waste
MANAGEMENT REVIEW
AUGUST/SEPTEMBER 2015

Resource revolution

Emmanuel Vivant shares how Suez Environnement is preparing for the future of the industry

FEATURES

The story of the inventor of "green steel"
Australia's first Edison Award winner
Tracking technology in waste collections

REPORTS

Southern Oil's new hydrotreater plant
How South Korea has approached waste management legislation
A successful fleet equipment partnership
Victoria launches new waste infrastructure plan

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COVER STORY 14

SAVOIR-FAIRE IN WASTE SERVICES

As SITA Australia moves to the Suez Environnement brand, Emmanuel Vivant tells Waste Management Review about the direction of its waste and recycling operations, and what he's learnt during more than 20 years with the company.

"OUR LEADERSHIP IS NOT NECESSARILY IN TECHNOLOGIES, BUT IN THE COMPLETE SERVICES AND SOLUTIONS WE CAN PROVIDE. WE WILL CONTINUE TO DRAW ON OUR INTERNATIONAL EXPERIENCE AND EXPERTISE, TAKING INTO ACCOUNT LOCAL FACTORS, TO DEVELOP THE BEST SOLUTIONS TO SERVE OUR CUSTOMERS AND THE COMMUNITY IN AUSTRALIA."

Emmanuel Vivant
Executive Director – Infrastructure, Suez Environnement

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From the Publisher

A new platform for a growing industry

ON BEHALF OF THE TEAM at Prime Creative Media, it gives me great pleasure to introduce this launch edition of *Waste Management Review* – a brand new magazine for those leading, supporting and working in the waste industry.

With so much development around improving waste management in Australia, we recognise the importance of providing quality information and a respected media platform to serve the needs of an industry so crucial to the nation.

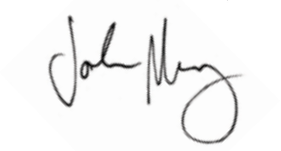
Waste production in Australia has risen by an astounding 150 per cent over the past 15 years. The waste management industry generates more than $11.1 billion in income and employs well over 35,500 people. Changing government policy and the demands of local authorities for contracted municipal waste collection and treatment services are the main drivers, as well as the evolving needs of the industrial sector.

As our growing population continues to require better and more refined waste and recycling processes, having a quality industry platform to share knowledge and experience becomes imperative. The waste management sector deserves an intelligent publication that can help promote its growth and sustainability.

We aim to offer you stimulating and enlightening editorial content. Our goal with *Waste Management Review* is to provide a resource that showcases domestic and international industry insights, information, innovation, equipment, and more.

Waste Management Review launches as part of a multimedia platform of a dedicated website updated daily and a weekly e-newsletter. Our online hub is designed to share breaking news, policy updates and industry announcements. The e-newsletter will feature highlights from the latest edition of the magazine and a review of that week's news. These will be useful resources for keeping abreast of industry developments.

We look forward to receiving your feedback on this first edition. We are committed to building a channel to help inform and grow the waste management and resource recovery industry in Australia.



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News in brief


Scientia Professor Veena Sahajwalla (right) is leading research into green manufacturing techniques.

INNOVATION

Scientia Professor Veena Sahajwalla has been in demand on the waste industry conference scene since her technology to use recycled plastics and tyres in steelmaking came to prominence in 2005.

As Director of UNSW's centre for Sustainable Materials Research and Technology – SMaRT – Veena and her research team were able to collaborate with industry partner One Steel to commercialise the technology in Australia, leading to more than 2 million tyres being saved from landfill since 2009.

The SMaRT centre has just moved to new premises, with a new bespoke laboratory. This follows an $8.8 million investment from federal government and industry partners, announced last June, to create a green manufacturing hub for a four-year research project. The aim of this is to create new technologies to transform waste glass and plastic into materials for the mining and building industries.

Veena is a leader of research programs on sustainable material engineering, and is championing the use of end-of-life products as raw materials for energy-efficient manufacturing. In the future, she would like to see localised recycling and manufacturing of waste materials in "micro factories" to help secure a sustainable manufacturing industry in Australia.

See page 20.

Green Distillation Technologies (GDT) is the first Australian company to win an Edison Award – a prestigious accolade that recognises innovation around the world.

The Melbourne-based firm received the bronze medal in the 'Resource Management & Renewable Resources' category this past April for pioneering a destructive distillation technology to reduce end-of-life tyres to their original elements. This process was invented and perfected by its Technical Director, Denis Randall.

Winning the Edison Award has led to international recognition and interest in GDT's technology. It is now looking to opportunities to build a series of plants in the United States, which produces 290 million end-of-life tyres a year. The company recently secured approval to build a plant in Thailand.

Aware of the domestic problem of transporting tyres long distances for treatment, GDT is also in discussions with a tyre manager in WA about building a plant there to process car, truck and mining tyres.

GDT is now completing its first full commercial-scale processing facility in Warren, NSW, after building its initial test plant there in 2009. Due to open in December, it will be named the Paul McKay Plant, in memory of one of its employees who died in January.

See page 26.


GDT's "Ned" plant started its journey to Edison Awards success.

South Australian waste authority East Waste has successfully rolled out tracking technology for its bin collection service.

PROFILES

More councils and waste service providers in Australia are turning to technology to improve efficiencies, education and customer service around their household waste collections.

East Waste, a waste management authority in SA, has successfully implemented a GPS and RFID (radio frequency identification) tracking solution for its waste collections services for six councils in the greater Adelaide area.

Adam Faulkner, East Waste's CEO, was an early adopter of the technology at Tweed Shire Council, NSW. He experienced some challenges in that first roll-out process, which meant he could bring a greater understanding to the process for choosing a suitable solution for his member councils this time around.

The new technology has allowed the authority to increase the efficiency of its waste collection routes and do more to ensure driver safety. At the same time, it has enabled East Waste to introduce a unique charging structure for its clients.

The next step for Adam and East Waste is to use the data obtained through the technology to inform targeted education and incentivisation campaigns for residents on behalf of its member councils.

See page 32.


Southern Oil's new hydrotreater plant opened in May.

Southern Oil has been re-refining waste lube oil for reuse as lube oil since 2001. Its process produces no waste and reduces the need for oil imports. Its end products also have a significantly smaller carbon footprint than crude-base oils.

The company has recently expanded, opening a $2.2 million hydrotreater plant in Wagga Wagga, NSW, in May. This facility turns organic waste and oil from processed end-of-life tyres into a stable, pure fuel, which can be used in stationary engines and boilers.

A boon to domestic alternative fuel companies, the new plant offers local producers of bio and green crude oils a refinery that can process their products and enable production on a commercial scale.

With this additional plant, the company now has three processing facilities. Its first Wagga Wagga plant and the Northern Oil Refinery at Gladstone are the only facilities in Australia producing fully re-refined lube oil accredited for use by a major international oil company for global applications. They have the capacity to process 38 per cent of the country's annual waste lube oil.

Southern Oil's investment in the new hydrotreater plant is a first step in its long-term plans for alternative crude processing. The company is working to secure contracts that could see it build another large-scale refinery in the next five years.

See page 36.

Many waste collection and transport businesses in Australia need tailored solutions for their fleets to meet their service and logistical requirements.

Veolia in Queensland has a long-established partnership with Sydney-based West-Trans to provide

News in brief

West-Trans recently provided Veolia Queensland with a bespoke hooklift solution.

it with innovative, fit-for-purpose equipment to meet those needs.

Most recently, West-Trans worked with Veolia on modifying a hooklift on a Volvo FM truck. It wanted to include load cells to monitor the weight of the waste. The use of a hooklift with a tri-axle dog trailer has also increased productivity for the environmental services firm. The combination has resulted in a user-friendly and safer solution for its drivers.
See page 48.

Regulations, policy and best practice on waste matters are continually evolving in Australia.

On 1 July, the Environment Protection Authority in NSW officially brought in its new risk-based licensing system. This affects all holders of environmental protection licences in the state, who will now have to undertake risk assessments as part of their licensing requirements.

Through the risk assessment, a licensee's environmental performance will then have a bearing on their licence administration fee. These fees will change from 1 July 2016.
See page 50.

In WA, the Department of Environmental Regulation is consulting on its new Environmental Standard for composting.

The draft regulations detail minimum standards for composting facilities, which will apply to aerobic composting operations in the state. Specifically, the rules would apply to facilities that store or process organic materials and waste for processing for commercial production purposes.
See from page 51.

