Jonkhoff: we remain committed.

DESSO: proving it by doing it

There is a group of business leaders engaged in the debate on the future of the world economy that believe it's distinctly circular in nature. Chief among them is Desso, the European company possibly known more for its commitment to Cradle to Cradle (C2C) principles than its carpet tiles and broadloom, although its products are extraordinary. The company has now set its sights on Australia and will work with Sustainable Business Australia to assist in the uptake of circular economy principles here. The new managing director of Desso, Roland Jonkhoff, spoke to *WME*'s Paula Wallace.

***WME*: What are some of Desso's current sustainability objectives and targets?**
RJ: One of Desso's key targets is to develop products from positively defined materials, as defined in the C2C health and environmental criteria. This is vital in order to create a closed loop system that is non-toxic, healthy for the planet and for people. Already we have exceeded our 2016 target for positively defined material in our commercial carpet tiles. When you look, for example, at a product like our Cradle to Cradle Silver Certified AirMaster carpet complete with our C2C EcoBase backing, you will find that (as calculated by the weight of the materials) more than half of the materials that go into this product consist of recycled input and around 70% is made up of materials that can be safely recycled in our own supply chain.

We also have other targets around material health, recycling, renewable energy, water stewardship and social fairness.

We will continue to play a major role supporting the agenda towards the circular economy. As always, we hope to do that through proving it by doing it, the best way to convince others. We remain committed to the Circular Economy 100, the World Economic Forum's Project MainStream and other related projects.

***WME*: Can you provide an update on your LIFE program and how you are progressing with finding solutions to some of the technical challenges to recycling/repurposing material?**
RJ: We have made progress in developing positively defined content across all our product lines, enabling us to be able to recycle in a way that is consistent with C2C principles. We also continue to discover new ways to develop C2C material streams. For example, over a three year period, our R&D team collaborated with Reststoffenunie, a collective shared service centre of the Dutch Water Supply Companies, to find a way to upcycle re-engineered calcium carbonate (chalk) from local drinking water companies.

As a result of this collaboration, we began purchasing the new material in Q4 2014. This material is positively defined in accordance with C2C criteria. Now, our products with EcoBase backing contain on average 50% positively defined recycled content. Next to that, it will also be rolled-out for Desso's bitumen-backed carpet tiles this year.

With the help of the subsidy we have received from the EU's LIFE program, we have been able to further develop and optimise our separation and recycling processes in order to achieve a higher level of purity. The new plant is scheduled to open in September this year.

***WME*: Australian industry has not been as progressive as some parts of Europe in adopting sustainable materials/circular economy models of doing business; however, our market for commercial green buildings has been developing over the last decade. How has the Desso offering been received in Australia?**
RJ: The market for commercial green buildings is well established in Australia; however, from a supply chain perspective there is a lot of confusion around what is an environmental and socially sustainable product. There is a plethora of eco labels and supplier led claims which has created a lot of mistrust.

That said, the concept of circular economy powered by C2C principles has been well accepted when explained to key participants in the commercial property sector. They have spent the last decade working on performance based sustainability outcomes such as energy and water efficiency and have now turned their full attention to the health and wellbeing of occupants.

We have been developing products that contribute to better indoor air quality for occupants, for example the DESSO AirMaster. This product represents a new sustainable business model for economic growth that generates wealth within the means of the planet's resources and where innovation leads to products that contribute to people's health and wellbeing.

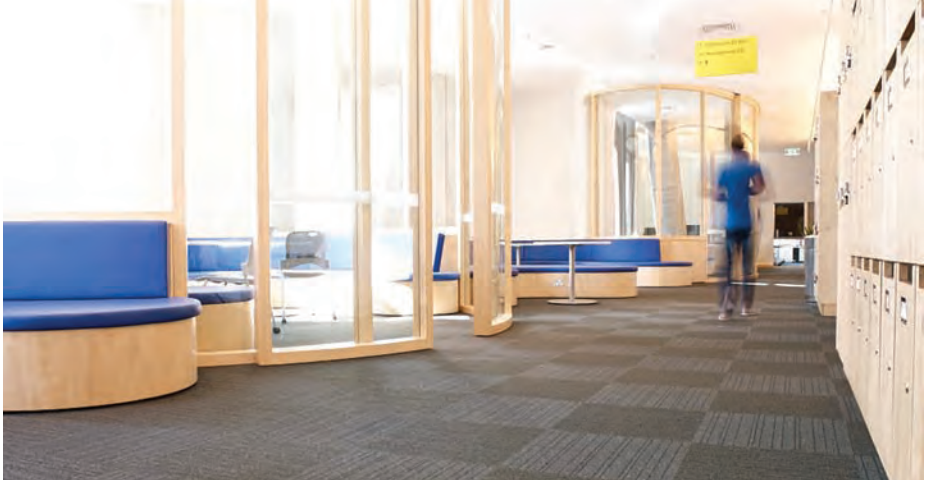
***WME*: There are some limitations in Australia in regard to take back and recycling given our geographical distance from many of the reprocessing facilities that are located in Europe or the US. What has been your experience and are your schemes expensive for Australian customers?**
RJ: Sure, in many ways the Australian market is perceived as too small for major

'take back' programs. Circular economy powered by C2C has shown us the value of designing products that enable regenerative manufacturing. This means being able to manufacture the same product over and over again as opposed to implementing recycling programs which aim to create a new waste stream and make something else altogether.

