gas is composed of between 40 to 60 per cent methane, which is widely acknowledged has a global warming potential of up to 25 times that of carbon dioxide, averaged over 100 years.

The 2007 Intergovernmental Panel on Climate Change (IPCC) report estimates that methane has a global warming potential 25 times greater than CO2. IPCC as a matter of convention uses a 100 year timeframe to measure global warming potential. However, methane has a life of just 12 years, therefore its early impacts are much greater. Using 20 years as the benchmark, methane global warming potential is up to 72 times greater than CO2 according to a recent study by Netbalance, based on IPCC figures.[4]

[4] Accounting for Methane - What are the issues and implications for waste management? Grant Bransgrove - Netbalance 2008 Commissioned by WSN

Methane packs a punch in the first couple of years after waste is buried. This means that reducing waste to landfill should be a high priority for policy makers because it provides an opportunity for significant short term benefit.

Given the unique situation in waste of long lags of up to half a century between the action of landfilling and the creation of emissions, priority must be given to action in this area today in order to avoid this becoming a larger part of the problem in the future

While emissions from landfill are about 3% of Australia's current emissions, if nothing is done they will form a larger part of Australia's emissions – landfill emissions capture is currently less than 30% and expected to rise to 36% by 2020 (AGO 2007).

If Australia sets an emissions target of 60% by 2050, the BAU projected landfill emissions of 46.9 Mt per annum at 2050 will then comprise about 25% of Australia's total emissions.

In addition to this problem is the level of greenhouse gas emissions generated through the amount of energy used to process and manufacture virgin materials, where recycled materials could be substituted instead.

The Australian Greenhouse Office has calculated that recovering resources from waste would reduce Australia's demand for electricity by 20 per cent.

Waste sent to landfill post 2010 should be categorised under the ETS as an activity that generates greenhouse gases, defining the landfills as stationary emitters and requiring the procurement and/or trading by these emitters of emissions permits.

The ultimate goal must be to phase out the disposal of food paper, garden and wood wastes in landfill. In addition to the ETS, other forms of market based instruments should be explored(including increased landfill levies which target non-emission externalities).

To more effectively manage the waste that is unable to be captured by recycling activity, the installation of gas capture and recovery systems for all landfills should also be mandatory even though such systems will not be able to capture the majority of landfill emissions.

1.3 Recycling and avoidance of landfill

Australia studies by Hyder Consulting and Warnken ISE, life cycle assessments completed for the Australian Greenhouse Office and a number of international

reports detail that recycling reduces greenhouse gas emissions from landfill, can reduce deforestation, saves energy and produces more energy efficient products.

Increased recycling activity and the diversion of waste from landfill could contribute to reducing Australia's greenhouse emissions by more than 10%. Analysis shows a potential abatement in Australia of 37.8 million tonnes of CO2(e) and a maximum abatement of 56 million tonnes CO2(e) per annum.[5]

Current recycling in Australia recovers 12.1 million tonnes of materials per annum. In net terms this reduces greenhouse emissions by almost 8.5 million tonnes a year, equivalent to an average benefit of 0.75 tonnes of savings per tonne of material recycled.[6]

Installation of new infrastructure based on existing technology could achieve an additional recovery of 13.5 million tonnes of resources a year. Improved resource recovery practices and waste management could deliver an abatement of 37.8 Mt CO2(e) per annum, which is a 6.7 per cent reduction on national net greenhouse gas emissions (2004 figures).[2]

Recycling not only avoids the landfilling of waste, it also results in embodied energy savings. Therefore the policy focus must be on promoting the greenhouse gas abatement benefits generated by avoided landfill and recycling.

It is acknowledged that potential allowable offsets that are tradable as abatement credits will need to meet appropriate additionality, permanence and measurement criteria. The measurement of net greenhouse gas abatement for avoided landfill should be based on a formula of one tonne of waste equaling one tonne of CO2e.

The allocation of property rights and ownership of such credits must also be determined so as to accurately reflect those who are responsible for generating the offsets. Work has commenced to establish rules and guidelines for property rights and ownership, as well relevant accounting and verification standards.