Eighteen months since its release in draft form, the Victorian Government launched its *Statewide Waste and Resource Recovery Infrastructure Plan* (SWRRIP) in June.

The SWRRIP puts in place objectives and policies to help the state manage its waste over the next 30 years. The local government is preparing for a sustained period of population growth, and the associated increase in waste it will generate.

The plan is built around four key goals: landfills becoming a last resort; resource recovery better supported through consolidation and aggregation; waste treatment options planned with environmental justice principles; and using targeted data to inform future plans.

The plan has been widely welcomed by municipal and commercial industry leaders. Particularly, the industry has approved the SWRRIP's goals to stimulate the resource recovery market and to consult with communities on future waste systems.

The Victorian Waste Management Association's Executive Officer, Andrew Tytherleigh, describes the SWRRIP as "exciting, visionary and ambitious". However, he says for it to be successful the demand for recycled materials must be generated, and local governments and industry need to invest in the plan.

The next step is for Sustainability Victoria to run a series of seminars for council chief executives to help them implement the SWRRIP.
See page 52.


The Victorian government launched a new waste infrastructure plan in June.

REGULARS

A NSW company is bringing its pioneering bin-locking technology to waste collection service providers.

Envirolock secures wheelie bin lids shut. As bins can be left outside for several hours before collection, the lock keeps their contents secure from windy weather and inquisitive animals, and prevents littering if they fall over.

Swedish on-road handling equipment provider, Hiab, is releasing its new generation skiploader to the Australian market. The Multilift Futura is quicker to install than its forerunners and includes 100 innovations to improve safety, efficiency and productivity. Hiab will be holding test-drive and demonstration days shortly.

The Australian-designed Hazibag is now being distributed nationally. The award-winning invention is designed for the safe packing and transportation of asbestos and other hazardous waste. The Hazibag is certified by the National Association of Testing Authorities and also meets European safety requirements.

Forty years after the first Iveco Acco rolled off the production line in Dandenong, Victoria, the 2015 range has hit the forecourts. The Acco compactor is one of the workhorses of the waste collection industry. The latest edition has a GVM of up to 30 tonnes and updated safety features. Iveco continues to source parts for and build the vehicle in Australia, helping minimise delivery and maintenance times.
See page 46.


The Envirolock is a new innovation to keep rubbish secure in wheelie-bins.

News in brief

A video featuring a real-life refuse collector has been anything but rubbish at engaging residents in Victoria with the value of their council's waste and recycling service.

Moreland City Council featured a side-load driver and operator in the first of a series of films aimed at promoting the value of local government services to the community. The *It's dirty work* video shows Keith "The Garbo" Lawson at work on his green waste collection round, sharing his thoughts on the realities of his job and his contribution to a vital public service.

The video became a social media hit, with over 7,000 views on Facebook and more than 700 likes, shares and comments. After seeing residents' positive response to the subject, the council immediately followed up with a *10 things you need to know about waste guide*, which was published on its website and the local *Moreland Leader* newspaper.

The council's Marketing and Communications Manager, Marco Bass, said the campaign's objective was to personalise the waste collection service, whilst conveying the message of the value for money the amenity represents.

See **www.moreland.vic.gov.au/environment-bins** for more details on Moreland City Council's waste management engagement work. **See page 58**.

NEWS ROUND-UP

Mark Venhoek has been appointed the new Chief Executive Officer of Suez Environnement in Australia.

Mr Venhoek is currently Vice President of Suez's waste operations in China, and has extensive experience within the group across Europe and

Mark Venhoek, the new CEO, Suez Environnement, Australia.

Asia. He takes over from Eric Gernath, who moves to become the company's CEO, North America. Both will take up their new positions from 1 September.

In other management changes, David Lamy moves to the role of CEO – Water & Treatment Solutions, Australia. He was previously Chief Financial Officer of the Australian business.

"Australia is a resilient market that is undergoing a step change in its approach to resource recovery and water management," said Mr Venhoek. "Suez Environnement is well positioned to leverage our local experience and international capability to further strengthen the position of our business in Australia."

The WMAA has announced that Martin Tolar will be its new CEO, following Val Southam's decision to step down from the role.

Martin officially joins the WMAA in September. The association's Operations Manager, Stephen Holland, was appointed Acting CEO from 1 July until Martin commences in post.

Val Southam is contracting back to WMAA to work on key projects.

Entries are open for the Queensland 2015 Premier's Sustainability Awards.

The awards recognise the work of Queenslanders achieving excellence for leadership in sustainability, innovation and eco-efficiency.

The program includes 10 categories, including the Innovation in Sustainable Technologies Award, which acknowledges those who develop or apply innovation to achieve environmental benefits, improve business sustainability and provide resource recovery alternatives to landfill.

The pinnacle prize, the Premier's Award, is decided by the judging panel and presented to an individual or group who have made an outstanding contribution to promoting and advancing sustainability in Queensland.

For more information about the awards, or to complete an online nomination, see **www.ehp.qld.gov.au/premiersawards** – or call (07) 3339 5873 for queries.

Annastacia Palaszczuk will present the Queensland 2015 Premier's Sustainability Awards.

The Department of the Environment (DoE) has published the annual list of classes of products the Environment Minister is proposing to consider during this financial year for accreditation or regulation under the Product Stewardship Act 2011.

The 2015-16 product list features two items: waste architectural and decorative paint, and end-of-life batteries weighing under 5 kilograms.

Waste paint is often cited as the highest volume component of household hazardous waste collections. Similarly, it has been estimated that only 5 per cent of the end-of-life batteries produced every year are recycled.

Photo: Gilles Paire / Shutterstock.com

The Department of the Environment is targeting regulation of end-of-life batteries.

Both waste paint and end-of-life batteries contain hazardous substances, which may harm the environment if they are not effectively managed. Their disposal commonly involves a cost to governments.

The DoE sees the potential to reduce impacts on the environment through the increased collection and recycling of these products.

SAVOIR-FAIRE in waste services

AS SITA AUSTRALIA MOVES UNDER A SINGLE SUEZ ENVIRONNEMENT BRAND, ITS EXECUTIVE DIRECTOR OF INFRASTRUCTURE IN AUSTRALIA, **EMMANUEL VIVANT**, TELLS *WASTE MANAGEMENT REVIEW* ABOUT THE DIRECTION OF ITS OPERATIONS, AND HIS OWN ASPIRATIONS FOR RESOURCE RECOVERY IN THE COUNTRY.

It was a French philosopher, Simone Weil, who asserted: "The future is made of the same stuff as the present." It seems somewhat fitting that a Frenchman is applying this philosophy now in developing Suez Environnement's waste management strategy in Australia.

When *Waste Management Review* caught up with the company's Executive Director of Infrastructure, Emmanuel Vivant, he had recently returned from an extensive overseas business trip. Suez Environnement is bringing all its businesses – including SITA Australia – together under one brand. There's been a great deal of preparation and liaison with headquarters in France involved for this exercise. Despite the remains of jetlag and the pressures of a busy schedule, Emmanuel is affable and accommodating in the hour-long photography shoot.

Emmanuel is obviously comfortable in a company he has worked at for over two decades. He brings to his leadership a stellar pedigree and wealth of experience in the waste management industry. With a background in civil engineering, Emmanuel first started working for a Suez Environnement subsidiary – France Dechets – in France 21 years ago, overseeing the construction and operation of landfills. He was appointed Regional Director of SITA in Hong Kong and General Manager of Far East Landfill Technologies in 1997. Then in 2000, following an acquisition, he was appointed Operations Manager for Landfills, Swire SITA – a role that involved running two of the largest landfills in the world.

Emmanuel moved to Australia in 2001, when he was appointed Executive Director of Infrastructure for SITA Australia. After almost 15 years in the country, he retains his Parisian accent. This lends a certain sophistication to our conversation about waste.

According to its website, Suez Environnement's strategy for its waste business in Australia is "to plan and deliver smart, reliable resource management solutions for towns and cities, business and industry". These solutions are constantly evolving, and Emmanuel says he has noticed many changes in waste handling in Australia since his arrival.

"When I first came to Australia, resource recovery was in its infancy," says Emmanuel. "Over the past 15 years, the focus of waste management has shifted from a landfill-only solution to an increasing and continued focus on resource recovery."