Desso already offers to take back used carpet tiles through its Take Back program. Despite the environmental impact of transporting the material from Australia to the Netherlands, this still gives a positive impact over landfill and waste incineration.

If the transportation can be organised based on larger volumes of recyclable carpet tiles, then this approach also becomes economically feasible.

***WME*: What do you see as the challenges in the Australian market to circular economy models of doing business and what are your strategies for this market over the next 12 months?**



Desso AirMaster carpet has been used throughout the UTS Chau Chak Wing building in Sydney. The patented technology of this carpet captures and retains hazardous particulate matter, making it eight times more effective in capturing and retaining fine dust than hard flooring and four times more effective than standard carpet solutions.

RJ: Our biggest challenge will be industry understanding and the ability to cut through some of the greenwash that exists in the market from a supply chain perspective.

In particular, understanding by specifiers, building owners and corporate end users that it is no longer good enough to accept claims of green from suppliers based on eco performance. Instead, they need to demand transparency in what products are made of and where they come from.

For major corporate clients, they will have the opportunity to 'lease' their carpet products, whereby the responsibility of maintaining our raw material supply chain stays with Desso and the preservation of often a major capital expense is avoided – simply a win for the client and a win for our precious finite resources. WME

What's the business case for the circular economy?

Sustainable Business Australia (SBA) will draw on the tools, resources and support of the World Business Council for Sustainable Development (WBCSD) and business leaders such as Desso to undertake an exciting new venture, writes SBA chief executive Andrew Petersen.

Analysis by McKinsey in 2014 estimated shifting towards circularity could add $US1 trillion to the global economy by 2025 and create 100,000 new jobs within the next five years.

Under the European Union's Waste & Resources Action Programme's Circular Economy 2020 Vision, a circular economy approach could realise an improved trade balance of £90 billion and the creation of 160,000 jobs.

Manufacturers, given their reliance on raw materials, are most likely to reap the quickest benefits. McKinsey argues that a subset of the EU manufacturing sector could realise net materials cost savings of up to $630 billion per annum by 2025.

Business innovation in this field is already underway with companies, including Desso and Unilever, embedding business models based on leasing, product performance, remanufacture and extended lifecycle thinking.

Business-led initiative in Australia

As the Australian Network Partner of the WBCSD, SBA sees an opportunity for Australian businesses to explore the commercial and environmental benefits of the circular economy.

SBA will announce its commitment to establishing an Australian presence for WBCSD's Safe and Sustainable Materials Cluster and launch a dynamic work plan for 2015 – 2017 at the World Resources Forum – Asia Pacific 2015.

The underlying premise is the WBCSD Vision 2050 Materials Pathway, culminating in the objective of "not a particle of waste".

The WBCSD is developing a business solution for a framework tool to assess the sustainability of product portfolios and share international best practice and lessons learned to help implementation across corporate functions.

SBA will draw on the tools, resources and support of the WBCSD and undertake Australian cross-sector engagement to:

- identify market drivers and opportunities based on performance/service based models;
- investigate policy hurdles and enablers needed to accelerate change;
- ascertain the success factors for effective collaboration;
- understand the critical supply/demand elements; and
- develop a clearing house for key learnings and best/next practices from Australian company examples.

Desso has joined SBA as part of the Governing Council that will drive this work plan.

The resource revolution: activating the transition

We've had the industrial revolution, the green revolution and the knowledge revolution. Now we're on the cusp of the resource revolution and there are many opportunities for Australian businesses, write Damien Giurco and Christine Wardle.

Our post-war industrial system was built on the premise of 'dig it up, process it, consume it and dump it'. But with increasing global competition from emerging nations and diminishing access to raw materials through depletion of natural resources, businesses face a future where supply risks are likely to outpace demand. Revolutionising the efficient and effective use of resources offers a more sustainable future than 'business-as-usual'.

Establishing a circular economy offers businesses the opportunity to reduce material risks and guarantee supply through a continuous loop of resource management.

By moving away from built-in obsolescence and designing for recovery, manufacturers can collaborate with other sectors to cycle products through consumption and end-of-life and effectively manage and secure their own material feedstocks. With greater coordination between sectors and across the economy generally, combined with innovation in systems and technology, comes a better understanding of markets, new job opportunities and improved business economics.