1.4 Co-Benefits

Inclusion of landfill in the ETS and policy support for greenhouse saving through recycling will bring significant co-benefits.

Economic benefits based on current industry estimates and programs such as Melbourne Metropolitan Waste and Resource Recovery Strategic Plan (which

[5] Potential for Greenhouse Gas Abatement from Waste Management and Resource Recovery in Australia – Warnken ISE, Sydney Australia 2007
[6] Australian Recycling Values – A net benefit assessment. Australian Council of Recyclers / Hyder Consulting Australia January 2008

identified opportunities for enhanced resource recovery and waste treatment) identify that the infrastructure required if Australia were to reduce waste to landfill by up to 75% would require $6 billion in investment and create more than 6000 new jobs.

Environmental co-benefits are generated through the avoided disposal of material to land and the opportunity to make products from recycled materials, using less energy and water. The Hyder net benefits report referenced earlier identifies that benefits include reduction in water consumption and use, improvement in water quality, enhanced bio-diversity, improved soil quality, extended landfill life, reduce pollution from landfill and increased production of renewable energy.

1.5 Recommendations

Commonwealth Government matters:

1. *Waste sent to landfill post 2010 to be a covered sector under the ETS and categorised as an activity that generates greenhouse gases, defining the landfills as stationary emitters and requiring the waste generator to procure and/or trade emissions permits.*

2. *The avoidance of landfilling biologically active waste and recycling to be categorised as a key greenhouse gas/carbon abatement and offsetting activity under the ETS, in which credits can be accrued and traded. This should also include an offset category for increasing soil carbon through the use of organic fertilisers.*

3. *Embodied energy saved through recycling should be recognized as credits / offsets within the ETS and related energy efficiency and renewable energy targets and related regulation.*

4. *Provide financial support to demonstrate the commercial viability of landfill avoidance projects, including EfW through the Low Emissions Technology Demonstration Fund and/or similar such government funding mechanisms.*

State Government matters:

5. *Imposing a ban on the disposal of biologically active materials and/or require the pre processing of all waste before entering landfill to recover resources and biologically stabilize the waste by 2020.*

6. *Increase landfill levies to more appropriately reflect the intended effects of making landfilling more expensive than the sustainable alternatives.*

7. *The application of a differential landfill levy based on whether a material is biologically active or inactive.*

8. *Mandatory installation of gas capture and recovery systems for all major landfills, including the closure of poorly run landfills in favour of fully engineered modern landfills with gas capture.*

2. The Greenhouse Impacts of Waste to Landfill – a long term problem

The most significant problem in disposing of certain types of waste to landfill is that it degrades and emits greenhouse gases for decades.

In particular, biologically active materials containing degradable organic carbon (DOCm) such as food, garden, paper and wood waste products will still be a greenhouse problem in 50 to 70 years time.

This waste produces high levels of landfill gas, consisting mostly of methane. Methane has a hundred year global warming potential of up to 25 times that of carbon dioxide based on Intergovernmental Panel of Climate Change assessments.

As noted earlier, the 2007 IPCC report estimates that methane has a global warming potential 25 times greater than CO2. IPCC as a matter of convention use a 100 year timeframe to measure global warming potential. However, methane has a life of just 12 years, therefore its early impacts are much greater. Using 20 years as a the benchmark methane global warming potential is up to 72 times.

In 2003/2004, the tonnes of waste material with DOCm generated in Australia totaled 16.4 million tonnes. Of this amount, 31 per cent was recycled and 69 per cent disposed of to landfill.

The disposal of materials with DOCm in 2003/04 will potentially generate 981,000 tonnes of methane, which carries a potential greenhouse liability of 20.6 million tonnes (Mt) CO2e.

The Australian Greenhouse Office estimates that the increasing amount of solid waste diversion (DOCm) up to 2020 will prevent the release of 13.7 MtCO2e of greenhouse gas emissions from landfill.