Emmanuel says councils and commercial and industrial customers are looking to divert waste from landfill while optimising the cost of waste management. He attributes that direction down to the public's expectation that waste will be recycled or reused.

"This has resulted in the development of new services where we can help commercial and industrial customers achieve 'zero waste' through material segregation at the source, through to ad-hoc processing, such as de-packaging or sorting," says Emmanuel.

From his position, Emmanuel is seeing a new direction for how municipal and commercial organisations in Australia wish to handle waste materials.

Weil's philosophy of the future being made of the same stuff as the present seems to chime with the aims of the "resource revolution", a concept Emmanuel discussed at a waste management conference in May. But what does it really mean to Suez Environnement's Executive Director, who oversees waste recovery?

"The 'resource revolution' means that the community will abandon a linear model of consumption from cradle to grave for a circular one, where recycling and reuse will become the norm," says Emmanuel.

A role to play

He emphasises that this is where Suez Environnement has an essential role to play, to engage with all stakeholders of the circular economy to manage and transform what is waste into new resources or energy. Under his direction, the business is developing new technology and services in response to the requests and needs of its customers.

"Suez Environnement has concrete solutions at various stages of the cycle and we're always looking for more effective ways to put waste to good use," says Emmanuel.

This is evidenced, he states, by his company's significant investment in resource recovery infrastructure in Australia, including a network of seven Advanced Resource Recovery Technology (ARRT) facilities and a de-packaging facility. The ARRT plants process organic waste to create compost and dry refuse materials to turn into alternative fuels.

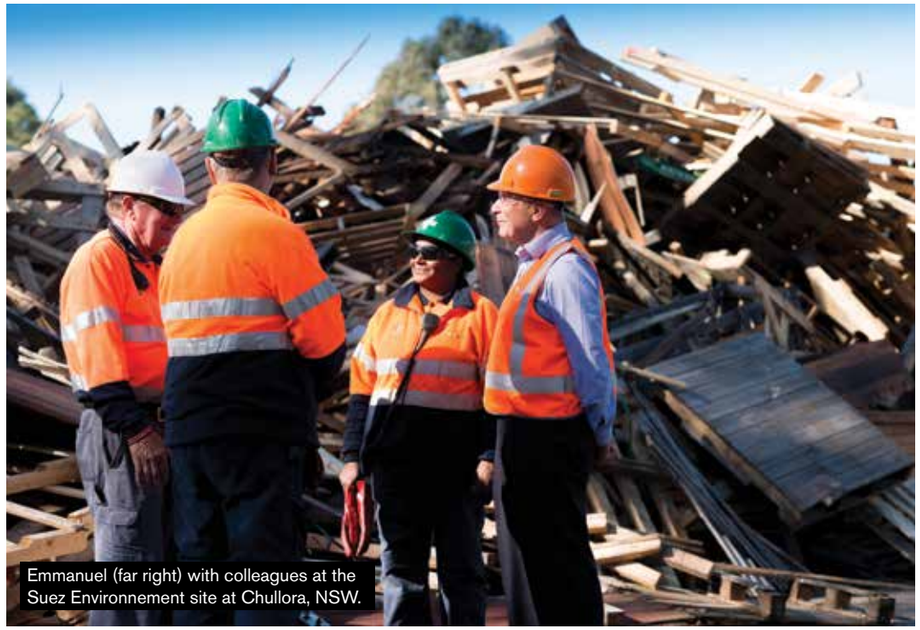
"Customers want smarter solutions to meet their waste needs, and globally Suez Environnement is prepared to lead and invest," adds Emmanuel.

One example of this investment came last year with the opening of PLAST'lab in Europe. This laboratory is dedicated

Did you know...

In 2014, Suez Environnement in Australia collected and recovered:

- 265,849 tonnes of organics
- 81,940 tonnes of paper & cardboard
- 29,340 tonnes of glass
- 12,290 tonnes of steel
- 5,570 tonnes of plastic
- 104,694 tonnes of PEF suitable material
- 463 tonnes of aluminium



Emmanuel (far right) with colleagues at the Suez Environnement site at Chullora, NSW.

SUEZ ENVIRONNEMENT FACILITIES IN AUSTRALIA

- 7 advanced resource recovery technology facilities
- 8 organic resource recovery facilities
- 2 material recycling facilities
- 3 community information centres
- 14 resource recovery and/or treatment facilities
- 8 engineered landfills
- 11 transfer stations
- 40 service depots
- 33 mine site recycling operations

to analysing, testing and classifying plastic materials, then developing new ranges of high-quality plastics from recycled products to meet manufacturers' requirements.

"As a company in Europe, we hope to double the production of recycled plastics in the next five years," Emmanuel states. "There's then an opportunity for us to leverage our global expertise to provide the best local solutions for the Australian market."

However, for the resource revolution to truly come to fruition, Emmanuel says product manufacturers, retailers and consumers need to work together with a shared vision.

"We need to move away from a situation where products are simply discarded at the end of their life," he says. "Manufacturers need to consider the deconstruction of their product at design stage to facilitate their recycling at the end of life. By doing so, we can reduce cost and recycling becomes a viable alternative to landfill."

Challenges for recovering waste

In this ongoing environment of throwaway goods, and the part played by fast-developing technology in generating more e-waste, Emmanuel advocates a collaborative approach between all stakeholders. For him, the manufacturer needs to look at smart design to consider their products' full life cycle. The consumer may need to accept the potential of paying more for goods. State and local governments need to support the development of new collection and processing services. Finally, Suez Environnement and its waste industry peers have a place in proposing and developing the recycling and recovery services and solutions.

Again, Emmanuel echoes the Weil philosophy of seeing the future in the present by citing the need for markets for recycled products. He calls for manufacturers to endorse the recyclables industry by actively using, and buying, secondary raw materials with which to make new products.

"Recycled paper, for example, has become a true commodity," explains Emmanuel. "But we need genuine markets for all sorts of materials, whether it's different grades of glass, plastics or wood. By that, I mean pull markets, not push, as is too often the case with recyclables."

When speaking at an industry conference in May, Emmanuel discussed the concept of waste not being waste. His conviction plays into Suez Environnement's strategy in its recycling and processing business, which he says it sees as manufacturing facilities.

"I believe that a product should not be judged by its origin, but by its quality and its specification," Emmanuel emphasises. "We manufacture products to a specification required by our customers and the market. Processes and quality controls are therefore paramount, especially considering the feedstock is by definition waste, heterogeneous, and we have very little control over it."

Suez Environnement has invested in developing and implementing systems to ensure constant quality in its products.

"In Adelaide, for example, we are producing alternative fuel, 365 days a year to a stringent specification," says Emmanuel. "We look at a wide variety of parameters, such as calorific value, moisture and chlorine. The specification is part of the contract. We're accountable for this and we've been delivering a reliable product for more than a decade."

However, he acknowledges that the key to the development of secondary markets is successful engagement and partnerships with end users or clients.

"These are long-term contracts, with guaranteed supply and take agreements, and obligations on both parts, so it's a real partnership where mutual commitment is required," says Emmanuel.

On the other hand, he is aware of the impact that the reduction of domestic manufacturing has on this aspiration. This has a domino effect on waste recovery and recycling operators and service providers.

"The lack of depth, or disappearance, of the manufacturing industry is a significant challenge, as it has reduced the outlets for secondary products and recycled materials," explains Emmanuel. "It's difficult to propose and establish new processing solutions without the certainty of long-term customer relationships and off-take agreements."

When considering additional challenges affecting the waste and recovery industry, Emmanuel cites as a particular frustration the lost opportunities for resource recovery due to the disparities in policy across Australia.

"The waste levy, which is a key driver for waste avoidance and resource recovery, varies significantly across the country," says Emmanuel. "Unfortunately, this triggers behaviours, as we have seen, like waste being transported from Victoria and New South Wales to Queensland. Although progress has been made in New South Wales, the interstate transportation of waste is still a major concern, and detrimental to the establishment of resource recovery solutions."

For Emmanuel, federal and state legislators need to work together to create more consistent policies that would help the waste recycling and recovery sector become more successful.

"There's merit in Australian state and territory governments taking a more strategic and coordinated regulatory approach," he says. "We'd like to see more harmonisation of waste policy, in particular uniform levies."

Emmanuel sees an opportunity for governments to lead the procurement and use of secondary raw materials. He believes regulatory frameworks for materials derived from waste would help them to compete with and replace traditional products.