Sector-by-sector roles – Christine Wardle

Each sector has a role to play in innovating for the future of a circular economy:

• **Designers:** Designers need to re-set definitions of good design and marketability. A product that is designed for efficiency, longevity and has less product complexity results in a smaller life cycle 'footprint', using fewer resources in production and use. This is the benchmark for a good design outcome.

• **Manufacturers:** Manufacturers can minimise leakage of resources through the production process (including raw materials, energy and water). Manufacturing processes can be reconfigured so that by-products and excess heat have secondary uses. A process that uses recovered resources and operates efficiently will reduce supply risks and is better able to compete in global markets.

• **Retailers:** Retailers can decide to sell either a product or the service derived from the product. Increased product longevity and higher levels of service can lead to improved relationships with consumers, building brand loyalty and maintaining profitability. Product stewardship systems can be operated to recover products designed and manufactured for recovery and reuse.

• **Users:** Consumers become both users and suppliers of feedstock, sharing or renting products or buying products which have an incentive for return at their end-of-life. Purchasing decisions are based on information about whole-of-life impacts derived from transparent supply chains. Recovery of resources becomes automatic through sophisticated material management systems.

• **Material managers:** Recycling companies become material managers. Through improved cross-sectoral material recovery collection costs can be reduced, meaning material recovery becomes about value not volume. Fostering partnerships with manufacturers will allow direct re-supply of materials.

The potential benefits of the circular economy are significant. It will include a wave of innovations, productivity improvements and employment in growth sectors of Australian business, while increasing competitiveness in international markets. This can build long term resilience in the Australian economy.

Christine Wardle is managing director, Blue Environment Pty Ltd.

Australia to host World Resources Forum – June 1-3

"The vision in 2030 is that we have people across the world recognising Australian innovators for bringing together partners to develop solutions which improve people's lives and the environment," Damien Giurco said.

To this end and to coincide with the first World Resources Forum Asia-Pacific being held in Australia, researchers from the Wealth from Waste Cluster are launching an *Action Agenda for the Circular Economy* on June 2. Important themes include a focus on resource productivity as well as energy productivity, collaborative business models for a digital age and renewing stocks by rethinking value. The aim is to raise awareness of the circular economy among industry leaders and policy makers and build a coalition for action.

The World Resources Forum (WRF) is the global science-based platform for sharing knowledge about the economic, political, social and environmental implications of global resource use. The event will take place in Sydney, June 1-3, co-hosted by the Institute for Sustainable Futures at the University of Technology, Sydney (UTS) and SMaRT@UNSW.

For more details and to become involved see www.wrforum.org; www.wrfasiapacific2015; and www.wealthfromwaste.net

Vision for Australia – Damien Giurco

By 2030, "Production and Consumption 2.0" will be upon us; digitally enabled, responsible supply chains, designed for product and material use across multiple use cycles (take-make-recreate) and with the continued rise of access over ownership. Economic growth underpinned by cheap access to natural capital exchange for manufactured capital is yesterday's model and will require radical transformation to restorative products, services and systems.

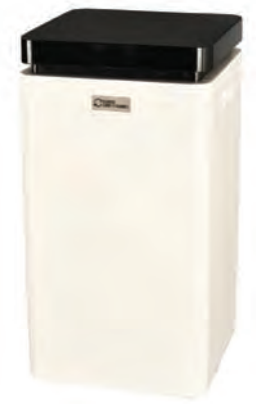
Think for example of electric vehicles which also clean up urban air pollution from traditional vehicles as they drive; which utilise batteries designed for a second life as precinct or home-energy storage; or where even the battery ingredients such as lithium (or newer battery chemistries available in 2030) are leased to facilitate closed loop cycling of materials. Australian firms must be part of generating value from supplying materials, know-how and technology and supporting systems for shaping future takeback, re-use and recycling.

Currently we collect waste and take it to a central location for processing – why not leverage our Australian know-how in the mining equipment and technology sector and conquer the e-waste challenge by developing a mobile e-waste recycling facility that brings the reprocessing infrastructure to the waste? Recovered materials and metals could offer a niche supply to local 3D printing hubs. This just requires an expansion of our view of 'resources' to include those above ground.

While the US dominated the auto-revolution last century and Tesla is making great strides, the Chinese are positioning to dominate the clean energy revolution this century – and have enacted circular economy legislation at a local, regional and national scale. Last year the Shanghai Metals Market launched a secondary metal pricing platform. Australia must find its seat at this table of opportunity now. I'd rather we were coupling renewable energy to metals manufacture to export sunshine in steel and aluminium ingots, than waiting for Chinese firms to dominate the development of turnkey metals management solutions, boosting scrap use and further negating the need for our iron ore.

But more than just recycling, the circular economy is about renewing stocks of natural capital and rethinking value – aligning economics to support long-term ecological and social value. The importance of understanding our ecological assets via national environmental accounting has been highlighted by the Wentworth Group of Concerned Scientists. Furthermore, the circular economy can harness the skill base of our ageing population, for example, the Men's Shed in Altona Melbourne has refurbished over 600 computers, thus extending its social value by seizing opportunities to take-make-recreate.