However to achieve this figure a recycling rate for DOCm of **72.5 per cent** would be required. Given that the rate of recycling in 2003/2004 was only 31 per cent, such a projection seems over optimistic, particularly in the absence of any mandated regulatory initiatives to recover resources or to divert biologically active waste from landfill.

The potential carbon liability arising from the business as usual disposal of materials with degradable organic carbon, ranges from 21 to 85 per cent of Australia's carbon budget at 2050, depending on the emissions reduction target.

2.2 Price signals for waste disposal

The price for landfilling of waste in Australia fails to reflect the true cost of such practice.

Recyclers and manufacturers compete with landfill facilities for recycled inputs and the trend has been for waste generators/collectors to direct their collections to landfill rather than to recycling and manufacture.

The reason for this activity is driven by price signals, with the benefit of sending waste to landfill outweighing any cost. While the price of landfill is lower, and the responsibility for generating the associated externalities remains unallocated, then there will continue to be little incentive to recycle and avoid landfill.

The states and territories have attempted to recognise and address this through the imposition of landfill levies, with NSW charging the highest levies. These levies have changed the value proposition in waste management, making resource recovery more financially attractive, however with the exception of those levied in NSW, they have uniformly been too small and had little impact on making landfilling more expensive than sustainable alternatives, such as recycling.

The potential costs of landfill to Australia's carbon budget are therefore significant and unless new strategies and policies are adopted in order to promote greater recycling of waste, then an increasing amount of Australia's carbon budget will not be available for future wealth generation both at the micro and macro levels.

Action needs to be taken to divert food, paper, garden and wood waste from landfill. It is predicted that such diversion would prevent up to 2 billion tonnes of greenhouse gas emissions (CO2e) from entering the atmosphere over a period of up to 50 years.[7]

3. The greenhouse benefits of recycling and avoided landfill

Recycling commodity materials in Australia results in a total greenhouse benefit of over 8.8 million tonnes of CO2(e) per annum[8]. As an emissions reduction activity, it provides a significant contribution to the stabilization of emissions and is greater than the average annual emission abatement achievements across all sectors throughout Australia reported from the base year of 1990 to 2005

[7] Ibid

[8] Australian Recycling Values – a net benefits assessment. Hyder Consulting / Australian Council of Recyclers January 2008

(Australian Greenhouse Office, 2006), or equivalent to taking 1.8 million cars off the road annually.

The use of recycled materials in manufacturing processes also provides for a reduction in the amount of energy and virgin materials used. For example, by recycling paper and cardboard Australians avoid 51% of the environmental impact of using virgin material.

By recycling 1,000 tonnes of paper and cardboard the environmental savings are as follows:

Energy savings –	18,000 Gigajoules of energy or enough energy to power 833 homes for a year
Landfill reduction –	3,231 cubic metres of landfill
Greenhouse benefits -	400 tonnes of CO2, the equivalent of removing 96 cars off the road for a year.
Water savings -	23,700,000 litres of water

Increased recovery and recycling could contribute to reducing Australia's greenhouse emissions by more than 10%. Analysis shows a potential abatement in Australia of 37.8 million tonnes of CO2(e) per annum and a maximum abatement of 56 million tonnes CO2(e) per annum.[9]

3.1 Avoided emissions by avoided landfill

Using Australian Greenhouse Office calculations to estimate the avoided emissions from diverting the 10.5 million tonnes of paper and cardboard, garden organics, food and wood disposed of to landfill, up to 18 million tonnes of avoided Co2-e[10] could be achieved.

3.2 Embodied energy savings from recycling

The Australian Greenhouse Office has calculated that recovering resources from waste would reduce Australia's demand for electricity by 20%.

Recycling delivers a net energy saving as there is less embodied energy in recycled material than comparable virgin products.