"To put it simply, there's no point in having separate collections for dedicated streams if members of the community don't do the right thing," says Emmanuel. "Contamination is a major issue for recyclers both technically and financially."

To help waste service companies provide cost-efficient processing, he thinks the public needs better education. He believes they have become more engaged with recycling, and they expect the items they put in recycling bins to be processed and re-used. However, where the current system fails is that not everyone understands what is required in terms of individual behaviour.

"Education is critical, through TV, radio and internet campaigns," extols Emmanuel. "We need to educate the community not only about doing the right thing with their waste, but also their role in helping to create and maintain a circular economy."

> "Manufacturers need to consider the deconstruction of their product at design stage to facilitate their recycling at the end of life. By doing so, we can reduce cost and recycling becomes a viable alternative to landfill."
>
> Emmanuel Vivant Executive Director of Infrastructure

Community and waste recovery

In addition to policymakers and industry sharing a direction, Emmanuel believes the general public has an essential role to play in the success of waste recycling and recovery initiatives. He says the reality for waste service providers is that recycling is difficult, and it drains resources when householders fail to dispose of their waste materials and use their bins correctly.

Supporting and engaging with the community is clearly important to Suez Environnement in achieving its business objectives in Australia. Emmanuel attributes this to the company's everyday role in providing essential services to the public: supplying water to homes, processing their waste water, and collecting, recycling and disposing of their waste.


Suez Environnement employees sorting recycling from yellow lid bins.

Providing these necessary services also comes with its challenges. The company recognises that waste management facilities can have some impact on the community. As such, it implements measures to minimise any detrimental effects of the location or operations of processing and disposal facilities. Nevertheless, Emmanuel emphasises that helping the public gain a better understanding of why such facilities are required would be helpful.

"We believe that collaboration with all stakeholders is essential to the resource revolution," he says. "We started this collaboration a long time ago with the communities around our facilities where we take their input into account."

Suez Environnement actively consults with residents who live near its sites through its "Community Reference Groups". These provide a forum for exchange and communication between the local residents and the company.

Emmanuel says the company also believes it is important to give back to the communities where it operates. In 2013, it launched the first national waste industry community grants program. As a result, it provided more than $96,000 to 21 community groups across the country in 2014. It expects to increase its investment in local communities to more than $120,000 in 2015.

In addition, the company has two education centres – based in New South Wales and Victoria – where schools, community groups and businesses can visit to learn more about recycling, resource recovery and sustainable environment practices. These initiatives are helping Suez Environnement build better relationships with the general public and raise awareness of what the business seeks to achieve for society.

Moving forward

SITA Australia won the Waste Management Company of the Year category in the Frost & Sullivan Australian Excellence Awards this past December. The awards committee highlighted the company's leadership and waste recovery solutions as important factors in that success.

For Emmanuel, it's the business's breadth of service and coverage that sets it apart from its peers.

"Our leadership is not necessarily in technologies, but in the complete services and solutions we can provide," says Emmanuel. "We will continue to draw on our international experience, taking into account local factors, to develop the best solutions to serve our customers and the community in Australia."

Leveraging this looks pivotal to achieving more business in the Australian market. Bringing SITA Australia under the single Suez Environnement banner is about more than branding. Emmanuel says the organisation's structure is changing to become more integrated, with its water and waste divisions under the same management team.

"This enables us to provide our customers with access to a fully integrated waste and water group offering a larger panel of solutions and expertise," says Emmanuel. "For example, both divisions have significant experience in the processing of biosolids and anaerobic digestion, but from different perspectives."

For the future of Suez Environnement's waste management business in Australia, Emmanuel sees producing energy from waste as a new development for its market.

"Energy from waste was perhaps a little taboo 15 years ago," he says. "Now we can see the emergence of such projects in Western Australia and discussions in New South Wales following the release of the energy-from-waste policy."

Emmanuel also praises councils for their significant investment in new processing technologies. He sees more opportunity in resource recovery as a business, if stakeholders and investors can come together to make that happen.

"Undisputedly, the push for resource recovery is there and the circular economy is gaining momentum," concludes Emmanuel. "Unfortunately this critical revolution won't happen overnight. Resource recovery technologies are still evolving and, in Australia, we will need to invest significantly in new processing facilities to reduce our reliance on landfill." ■

A steely resolve to put waste to work

Photo: Tamara Dean, UNSW Media Office

THE INVENTOR OF 'GREEN STEEL' MANUFACTURING, SCIENTIA PROFESSOR **VEENA SAHAJWALLA**, SHARES THE STORY OF HER BACKGROUND AND HER ASPIRATIONS FOR TECHNOLOGY TO RECOUP THE VALUE IN WASTE.

It might be difficult to imagine how the rubbish heaps of Mumbai would be inspiring. Yet for one local girl, watching the ragpickers trawl landfills for items to sell sparked a career that has led to award-winning inventions and international recognition.

Materials engineer and innovator Veena Sahajwalla is the Director of Sustainable Materials Research and Technology – the SMaRT centre – at the University of New South Wales (UNSW). The Scientia Professor and her research team are at the forefront of waste recycling technology. They work with industry and research partners to translate their developments into viable technologies to use in commercial manufacturing.

Veena is the inventor of 'green steel' manufacturing – an environmentally-friendly process for using recycled rubber tyres in steel making. In 2005 she received the Eureka Prize for Scientific Research and the 2006 Environmental Technology Award from the Association of Iron & Steel Technology in the United States. Since then, Veena has won many more awards, including an Australian Research Council Laureate Fellowship in 2014.

Underpinning those impressive credentials, she is a citizen of the world and a passionate ambassador for using waste as raw materials in manufacturing. When she talks about her background, the reasons behind her vocation become clear.

Veena was born in Mumbai and brought up in India's industrial heartland. The most populous city in India, Mumbai produces an estimated 10,000 metric tonnes of waste a day. It's also the electronic waste capital of the country, sending 11,000 tonnes of it for disposal a year.

Mumbai is well known for its slum-dwellers, who pick among the rubbish heaps for paper, plastic, cardboard and anything of value to sell on to scrap dealers.

> "When you're a child, you don't have all the answers in your head, but you know what your heart is telling you about what you'd like to do as an adult."
>
> Veena Sahajwalla **Director SMaRT**

"People in the most disadvantaged communities were doing so much with so little," says Veena. "They were making livelihoods around collecting and recycling end-of life products. People can be very entrepreneurial."

Seeing so much garbage piled up and people finding value in it has influenced Veena's understanding about the reality of waste from a young age, and her career direction.

"There was a lot of rubbish lying around that would end up polluting the local environment," Veena says. "I suppose I had a eureka moment as a girl. I thought: 'How could I improve things around me?'

"When you're a child, you don't have all the answers in your head, but you know what your heart is telling you about what you'd like to do as an adult," she adds.

As she grew up, Veena developed a "fascination" with science and technology. She pursued studies in science and engineering. She was the only woman in her Bachelor of Engineering class at university in India.

After her first degree, Veena moved to North America for her postgraduate courses. She undertook her Masters of Science in Metals and Materials Engineering at the University of British Columbia, Canada, followed by a doctorate in Materials Sciences and Engineering at the University of Michigan, US.


In May 2013, Veena became the first Australian to deliver the Howe Memorial Lecture, a prestigious invitation in the global iron and steel industry.

Veena says she chose to study in North America to broaden her horizons.

"I wanted to see the world, something different to India, and to learn how its approach might not be the best way to deal with the environment," says Veena. "Also, like many young women at that time, I had a desire to make an impact on the world as a woman."

By studying in the US and Canada, Veena learnt that even though the nature of waste can vary from region to region, nobody wants it in their backyards. This expanded her thinking about how rubbish could be re-used, and how society was taking resources for granted. This gave her a steer for putting her knowledge into practice.

"As a society, we have not been smart in tapping into end-of-life materials as a resource," says Veena. "I had long been interested in science and doing work with a practical purpose. When combined with my desire as a materials engineer to see waste as a resource, I could see lots of exciting opportunities."

In her research, Veena says she was motivated by the environmental three Rs – reduce, reuse, recycle – which she describes as "the low hanging fruit in waste management". For instance, recycling generally meant turning glass back into glass products and PET plastic bottles back into plastics.

However, she realised that society had a problem with goods that didn't sit within the three Rs. Some products were landfilled because they were made of a mix of materials, which could not be recycled easily.

"I started thinking about when we can't recycle, we need to think about re-forming the waste," says Veena.