Damien Giurco is research director at the Institute for Sustainable Futures.



Closed Loop offers a range of commercial and household composting technologies that can convert organic waste to compost in 24 hours.

Closed Loop sees big future in organics

With roots in the packaging game, Closed Loop is diversifying its business to capture a slice of the growing market for recycled organic material. Paula Wallace speaks with the company's chief Robert Pascoe.

Closed Loop evolved out of large packaging corporation, Visy Recycling, in the 1990s. Under the Visy banner, it transformed an existing recyclable hamburger clamshell into a unique environmental product, with a recycling program attached. The idea caught the eye of sustainability minded individuals in entertainment and sport keen to source recycling solutions for their events. The Closed Loop concept of 'renting' recyclable packaging took control of inputs and outputs, and a highly successful recycling program for business was born.

Closed Loop was independently launched in 2001 after its involvement as a key waste sponsor of the Sydney 2000 Olympic Games, where it helped achieve a record Olympic landfill diversion rate of more than 70%.

Making packaging to fit with Closed Loop's range of recycling solutions is still the core part of the business – around 60% of revenue but it's diminishing. The organics division (leasing and sale of organics machines) accounts for around 15% at present; with the environmental consulting and media/marketing production side of the business generating around 10-15% apiece.

Pascoe: fear is the biggest barrier to sustainability.

"The whole purpose of Closed Loop is that it's a concept," Robert Pascoe told *WME*. "The concept is about treating waste as a resource and you're using that resource to put back," he said whether it's into a packaging product or as nutrients in the soil.

Traditionally, the concept has played out through plastics recycling, namely PET which Closed Loop recycles and then manufactures into products used by organisations such as NSW Health, airline QANTAS, and fast food retailer KFC.

However, the focus of the business in the last few years has turned to the organic waste stream.

"I'd expect that within the next two years that organics and resource management consulting side of the business … those two areas alone will be around 60-70% of our business and packaging will go to less than 20%," said Pascoe.

Why organics?

"In the food service industry, if we're trying to eliminate waste going to landfill, a big chunk of our waste is organic waste because we're working predominantly in the food service industry," he said.

"We're turning the organic waste into a compost and then using that compost to put back onto gardens to grow products to bring back into the catering stream," he said, adding that Closed Loop showcases this at its own farm and restaurant facility, located just past Geelong, Victoria. About one hour's drive from Melbourne, the Farmer's Place is a proof of concept site and a brand name that Pascoe would like to replicate around Australia.

Separate to the Closed Loop business, Pascoe has also established a non-profit social enterprise, City Harvest, which commenced in Melbourne last year and is planning to come to Sydney.

City Harvest collects organic waste from restaurants that they have processed either through a Closed Loop machine or alternative technology and then take it to a community garden where vegetables and compost are then generated for sale back to restaurants. Closed Loop pays a fee to City Harvest for this service.

"It's a micro version of the Farmer's Place in the city. City Harvest is a great opportunity for our organics unit customers want an outlet for the compost they are producing … it's also gives them a great marketing opportunity," he said.

The social and environmental benefits of processing organics onsite is a compelling reason for some businesses to buy or lease the technology to enable the process but also, according to Pascoe, to set up their business as potentially a "zero waste".

Does Pascoe forsee pushback from traditional waste contractors?

"The whole concept to what we're trying to do here is partner with the waste industry but instead of transporting waste, transporting resources," he said, arguing that there would still be demand for transport services and that in 10 years time there won't be any organic material entering landfill.

"This is not me saying this because I want to sell organics machines, this is because … it's a waste of a resource … it doesn't make commercial sense for us to bury that product at the scale we do".

He said regulation will drive some of the shift in practices around organics, especially landfills operated by council seeking to extend life.

"We've already proven that it [household recycling machines] would be a lot cheaper than sending organic waste to a windrow composting facility somewhere," said Pascoe.

"The biggest barrier to entry, it's not that recycling costs more, it's purely about the age-old thing of change … fear, people are really concerned about changing the way they operate or it's going to have some negative impact on their business," said Pascoe, adding that projects like Farmer's Place can effectively counteract these fears. WME

Major boost for Australian-made recycled paper

Australian Paper's $90 million facility at Maryvale Mill has started producing recycled copy paper and will soon extend into envelope and printing papers, writes Paula Wallace.

Australian Paper's wastepaper recycling and de-inking plant in Victoria.

The company says the facility, located in Victoria's Latrobe Valley, is the only premium wastepaper recycling and de-inking plant in Australia. The plant will take up to 80,000 tonnes of wastepaper out of Australia's landfills each year, which is enough to fill a tennis court to more than twice the height of the Eureka Tower.

"The company actually recycled the decommissioned wastepaper de-inking plant from the Fairfield Mill in Victoria, saving the energy which would have been involved in manufacturing a new plant from scratch or in scrapping the old plant," Australian Paper senior marketing manager, sustainability Craig Dunn said.