[9] Potential for Greenhouse Gas Abatement from Waste Management and Resource Recovery in Australia – Warnken ISE, Sydney Australia 2007

[10] National Emissions Trading Scheme – Opportunity for Recycling as Carbon Abatement – Warnken ISE, Sydney Australia 2006

Indicative embodied energy savings for the recycling of paper and cardboard, glass, aluminium, steel and plastic are as follows:[11]

Paper and cardboard saves 13 giga-joules (GJ) per tonne recycled (virgin=36.4 GJ/tn, recycled=23.4 GJ/tn)

Glass saves 7.2 GJ per tonne recycled (virgin=12.7 GJ/tn, recycled=5.5 GJ/tn)

Aluminium saves 152.5 GJ per tonne recycled (virgin=170 GJ/tn, recycled=17.5 GJ/tn)

Steel saves 21.9 GJ per tonne recycled (virgin=32 GJ/tn, recycled=10.1 GJ/tn)

Plastic saves 69.5 GJ per tonne recycled (virgin=90 GJ/tn, recycled=20.5 GJ/tn).

There are also significant water savings that result from recycling. Greater water savings in particular are available for the recovery of paper and cardboard, which is generally a water intensive process due to the wood pulping process for producing from virgin fibres.

The water savings associated with recycling activities in Australia are close to 134 GL per annum[12]. Such savings would increase proportionally with greater recovery and recycling of products, including paper and aluminium.

Based on a volume of 2.5 million litres to fill an Olympic size swimming pool, recycling in Australia results in water savings equivalent to almost 54,000 Olympic swimming pools each year.

3.3 Recycling carbon in organics back to soil

Australia currently uses 6 million tonnes of chemical fertiliser per annum. The generation of nitrous oxide from fertilizers is a major greenhouse gas, and it can be released from soil through the over-use of nitrogenous fertilizers coupled with certain seasonal conditions.

The application of chemicals to farm soils harms their function, and the use of chemical fertilisers has resulted in soil becoming a net source of greenhouse gas.

This reliance on chemical fertilisers could be replaced by production and use of organic fertilisers through diverting degradable organic carbon waste from landfill and other sources.

[11] Ibid
[12] A net benefit assessment of Australian Recycling Values, Hyder Consulting, Australia 2007.

Organic fertiliser provides an opportunity to increase and retain soil carbon and supply a source of nutrients for plant growth.

The outcome would be that farmland could be used either expressly or partially for carbon sequestration.

There are already companies utilising technology that can turn degradable organic waste into material for use in soil conditioning. This includes alternative waste treatment (AWT) which involves a mechanical biological treatment process that treats municipal solid waste through integrated sorting, biological digestion and composting processes.

The AWT process separates and cleans the organic fraction of household waste, returning carbon to the soil through producing agricultural fertiliser.

Under the Australian Soil Carbon Accreditation Scheme trial, farmers are receiving soil carbon incentive payments for every tonne of carbon they sequester, using perennial plant species that have significant biomass in their root systems. The intention (or hope) is that soil carbon sequestration will be included under the ETS.

To complement this activity, increasing soil carbon through organic fertilisers, or avoided use of fossil fuel based fertilisers, should be categorised as an abatement activity and an allowable offset under the ETS.

3.4 Generation of energy from waste

The generation of energy from waste (EfW) provides a clean, reliable and renewable source of energy.

For every tonne of waste processed into energy, almost one tonne of greenhouse gas is avoided, resulting in a net greenhouse gas reduction.

Over the past 25 years, the EfW industry has developed state of the art technology that makes EfW one of the cleanest forms of energy generation.

EfW plants throughout Europe and the United States combust municipal, industrial and clinical waste, providing a safe and effective solution for managing waste, resulting in a reduced reliance on landfills.

EfW processes can reduce municipal solid waste to less than 10% of its original volume.

The United States Department of Energy states that turning garbage into energy makes 'important contributions to the overall effort to achieve increased renewable energy use and the many associated positive environmental benefits'.

In Australia renewable energy from waste is primarily generated through the use of solid waste derived fuels (primarily wood/timber) in power stations and cement kilns, and through the anaerobic digestion of food and other organics.

Policies designed to avoid landfilling waste in Australia will provide further incentive for research and development and capital investment in EfW technology and infrastructure.

EfW projects which will clearly deliver long term large scale greenhouse gas emissions reduction should also be eligible for financial assistance from the Australian Government's *Low Emissions Technology Demonstration Fund.*

Investment that may presently be considered marginal will become more attractive and economically efficient relative to investment in other power generation activity.