This direction turned her traditional thinking about recycling products upside down, leading Veena to the view that hard-to-recycle waste could have great value if its elements were targeted.

"You have to ask the right questions," says Veena. "It isn't about asking, 'What is it?' – It's a plastic bottle that's the wrong sort of plastic to recycle. One needs to ask: 'What is the plastic bottle made out of and how can we get to those elements?'"

This was the trigger behind Veena's research into using end-of-life products as raw materials in manufacturing. In addition to creating a new resource to draw from, this would have the added environmental benefits in reducing landfill and increasing energy efficiency in the production process.

The SMaRT Centre

After finishing her PhD in the US, Veena wanted to remain in academia. The opportunity to combine research with building collaborative partnerships with external groups led her to the Faculty of Science at UNSW.

"That working together – with other researchers, government and industry bodies, and manufacturers – to exchange knowledge and learn, is encouraged at UNSW," says Veena. "That helped us when developing the green manufacturing hub."

When talking about her invention of 'green steel' technology, Veena explains it as a decade-long journey, rather than a single moment. It was 2003 when she pioneered the technology in a laboratory at UNSW. The name developed as the research came to an end through discussions with industry partners. Then in 2005 she won the Eureka Prize for Scientific Research for her innovation.

Veena then describes 2008 as a "landmark year". She was appointed Founding Director of the SMaRT Centre at UNSW, which was being established to focus on advancing the sustainability of materials and processes in manufacturing. In addition, One Steel, now Arrium Mining and Materials, came on board as an industry partner. That was when the commercial possibilities of her invention started progressing.

Veena had already gained prominence for her award-winning idea of using the carbon and hydrogen from waste plastics to make steel. However, as her research team worked on a way to commercialise it, they found another efficient method was to use the polymers from end-of-life tyres.

The waste tyres provide the carbon required, replacing the need for as much coal or coke. Using this product also speeds up the process. This increases the energy efficiency of the furnace, costing less for the manufacturer to produce.

SMaRT conducted successful trials with One Steel, who then incorporated the technology into its commercial production process in 2009. So far, this has led to more than 2 million tyres in Australia being diverted from landfill and processed into a feedstock for manufacturing steel. The SMaRT Centre has since licensed the technology to One Steel, and it is being rolled out around the world.

Veena won several awards for this commercial application of her team's technology, including *The Australian* Innovation Challenge award in December 2012, which recognises inventors who create "solutions to world problems that also offer positive environmental and community benefits". The awards committee said her technology "was a fine example of how you can have a win/win for both industrial productivity and the environment".

Then in May 2013, Veena became the first Australian to deliver the Howe Memorial Lecture, in Pittsburgh, US, a prestigious invitation in the global iron and steel industry. The honorary lecturer is selected for their outstanding contribution to scientific and developmental research.

International recognition

Veena is rightly proud of her individual and team's successes, and the positive outcomes these have generated for the SMaRT Centre.

In June 2014, the centre was singled out to become a green manufacturing hub with an $8.8 million investment. The federal government contributed $2.2 million as part of the Australian Research Council's Industrial Transformation Research Hubs scheme. Industry partners agreed to fund the balance of the investment and provide in-kind support for the four-year project. The hub's goal is to research transforming waste from mixed plastics and glass to manufacture products for the building and mining industry.


Veena (centre) won an Australian Research Council Laureate Fellowship in 2014.

"With items like windscreen glass, that are made from several elements, you need to extract the valuable materials within them to create a new generation of value-added products," explains Veena. "At the same time, you are using waste that would otherwise be landfilled, and it can lead to energy efficiencies in the process."

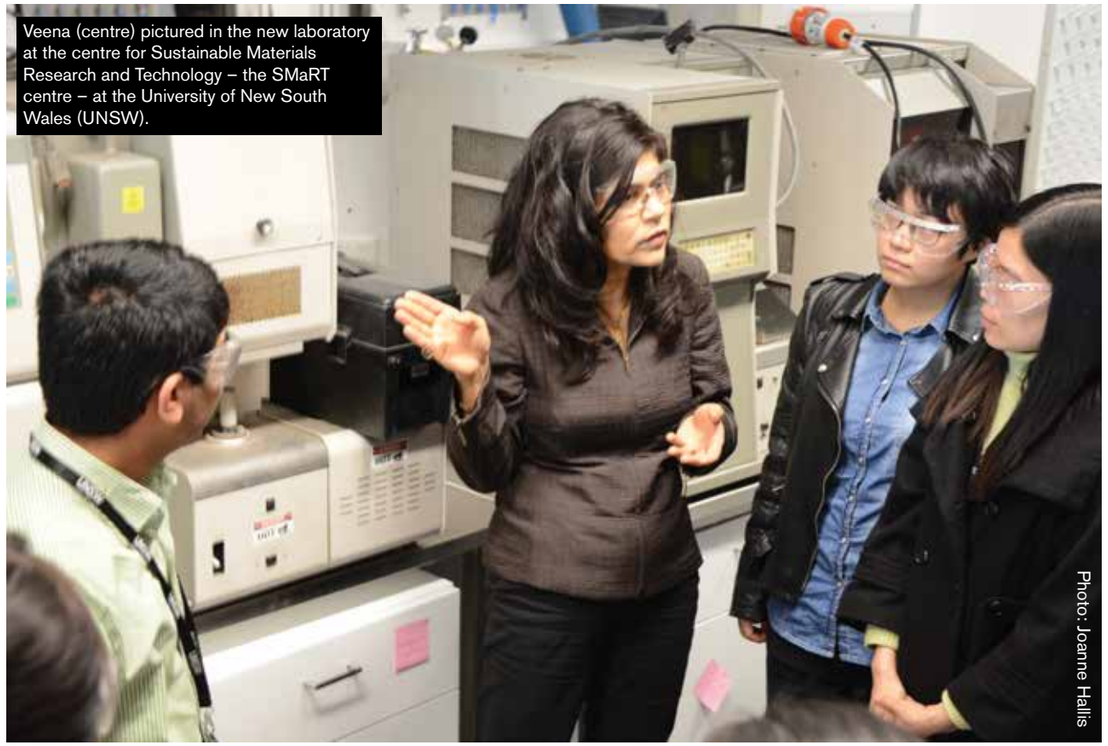
Veena also won an Australian Research Council Laureate Fellowship in August 2014. This included a $2.37 million award to the SMaRT Centre for research in micro-recycling of electronic waste into high-value materials.

Veena says the overarching goal of both these projects – and the SMaRT Centre team – is to change the perception of waste, so industry and the general public see it as a valuable commodity. She says that so much more can be achieved in green manufacturing, calling it "the green revolution".

"We want to change attitudes about landfilling waste," says Veena. "As scientists and engineers, we can create solutions that go beyond conventional thinking. We can look for smarter, cleaner ways of manufacturing that have a low impact on the environment."

Current focus

As a result of the recognition she has achieved as an inventor, and the SMaRT Centre's growing reputation, Veena's role now is broad and varied. Her daily work at UNSW involves discussions with students and



Veena (centre) pictured in the new laboratory at the centre for Sustainable Materials Research and Technology – the SMaRT centre – at the University of New South Wales (UNSW).

Photo: Joanne Hallis

colleagues on new concepts, which can often continue into the laboratory. She also has regular meetings with the SMaRT Centre's collaborators and industry partners, as part of the research and development process.

"When you're leading a unit, you are part of the intellectual drive to promote its work, the analysis and interpretation of the research done," says Veena. "But it's also a very hands-on role, evaluating students and mentoring and supervising in the laboratory on new ideas."

She is also a sought-after keynote speaker on the conference circuit for a range of industries and organisations.

Most recently, Veena has been involved with moving the SMaRT Centre, along with the rest of UNSW's School of Materials Science and Engineering, to a new building on campus. Its new home includes a state of the art laboratory, and has the capacity to allow the centre to grow significantly.

Despite having so much on her plate, Veena is already looking at another challenge. She would like to see recycling and manufacturing of waste materials achieved in local areas, in "micro factories".

For this to happen, Veena says there has to be a change in mindset, where people appreciate the ongoing value in their end-of-life products, and councils see themselves as raw materials suppliers. She gives one example that e-waste has a concentrated resource of copper, at 10 per cent, compared with 1 per cent from mined ore.

"In effect, councils will become owners of above-ground mines of valuable resources," says Veena. "They will be processed by niche specialists to extract the valuable elements, which can then by used by manufacturers."