The process of the old plant was evaluated, reconfigured and the the plant was re-engineered and re-purposed to suit the new layout and process configuration.

Australian Paper also utilised additional de-inking technology through its parent company Nippon Paper and added this to the plant to improve the end quality of the recycled pulp. Australian Paper is a member of the National Carbon Offset Standard Carbon Neutral Program and, as part of its Life Cycle Inventory, will be assessing the carbon footprint associated with the recycling process. However, it has already established that the new process configuration is more energy efficient than the previous operation at the Fairfield Recycling Centre.

"We are committed to meeting the growing demand for premium, local recycled paper," Australian Paper chief operating officer Peter Williams said.

"It is a vital part of our future operations and we thank everyone who has made this investment in regional Victorian manufacturing possible.

"We received project funding from the federal and Victorian governments and letters of support for the project from Planet Ark, Green Capital and a number of our key customers."

Planet Ark's CEO Paul Klymenko applauded the initiative, calling it a "great win" for recycling.

"The Australian government has specified that it will purchase 100% recycled papers from July 1 this year and we are hopeful that all government departments, federal and state, will recognise the sustainability advantages of Australian-made 100% recycled paper over imports when making their purchase decisions," he said.

"The current Australian market demand for recycled content office papers is only one third of the new plant's capacity, so we need everyone's help to lift the demand for Australian-made recycled content paper and do the right thing for our local environment."

The construction phase of the plant has supported almost 1000 Australian jobs and ongoing operations will provide flow on employment for around 250 people, mostly in the local manufacturing and wastepaper collection industries.

Australian Paper hopes demand will grow for Australian-made recycled content paper.

Closing the loop

The environmental benefits of this project are significant. Importing recycled paper made overseas adds to Australia's waste burden and also generates significant sea-freight emissions.

"In contrast, removing 80,000 tonnes of wastepaper from Australia's landfill saves up to 200,000 tonnes of carbon emissions every year, which is equal to taking more than 70,000 cars off Australia's roads," Williams said.

From this tonnage of waste paper, the company aims to produce 50,000 tonnes of recycled pulp.

Australian Paper is sourcing wastepaper from a network of paper recyclers on the east coast and has already stockpiled more than 30,000 tonnes of wastepaper for processing.

"The majority of the waste generated by the plant will be in the form of filler, fibre, ink and toner. These outputs are being composted together as a soil conditioning agent," Dunn said, adding that the plant would also screen out contaminants such as plastics and metals which would be sent to landfill.

"We consider the Maryvale recycling plant to be an example of proactive product stewardship and as the only local manufacturer of copy and printing papers, Australian Paper is uniquely positioned to deliver this example of closing the local paper recycling loop." WME

TerraCycle recycling the 'unrecyclable'

Anna Minns and the small local team that form TerraCycle are pulling off a 'David & Goliath' type feat in tackling the waste associated with major brands operating in Australia, writes Paula Wallace.

It's simple; it's ingenious; and it seems to be working. Anna Minns told *WME* about how the start-up was collecting and storing massive amounts of waste in a Victorian warehouse that would have gone into landfills or otherwise entered the environment.

But the big news is not the waste being diverted that had previously been considered unrecyclable but, instead, the programs TerraCycle is putting together with corporates to recycle/re-purpose it.

"Virtually everything is recyclable," TerraCycle general manager, Australian and New Zealand operations Anna Minns said.

"The whole purpose for this business is to create markets for these materials ... so that eventually people aren't throwing away chip packets because they're actually worth something."

It's true that companies have it within their power to take a greater stewardship role in the lifecycle of their products. It could even be argued that some progress has been made through industry-led initiatives focusing on packaging. But it has taken an innovator such as TerraCycle to disrupt the business-as-usual approach and show big brands how to close the loop on difficult-to-recycle materials.

While many have complained about the blight of cigarette butts on the Australian landscape few have been able to make much of a difference, until now. Thanks to TerraCycle and its 'Brigades' program model, little parcels have been arriving from all around Australia, containing hundreds of thousands of butts – in fact six tonnes worth to date.

Australia Post has partnered with TerraCycle to transport a range of waste items, including a new program launched at the end of May that will operate via specially created postal 'bins'. TerraCycle is also gradually building up a national network of materials drop-off points that range from interested business, to the dentistry industry and other businesses.

Minns: we like to rely on existing technologies.

But back to the butts: Minns has achieved a first with the cigarette brigade program even for TerraCycle, which now operates in more than 20 countries, as she managed to get the three big brands to work together – British American Tobacco Australia, Philip Morris Limited and Imperial Tobacco Australia.

"The entire tobacco industry is our partner," Minns said. "They came together as a industry to fund the program and it's a great example of industry funding a voluntary product stewardship scheme."