3.5 Improved landfill gas capture and use

The greenhouse gas intensity of landfill gas provides a strong imperative to capture it prior to release to the atmosphere.

There is significant short term opportunity for the capture of methane and its conversion to energy. Landfill gas has an energy value that can be used to generate electricity, converting methane into carbon dioxide and lessening the greenhouse impact.

Gases from landfill can and are being converted into energy sources. For example, in Britain, landfill gas makes up a quarter of the country's renewable energy, giving electricity to some 900,000 homes.

An estimated 8.583 million tonnes of CO2e impact could be prevented through better capture of landfill gas and increased generation of electricity. Up to 7.5 million tonnes CO2e of this total would be saved through better capture of landfill gas.

The remaining 1.083 million tonnes CO2e abatement would be created through the offset of fossil fuel emissions by using half of the gas captured to generate 1,000,000 MWh of electricity.[13]

[13] Potential for Greenhouse Gas Abatement from Waste Management and Resource Recovery Activities in Australia, Warnken ISE, Sydney Australia 2007

4. Economic Benefits of Increased Recycling and Avoided Landfill

In 2006, the Australian recycling industry had a turnover of $11.5 billion, contributing 1.2 per cent of Australia's GDP, and a capital investment of over $6 billion.

The industry directly employs approximately 10,900 Australian workers and indirectly employs another 27,700.

This investment and employment has a number of direct and indirect benefits conservatively estimated at $55 billion.[14]

Apart from the significant environmental and social benefits to be achieved from diverting so-called 'waste' from landfill and using it to make new products, there are also economic benefits and dividends.

The inclusion of landfill avoidance and recycling activity as a carbon abatement/offset activity under the ETS would result in monetizing the prevented greenhouse gas emissions from the diversion of DOCm from landfill. This would provide a direct incentive to those businesses that recover value from DOCm that would otherwise be disposed of to landfill.

This would provide the impetus for major additional investment in new/emerging and existing industry, including resource recovery and recycling in areas such as organics, wood residue, waste paper, plastics, glass and metals. We know that such investment is justifiable on environmental grounds; however it must also be underpinned by economic efficiency.

The recognition of recycling as a tradable offset would also provide an additional market mechanism by which the economic value of recycling can be further quantified. This will also ensure continued investment in the necessary capital to improve recycling technology and to find new and innovative ways to efficiently collect and recycle both commercial and household recyclables.

It is estimated that a $6 billion capital investment to rollout 30 to 40 major recycling plants across Australia would divert over 10 million tonnes per annum of putrescible waste from landfill and at least 18 million tonnes per annum of greenhouse gas reduction. Such investment would create approximately 6,000 new direct jobs.

Trial projects in partnership with federal, state and local government have been proposed by industry to demonstrate that local government can commercially bridge the gap between low landfill fees and the higher processing cost of large

[14] A net benefit assessment of Australian Recycling Values, Hyder Consulting, Australia 2007.

recycling through profit sharing the revenue from new aftermarket products and carbon credits/offsets.

Such projects, which will clearly deliver long term large scale greenhouse gas emissions reduction, should receive financial assistance from the Australian Government's *Low Emissions Technology Demonstration Fund (LETDF)*

Landfill avoidance projects, particularly those focused on recycling, lead to avoided landfill gas emissions and embodied energy savings. This satisfies the stated objective of the LETDF to 'deliver long – term large – scale greenhouse gas emission reductions'.