For Veena, this could help secure an ongoing manufacturing industry in Australia. She would like to see young people choose science and engineering at university, and consider an exciting future in innovating new waste re-use technologies.

Veena says that this is where researchers, like those at the SMaRT Centre, can innovate technology for processing end-of-life products.

"It would be cool if we in Australia could demonstrate to the rest of the world that this can be done," says Veena. "I'm excited that the Australian Research Council is supporting green manufacturing research with us, which will lead to economic and environmental benefits… We need to leave behind a planet for future generations that's better than when this generation found it." ■

Treading **new ground** in tyre recycling

MELBOURNE-BASED **GREEN DISTILLATION TECHNOLOGIES** HAS PIONEERED A NEW WAY TO RECYCLE TYRES, WHICH HAS LED TO INTERNATIONAL RECOGNITION AND EXPOSURE TO NEW MARKETS.

Not only was Thomas Edison a great inventor, but the American also had an aptitude for transferring technology from the laboratory to the market place. In addition to inventing a sustainable electric light bulb in the 1870s, he also designed the electric system for people to have light bulbs working in their homes.

More than 130 years later, Green Distillation Technologies (GDT) from Melbourne has become the first Australian company to win an Edison Award for innovation for its technology in recovering energy from tyres. Its directors are following in Edison's footsteps in securing markets for both GDT's recovered products and implementing the technology for use in other territories.

GDT received the bronze medal for innovation in the 'Resource Management & Renewable Resources' category at the Edison Awards, held in New York this past April. The prize was for its destructive distillation technology, which Technical Director Denis Randall pioneered. The process uses controlled heat to reduce whole tyres to their original elements. The reformed gases are distilled and collected as an oil. The carbon is retrieved as a high-purity powder, while the steel does not get hot enough to melt, so it can be collected clean and unchanged.

Although other companies recover products from end-of-life tyres, the GDT process is unique because it can process tyres whole – not crumbed or broken down. Most of the material is fully recovered and the entire process is emission-free.

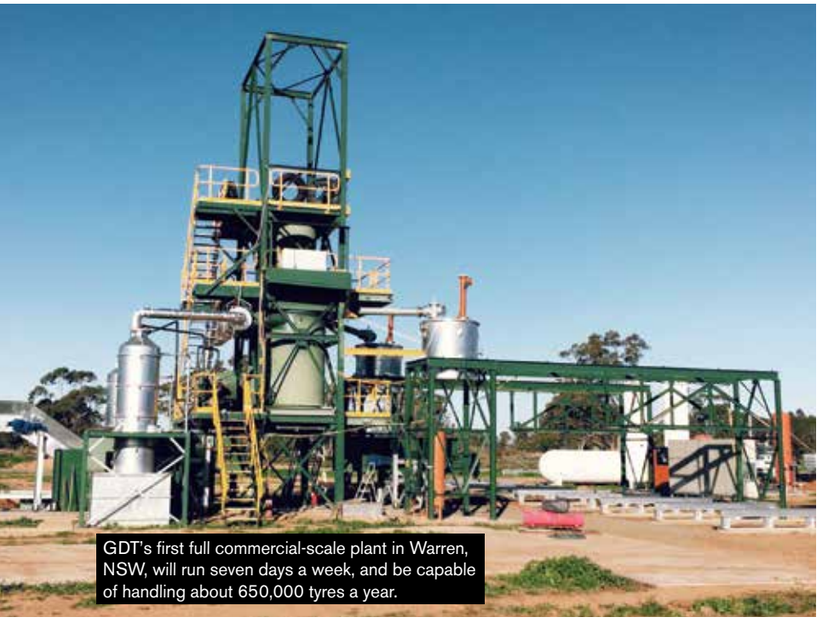
Denis had been working in this area for 25 years. He has studied hydrocarbon products, how to process them to provide oil and carbon, and has undertaken experimental work on agricultural products and tyres. It took a chance meeting with Craig Dunn, now GDT Chief Executive, for him to find a commercial channel to apply his research.

"A friend introduced Denis to me in 2009," says Craig. "I'd been aware of his work and the concept appealed to me. I had a business partner, so we decided to invest some money to test the process. If it tested successfully, we would look to commercialise it. When we agreed to work together, we made a commercial decision to focus on processing tyres."

The safe and legal disposal of tyres is a major environmental issue for Australia, where 20 million tyres from the commercial road transport and mining sectors reach end of life each year.

Tyres are so robust that it can take 500 years for them to start to even start to degrade. Many are stockpiled or illegally dumped, which can cause air, water and ground pollution. If exported to countries like China, they are burned in brick and cement kilns, causing pollution.

GDT's Alpha Module plant in NSW can handle all road transport tyres. The company started processing here in March 2012.



GDT's first full commercial-scale plant in Warren, NSW, will run seven days a week, and be capable of handling about 650,000 tyres a year.

Craig and his investors could see the commercial and environmental opportunity of taking the problem out of the collectors' hands and finding markets for the recovered products. He attributes the timing of starting the company as significant to being able to pursue building a business around resource recovery in end-of-life tyres.

"At the time, there was a growing interest in renewable energy and Australia now has more state regulation around waste management, especially for tyre disposal. And over the past 25 years, Denis had perfected the various techniques he was using," explains Craig.

Craig, his business partner Trevor Bayley (now Chief Operating Officer) and Denis formally came together as GDT in 2009, establishing an office in Melbourne. Their first step was building a small, laboratory-type plant in Warren, New South Wales, where the local council was keen to support their enterprise and made land available near the racecourse.

"After creating the plant and undertaking testing, Denis's team was able to produce carbon and hydrocarbon gas," says Craig. "They sent these off for independent testing. When the results came back, they showed that they were viable products."

Did you know...

GDT's unique process
- the tyres are processed whole, with no crumbing or pre-processing
- the process is completely emission-free
- most of the material in the tyre is fully recovered.

Buoyed by this initial success, GDT needed a much larger experimental plant and was fortunate to be supported by Warren Shire Council.

"The council was keen for us to adopt Warren as the site for the plant and assisted us in finding suitable land," explains Craig. "It sub-divided its Ewenmar landfill site to make land available for us. They helped us with building approvals and the administration side to make the project work."

The first small plant was built to hone the technology. After this, they were ready to start processing car tyres. In 2010, they built the Ned plant, so named because it resembled Ned Kelly's helmet. Next, GDT constructed a larger commercial plant, called the Alpha Module, which could handle all road transport tyres. The company started processing there in March 2012.

Businesses soon started transporting their tyres to the plant in Warren by road. GDT addressed concerns from the local community about the increased traffic and the plant.

"We engaged with local residents on a regular basis," says Craig. "We invited them to several open days to see the plant operate: firstly with the Ned plant and then the Alpha Module. We got enormous acceptance from the community of Warren, I think because with the technology advances happening there, it's going to make it a very unique place and put it on the map."

Businesses and councils that needed to dispose of tyres started to hear about GDT's facility and enquire about processing.

"We now get around five calls a week from trucking companies, councils and collectors asking if we can take more tyres. Obtaining the tyres isn't the difficult part. They bring the tyres to our plant and pay us $150 a tonne, which is a cheap way for them to dispose of the tyres they've amassed," says Craig.

GDT is now completing its first full commercial-scale plant in Warren, which will run seven days a week. It will be capable of handling 19,000 tonnes of tyres a year – that's about 650,000 tyres.

This will be known as the Paul McKay Plant, named after one of GDT's employees, who sadly passed away in January due to illness. Paul started with GDT in its infancy in 2009. "He made a big contribution towards our work," says Craig. "It feels right to honour his memory in this way."

GDT is aware of a wide problem with tyre disposal nationally because of the size of Australia. Some collection sites, especially for truck and mining vehicle tyres, are in remote locations. This makes it costly and onerous to transport them for processing. As a result, GDT is in discussions with one of the largest managers of mining tyres, based in Western Australia, about building a plant to process car, truck and mining tyres.

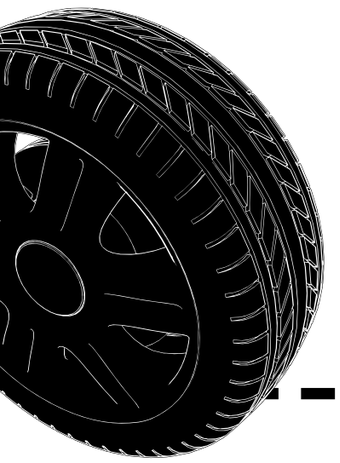
"That's going very positively, and if it goes ahead, we would have a plant there within 18 months," Craig says.