For every kilogram of cigarette waste that participants send in to TerraCycle they receive 200 TerraCycle points ($2.00), which can be redeemed for a payment of $0.01 per point to the charity of their choice. Shipments must contain a minimum of one kilogram of cigarette waste in order to receive a TerraCycle point donation.

The postage is offered free and the whole program is underwritten by the tobacco industry.

TerraCycle hopes that in the future it can work with established organisations such as the Australian Packaging Covenant to develop similar programs with major product suppliers.

TerraCycle has similar programs operating for Dolce Gusto and Nespresso brand coffee capsules, toothbrushes and toothpaste tubes with Colgate, and triggers, sprays and pumps used in Natures Organics' product range.

"We don't do any of the processing or manufacturing, that's all third party suppliers ... we like to rely on existing technologies," Minns said, adding that TerraCycle's team of designers and scientists conducted the research and development on extracting resources from waste streams – IP which they share with local processors.

According to Minns the lifecycle analysis that TerraCycle has conducted on various waste streams have all found conclusively that it's a better environmental outcome to recycle than to landfill or incinerate.

"Transporting is only a small part of the footprint, especially because we work through existing transport networks. We work with Australia Post so it's just the extra weight on the truck," she said.

Creating markets

What seems most remarkable about the TerraCycle story is that the Australian operation received no start-up funding from its US parent and no other forms or capital or government funding.

TerraCycle is a private US small business headquartered in Trenton, New Jersey. It makes consumer products from pre-consumer and post-consumer waste and by re-using other waste materials.

Minns, who previously worked in the legal field, worked at TerraCycle's headquarters in the US for six months prior to bringing the business model to Australia.

She worked unpaid for the first 12 months, managing in that time to devise programs with the tobacco industry and companies Colgate-Palmolive, Nestle and Nature's Organics.

The start-up's marketing activities are primarily targeting companies and individuals, face-to-face presentations, online marketing and word of mouth.

Minns said that recycled products would develop over time as they were able to build demand for the materials. "We pelletise the materials and sell them into an open market, we have a whole team that is focused on materials sales. That's the overarching driver and purpose behind it all," she said.

"We collect so many chip bags in the US we are now able to sell that material. There's a company in the US that buys the chip bag plastic for their decking products. She added that markets would not develop "overnight".

TerraCycle most recently launched its first user-pays program using Zero Waste Boxes, distributed through retail outlets for $100-200 each.

Similar to programs running in the US and Canada which have seen two million pens collected in just one of the waste streams, the program will target businesses and households. Some of the materials accepted include coffee and tea capsules; office stationery such as pens, pencils and markers; batteries; mail room supplies; binders; plastic gloves; beardnets and hairnets; and snack wrappers.

"We're hoping to launch some new programs soon," Minns said. "We're working with councils on a cigarette programs with some councils already trialling bins around cities, hospitals and universities". WME

FACT FILE

Great Aussie initiative

Natures Organics is an Australian company producing naturally based environmental household cleaning and personal care products. TerraCycle and Natures Organics have partnered to recycle 'unrecyclable' beauty, cleaning and laundry triggers, pumps, taps and other waste into new unique products.

The pioneering founder of Natures Organics, Terry Dowel, was the first person in Australia to process and stabilise aloe vera gel, and was also closely involved in assisting the initial development of Environment Protection Authority (EPA) standards.

Natures Organics use recycled PET in its products and they are all recyclable. The parts of the packaging which are not recyclable can be collected and recycled through TerraCycle, giving consumers the opportunity to close the loop on waste.

Office strip-out recovery set to improve

There are genuine win-win opportunities to capture and divert materials from landfill and create new economies of re-use through greater co-operation and knowledge in the industry, writes Paula Wallace.

In April, the Better Buildings Partnership (BBP) and the Sydney Industrial Ecology Network (SIEN) hosted an event to promote efforts in developing tools, networks and research to improve the recovery rate of resources from office refurbishments – typically floor coverings, ceiling tiles, furniture and other construction waste.

The SIEN has been established by consultancy Edge Environment under the NSW EPA's Industrial Ecology Grants.

One of the highlights was findings from a recently completed project at Governor Macquarie Tower (in Sydney's CBD) which showed that 61% recovery was possible now, without established markets and pathways for many of the common materials that were currently going to landfill.

Using the best available knowledge including input from BBP Members, it is estimated that:

- 400,000sq.m of leased office space among BBP members churns each year;
- Recycling rates in office strip outs can be as low as 20%; and
- Every 1000sq.m of office space generates round 63 tonnes of waste during strip out.

Based on these figures, there may be around 25,000t of strip out waste generated in the Sydney CBD annually, of which 5000t is currently recycled.

Case study: GMT

Governor Macquarie Tower (GMT) is a jointly owned property of DEXUS, GPT Group and Lend Lease, with the site managed by DEXUS.

The strip out of levels 34-41 of Governor Macquarie Tower (GMT) were presented to the BBP and SIEN as an opportunity to trial and document the means by which high diversion rates could be achieved at no extra cost. In this project, Buildcorp acted as the construction manager and Demolition Plus performed all demolition work.