5. Summary of Recommendations

The most effective solution to reduce or eliminate the carbon liability of landfill is to prevent materials with degradable organic carbon from being landfilled and instead recycled. The range of initiatives that could deliver on this objective include:

1. *Waste sent to landfill post 2010 to be a covered sector under the ETS and categorised as an activity that generates greenhouse gases, defining the landfills as stationary emitters and requiring the waste generator to procure and/or trade emissions permits.*
2. *The avoidance of landfilling biologically active waste and recycling to be categorised as a key greenhouse gas/carbon abatement and offsetting activity under the ETS, in which credits can be accrued and traded. This should also include an offset category for increasing soil carbon through the use of organic fertilisers.*
3. *Impose a ban on the disposal of biologically active materials by 2020 and require the pre processing of all waste before entering landfill to recover resources and biologically stabilize the waste.*
4. *Increase landfill levies to more appropriately reflect the intended effects of making landfilling more expensive than the sustainable alternatives.*
5. *The application of a differential landfill levy based on whether a material is biologically active or inactive.*
6. *Embodied energy saved through recycling should be recognized as credits / offsets within the ETS and related energy efficiency and renewable energy targets and related regulation.*
7. *Mandatory installation of gas capture and recovery systems for all major landfills, including the closure of poorly run landfills in favour of fully engineered modern landfills with gas capture.*
8. *Provide financial support to demonstrate the commercial viability of landfill avoidance projects, including EfW through the Low Emissions Technology Demonstration Fund and/or similar such government funding mechanisms*

These recommendations will support and underpin one of the key pillars that the Australian Government has built its climate change policy on, namely the reduction of Australia's greenhouse gas emissions.

They also fit with the Climate Change Minister's stated intention to deliver measures to reduce greenhouse emissions at least cost, and with the greatest potential to drive new growth, create jobs and develop new industries.[15]

[15] Senator the honourable Penny Wong, Minister for Climate Change and Water, address to the Australian Industry Group, 6th February 2008, Melbourne, Australia.

Participant Details

The following companies have joined together to advance the understanding of diversion from landfill and recycling as a weapon against climate change.

VISY

The VISY group is committed to recycling and the environment. It has grown to become the world's largest privately owned packaging and recycling company, with 8,000 employees in more than 100 packaging factories and recycling sites across Australia, New Zealand and the USA. The Visy group now operates eight paper recycling machines - six in Australia and two in the USA. Together these machines produce more than 1.2 million tonnes of 100% recycled packaging paper annually. VISY was voted Australia's leading company for environmental performance in the Sydney Morning Herald and Age newspapers' annual corporate reputation index for four consecutive years.

Contact: Nicholas Harford, General Manager, Environment

ACT Recyclers

ACT Recycling Pty Ltd commenced operations in April 2003, through the recycling of fill, rocks and asphalt using a screen, rollers and loader. The company has expanded to include crushing plant, sorting plant, 8 machines and 20 staff. Since then managements main focus was on developing a sorting process for C & D waste to extract materials for recycling and commissioning a crushing plant for the processing of materials extracted. The company spent 3 years designing, developing and constructing our innovative sorting plant, and commissioned it in October 2007. The plant sorted through 8000 tonnes of construction and demolition waste and achieved a recycling rate of 96%.The combined operation of the company's sorting and crushing plants has seen the company achieve a consistent recycling rate above 98%. Our facility has proven that landfilling this type of waste serves no purpose as most materials are valuable resources.

Contact: Tanya Zantis

Global Renewables Limited

Global Renewables is a leader in sustainable business which delivers economic, social and environmental results by reducing, reusing and recycling municipal waste and improving carbon efficiency. Global Renewables provides innovative technological solutions to the growing problem of municipal solid waste in order to significantly reduce greenhouse gas emissions and contributes to a sustainable environment for the benefit of all, while delivering a positive economic return to shareholders.

Contact: John White

WSN Environmental Solutions

WSN Environmental Solutions provides responsible recycling, resource recovery and waste management services to the greater Sydney area and beyond with a network of 12 waste and recycling facilities, kerbside collection and commercial waste management services. WSN currently employs 380 people and in 2005-2006 processed over 1,900,000 tonnes of waste. In 2004, WSN partnered with GRL to open Sydney's first alternative waste processing facility at Eastern Creek. In July 2008 WSN will open Australia's largest fully integrated resource recovery site for household waste in Sydney's south west, with an alternative waste processing facility capable of diverting around 70% of household waste from landfill.

Contact: Ken Kanofski, CEO, WSN Environmental Solutions