Selling the by-products

The next step for GDT, after building a commercial-scale facility, has been to find a market for its recovered products. Carbon, steel and oil are valuable commodities. Manufacturers can use the oil in stationary engines. It can also be used for heating or further refined as aviation fuel. Steel is sought after in many industries, while carbon can be used in a number of industrial processes and consumer products.

"The response to our work has been growing in enthusiasm. Everybody wants to be seen to be using some sort of renewable fuel, so demand for that has increased since we first started," Craig explains.

GDT has several customers for its oil, primarily Southern Oil, an oil recycler. It has an agent in Japan, who takes the steel and sells it back to tyre



2009
- Craig Dunn meets Denis Randall through a friend in Sydney
- GDT starts business – opens offices in Melbourne and Warren, NSW
- Takes on Roger van der Lee as the first employee in a corporate affairs and purchasing role. (Roger is still with the company.)
- GDT builds laboratory plant, then a larger test plant in Warren, NSW.

2010
- Destructive distillation products tested independently by Intertek Laboratories and approved as viable products.
- Ned plant built to process car tyres. This is a single module plant capable of multiple runs.

2012
Building of Alpha Module plant completed and processing starts in March.

2013
Testing of Alpha Module's two tubes for processing car and truck tyres.

2014
GDT commences construction of commercial scale plant.

2015
- GDT wins bronze medal for innovation in the 'Resource Management & Renewable Resources' category at the 2015 Edison Awards.
- Paul McKay commercial plant in Warren, NSW, due for completion in December.

manufacturers. The company is also in talks with the SMaRT Centre at the University of New South Wales about using its carbon for steel manufacture.

Although GDT's customer base is growing, Craig would like to see improved regulation across Australia for recycling end-of-life tyres and encouraging industry to use renewable products. Until this happens, GDT has been looking internationally for future production and distribution opportunities.

"The interest we have in our work in the United States, Thailand and Japan far exceeds what happens here. Australia is a bit behind in encouraging renewable energy," says Craig. "We would like to see support for renewable fuels, and a plan and regulation around carbon footprint. We take an international view. We can see that if Australia doesn't move in this direction, and meet the requirements of other countries, it's going to be penalised in the future on its exports."

GDT sees Australia's individual state laws, coupled with a lack of commitment from manufacturers and importers, as hindering the impetus for resource recovery projects and renewable energy. Craig advocates that tyre companies need to take responsibility for the product and waste they create. They could also use recovered materials, as carbon needs to be added to natural rubber to create the strength and rigidity required in tyres.

"Tyre manufacturers taking product back for the tyre-making process would be a big step forward," he says. "We've been engaging with Goodyear and its research facility in Europe to try and get our recovered carbon product back into tyres."

Craig also says it's time to rethink about how tyre disposal is paid for in Australia, as this isn't covered in the Tyre Stewardship levy.

"Currently, consumers pay about $4 to dispose a tyre, but there is no transparency about what happens to the recycling fee collected, leading to stockpiling of the end-of-life tyres," Craig explains. "The perfect situation would be a recycling fee at the start of a tyre's life – between $1.50 and $2 a tyre. This should be payable by manufacturers when tyres are brought into the country, then included in the price for the consumer, who wouldn't have to pay an additional fee on replacement. If that figure were collected upfront, tyres would be recycled properly."

Denis Randall, GDT's Technical Director and inventor of its "destructive distillation" technology, with the Edison Award.

The future, at home and overseas

GDT sees itself as having a bigger part to play in Australia's waste recovery industry in the future, as regulation and management around the treatment of waste increases. Although it is concentrating on tyres at the moment, its plant is capable of processing agricultural organic waste. The team has a genuine zeal for recycling and reusing waste resources.

"We believe all waste should be recycled properly and there should be incentives to encourage that," says Craig. "Many councils are adopting policies to reduce landfill. That's a very positive direction, which we believe will increase in the future."

GDT's recent recognition at the Edison Awards has opened more doors internationally, for both its products and the potential to expand its plants. It plans to build, own and operate 30 plants across the US, with an eye on pushing into Canada afterwards.

"The interest in the US is enormous. It produces 290 million end-of-life tyres each year, and it's very advanced in terms of waste management and renewable energy. The US is a big focus for us, perhaps more so than Australia," says Craig.

GDT is also in talks with businesses in Japan, another lucrative market due to its heavy regulation for the management of end-of-life tyres. Recently, GDT secured approval to build a plant in Bangkok, Thailand, following a three-year process.

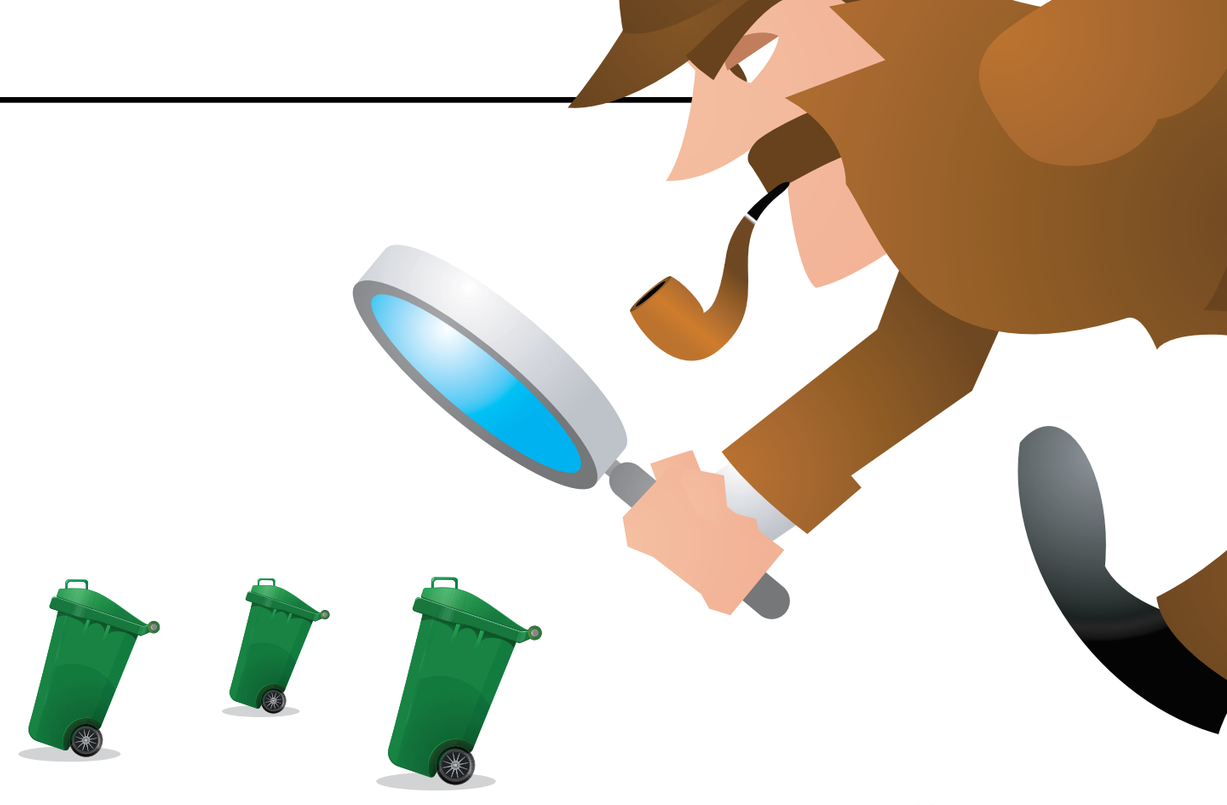
Amid this optimism for growing GDT's business, Craig and his fellow directors remain focused on the business's general purpose.

"It's a feel-good story… We're taking a waste stream and disposing of it in a real sense, and creating renewable products in oil, carbon and steel," Craig says."We've come a long way and there's exciting commercial opportunity in the future."

Did you know...

GDT has 17 employees. Most engineering is undertaken in-house, while all of the fabrication and equipment comes on a contract supplier basis. GDT sends the drawings out to several Australian steel and electrical manufacturers, then the parts are assembled on site.