Figure 1: Currently (domestically) non-recyclable waste streams identified by the GMT trial and current actions by industry

Material	Action
Ceiling Tiles	Recycling schemes already available in Europe and America – BBP and SIEN working with suppliers to develop domestic reprocessing capability.
Carpet (Tiles & Broadloom)	Many product stewardship plans already in place with various suppliers, BBP and SIEN working with the suppliers and property owners to promote the installation of these recoverable systems.
Composite Timbers	Processed timber products (melamine, MDF, laminated products) are being trialled as fuel in waste to energy projects with Crucible Carbon and the CSIRO.
Furniture	Furniture is highly reuseable and the BBP is working closely with the charitable sector to promote the donation of furniture destined for landfill.

Source: A case study in resource recovery from office strip out: Governor Macquarie Tower, 5 May 2015; Edge Environment & Better Buildings Partnership.

Its report [http://tinyurl.com/noqfuea] details the results of resource recovery efforts, identifying reprocessing pathways, introducing a standardised template for reporting strip out projects among BBP members and a framework to move the industry toward 80% resource recovery in office strip out.

An overall resource recovery rate of 61% was achieved at GMT and tracked through receipts (where possible) from reprocessing/disposal facilities. The waste streams included mixed waste (38.79%), metals (20.31%), hard fill (16.80%), gypsum board (16.31%), glass (6.73%), furniture (0.95%) and dacron insulation (0.11%). Mixed waste comprised all currently non-recyclable materials including timber products, loose furniture, broadloom carpet, ceiling tiles and other construction waste.

The GMT trial demonstrated the current ability of demolition contractors to achieve high diversion rates in commercial office strip outs and the ability to recycle 100% of gypsum board, glass, hard fill and metals.

"Recycling alternatives offer gate fees lower than landfill due to their ability to monetise the recycled product. Thus, recycling offers not only an environmentally responsible solution to landfill, but also an ability to significantly reduce costs," Edge Environment director Tom Davies said.

To address some of the challenges identified, the BBP is working with its members to maintain a register of upcoming strip out projects to ensure more time is given prior to contractors moving onto the site. This will allow a more organised approach to strip out and also crucial time to remove and re-use furniture.

The market is already exploring innovative leasing and take-back schemes, such as those of Armstrong (ceiling tiles) and Interface (carpet tiles). The report says promoting the use of these products should be driven from the top down through greater awareness among building owners.

The BBP is developing key contractual clauses in its Strip Out Waste Guidelines, which will encourage greater responsibility and market awareness.

"The SIEN will be leading the exploration of new reprocessing facilities and markets, looking at waste to energy and business development opportunities to divert waste from landfill," Davies said.

The BBP tools released for industry review – the Strip Out Waste Management Plan and the Reprocessor Facility Directory – are now available at: http://tinyurl.com/psog2c3 WME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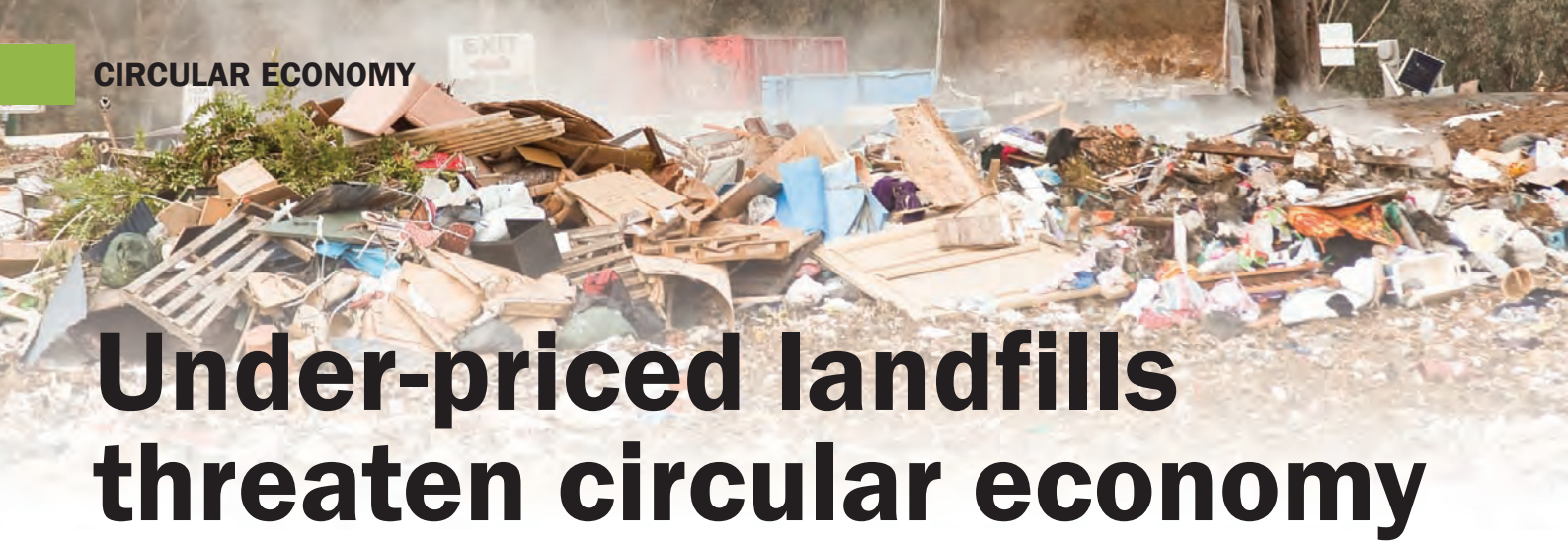

Under-priced landfills threaten circular economy

For Australia, the growth of a circular economy starts with a critical evaluation – some might find it surprising – of landfill pricing, write Mike Ritchie, Jordon Wong and Tom Mallet.

You can't build a circular economy if it is (artificially) cheaper to landfill than to recycle. You can't build a circular economy if you don't properly value recovered materials and price in the externalities of landfill.

Cheap landfills act like vacuum cleaners for unwanted or undervalued materials. circular economy starts with getting landfill pricing right. Europe and America have done it but Australia is still characterised by a large number of underpriced and underfunded landfills.

Landfill gate fees typically cover costs of operation, overheads, mobile plant and equipment, labour, depreciation costs of roads and buildings and other fixed assets and profit. But the costs (and therefore the gate fee), also need to include 30-50 year post closure management, long term monitoring and reporting, and importantly replacement of the landfill asset itself. In MRA's experience, many rural, local council run landfills do not recognise these latter costs and as a result gate fees are too low to cover the true costs of operation.

FACT FILE

Is my landfill pricing right?

There are a few quick checks a council can do to make sure their landfill pricing is right:

- Did you buy or "inherit" the landfill?
- Does the gate fee cover all operating (fixed and variable) costs and profit?
- Does the gate fee include provisions for final capping and remediation; post closure maintenance and reporting; asset replacement (purchasing a void); and planning consent and licencing?

Long-term management

The risks of landfill leachate pollution of waterways and groundwater, fire and damage to adjoining properties, asbestos contamination and remediation, are reasonably predictable but the costs can be high. These can happen during the operating life or after the landfill has closed. Just stabilising the landfill at closure can be very expensive. MRA has seen costs from $1-20 million in post closure rehabilitation. The cost depends upon the scale of the landfill, location, risk profile and proximity to sensitive environments. Similarly, the EPA's of Australia require monitoring of the closed landfill for up to 50 years prior to relinquishment of the landfill licence.

Asset replacement

Another significant oversight in landfill pricing, is failure to account for the consumption of void space and therefore landfill asset replacement.

We think a main reason may be related to how many (local government) landfills, come into being.

Privately owned landfills are generally "purchased" on the open market as quarries or existing landfills. A savvy seller will include a factor to account for the value of the void (air space to be used for future landfilling). This will be reflected in the price and therefore in the operating costs of the landfill.

Many councils however, "inherit" their landfills from council quarry operations or as operating landfills from previous generations. Consequently, the airspace is a ("free") gift. These councils generally depreciate fixed assets on the landfill (roads and buildings, weighbridges etc), but since the void was free, few account for its replacement.

That is fine if all generations of users obtain the same benefits, in this case, inheriting a free void. But as landfill void opportunities shrink and landfills become harder to find or approve and costs of replacement rise, future landfill users are at a significant cost disadvantage to current users.

MRA estimates that void replacement costs can add $16-60 per tonne depending on the size of the landfill.

Elected representatives understandably want to keep landfill gate fees low for their ratepayers. But rather than asking 'how will our ratepayers afford this?' they should be asking 'what is the real cost of this service and who is going to pay for it – ratepayers or landfill users?' They are most often not the same or have very different waste generation profiles.

Pricing parameters

According to the BDA study (2009) landfill gate fees, incorporating all costs (see *Fact File*) and provisions (excluding landfill levies and profit) in 2015 dollars, should generally be: small landfills (<10,000 tpa) ≥ $120/t; medium landfills (10,000- 100,000 tpa) ≥ $72/t; large landfills (>100,000 tpa) approximately ≥ $50/t.

Of course there are variants on this theme but pricing outside these general parameters should be reviewed to ensure unfunded liabilities do not arise. The key learning from the BDA study is that small landfills are particularly vulnerable to unfunded liabilities.

There are very few small landfills in Australia with gate fees above $120/t. Unfunded liabilities are bad for business – bad for landfill owners, bad for ratepayers, bad for recyclers and particularly bad for the circular economy.

Mike Ritchie, Jordon Wong and Tom Mallet are with MRA Consulting Group.
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