Put the thought in TO GET THE MOST OUT



EAST WASTE'S CEO, **ADAM FAULKNER**, SHARES HIS INSIGHTS OF IMPLEMENTING A SINGLE TRACKING SOLUTION FOR SIX MEMBER COUNCILS, AND HIS THOUGHTS ON THE FUTURE ROLE OF TECHNOLOGY IN WASTE COLLECTION SERVICES.

When George Orwell wrote his novel *1984* and shared the idea that "Big Brother is watching you", one cannot imagine that he had bin monitoring in mind for this all-seeing eye. More than 60 years on, one waste authority leader generated "Bin Brother" headlines when launching tracking technology across its collection services.

Adam Faulkner first came across global positioning system (GPS) and radio-frequency identification (RFID) technology for garbage collections while working at Tweed Shire Council, New South Wales. After taking the role as Coordinator – Waste Management in 2005, he oversaw the planning and roll out of the technology to household bins across its area.

RFID involves the use of wireless technology on chips or tags that can be attached to an object to store and transfer data. In waste collection services, chips are attached to bins and a scanner on the garbage truck reads them. It can identify the household they belong to and details around time of collection, and, in this case, weight of contents can be relayed to a depot for customer service enquiries.

The use of GPS technology in waste services includes: tracking vehicles for service delivery and employee safety factors, assessing and improving the efficiency of routes, reviewing time spent providing the service, and monitoring driver behaviour.

"The use of RFID in waste collection was reasonably new back then [in 2009] and we probably bit off more than we could chew," admits Adam, reflecting upon his first experience introducing the technology.

Tweed Shire Council residents didn't seem to understand the reasons for using the technology, especially on the bin weighing aspect, as the council was among the earliest adopters. Their pessimistic views were highlighted in local media coverage.

"This led to a few negative 'Big Bin Brother' headlines about the service," says Adam. "We learnt some lessons there and eventually had some good conversations with our community that we should have done at the start."

For anyone else looking to implement the technology, he recommends engaging with residents and stakeholders to explain that implementation of any tracking technology is part of an overall strategy.

Other than public relations, the council had a few other problems from the start with using the technology and how it was rolled out.

"We tried to introduce everything at once: bin weighing, RFID and GPS," Adam explains. "But the technology wasn't quite there. So we had problems getting accurate and timely data."

Through this experience, Adam learnt that clearly identifying objectives for using GPS or RFID technology will help businesses get the most out of it. These aims can include: asset management, enabling better customer service, improving collection route efficiency, and monitoring driver behaviour.

"Just be clear what you want it for," says Adam. "Is it to address one element or a whole contract management purpose? You pay for different complexities of systems and solutions. We thought we wanted an all-system solution, but we didn't need all of what we asked for."

The second time around

Six years later, Adam used these lessons to lead the introduction of the technology for the Eastern Waste Management Authority – known as East Waste.

Having dealt with those challenges the first time around, Adam's experience of implementing a single RFID and GPS solution for waste collection services in South Australia has been smoother.

East Waste looks after waste collections for six councils around Adelaide. When Adam joined as CEO in February 2014, the authority was already using two GPS systems, introduced in 2011, and an RFID system, which was used by one council.

As five of the councils used GPS, East Waste needed a standard system that was reliable and user friendly for its drivers and customer service team.

The authority undertook a competitive tender process to choose one provider, concentrating on price, capability, service provision and usability.

"The usability factor was really important for us," says Adam. "There was no point having this solution, then our drivers and customer service team not using it or believing in it."

East Waste eventually chose Queensland-based 3Logix in late 2014. They have been working together ever since to roll out a complete fleet solution.

"3Logix had the best solution for us. Their technical ability is unquestioned, but they also have a common sense approach; they explain things simply and clearly. They understand a business's issues. Instead of trying to bolt on an off-the-shelf solution, they

Did you know...

RFID: Radio-frequency identification – involves the use of wireless technology on chips or tags that can be attached to an object to store and transfer data. In waste collection services, chips can be attached to bins to identify the household they belong to and details around date and time of collection, weight of contents and more, which can be relayed to a depot for customer service enquiries.

GPS: Global positioning system technology in waste services include: tracking vehicles for service delivery and employee safety factors, assessing and improving the efficiency of routes, reviewing time spent providing the service, and monitoring driver behaviour.

tailor it to give you the best outcome. Being a relatively small operation, with only 37 trucks, that was important for us," says Adam.

After allocating the project to 3Logix, Adam and his team worked to realign the technology against its service objectives. They recently finalised a whole-of-fleet GPS solution to work alongside RFID for the new financial year.

"We knew exactly what we wanted the technology for and the system is working really well," Adam says. "That's a lot to do with a consistent, clear vision."

East Waste went through an exercise of moving its processes to one system, communicating the plans with its councils and residents.

"Communicating the use of this technology to stakeholders was really easy this time because GPS is more a part of our lives," says Adam. "There's a greater acceptance that it helps us to be more efficient, safe and reduce our overall costs."

The authority also needed to engage its employees to teach them about the value of the technology with regard to safety, reputation management and job efficiency.

"The technology contributes to a safe workplace in several ways," explains Adam. "We can track where the drivers are, where they've been and help them avoid spots that are difficult to access. Having data around speed of travel, acceleration and excessive braking means we can intervene and improve behaviour where necessary, improving operational safety."

The solution also has a lone worker device, which is linked to GPS. If a driver is in a remote location without a mobile phone signal, they can trigger the device to inform the depot where they are and if they're in distress.

In addition, the technology helps the customer service team handle complaints, protecting the public view of the service.

"We can deal with claims about not collecting a bin or damage to property because we know where the trucks have been and at what time," says Adam. "And with RFID, we can record footage as we go. Having this evidence means we can manage our reputation and changes the conversations you can have with residents and councils, making them more mature."

East Waste has also noticed the benefits of GPS technology in areas they didn't expect. For instance, they receive automatic reminders for truck maintenance and can manage driver fatigue by monitoring truck hours.

The RFID kit has helped East Waste by allowing the authority to get more detailed information. With RFID, the chip in each bin is read when it's lifted by the truck. This allocates a date and time stamp for that event. The driver can then choose to provide extra information if needed, such as noting if a bin is broken. Those details are sent remotely to customer service with a photo, ready in case the resident calls with a query.

The solution also includes cameras on the trucks, so drivers can watch footage of bins being emptied. If they see contamination in a recycling bin, they can record what they saw and log a "service exception" – an explanation of why the bin was not emptied. This information is then made available to customer service.

"They can also record along an entire street or suburb, to build up a profile of that area," adds Adam. "So if we notice a trend in behaviour, we can go back and do some education about recycling there."

For other councils or organisations considering investing in GPS and RFID for waste collection services, Adam emphasises that the most important thing is to define what you're trying to fix or improve.

"If you're going to implement this technology, you have two opportunities to get it right: at contract commencement or when you roll out your bins," he says.

He advises organisations to build the use of the technology into a broader asset management or waste management strategy. This will provide a solution that will work.

"Talk to other councils or industry experts about their experiences and you'll more likely land on a good outcome," says Adam. "But if you get distracted by the bells and whistles, you're potentially not going to get a good result."

Enabling a new charging approach

The close location of East Waste's clients, coupled with its use of technology, has led to an innovative approach in operating and charging for its collection services. As it services six adjoining council areas, its trucks can cross boundaries on collection routes.

"As long as we're in the geo-fence of the six areas, we can use a common fleet across all six councils. This leads to greater efficiencies in service because we can use the most efficient routes, instead of trucks having to go back on themselves or avoid certain streets," says Adam.

East Waste also adopted a new way of using GPS data to charge its clients for their waste collection services – by time spent on their service.

Adam explains: "How East Waste operates is unique. First, we are a not-for-profit, which differentiates us from commercial waste providers. However, we have all the typical costs that a waste collection operator has. Instead of building those costs into a lift rate, which is how most commercial contracts agreements are built, we split the costs across all six councils based on the time it takes to deliver their service, calculated through the GPS system – a ground-breaking costing method based on GPS time."

The member councils drove this approach for the costing methodology, as they could see it was fair and transparent. The reliable and robust technology underpins the administration process.

"In terms of measurables, we have certain KPIs. We still measure lifts per hour and truck hours," says Adam. "But thanks to what we can track, we know that we have a unique statistic of 95 per cent of bins back on the kerb with lids closed – this differentiates us from a lot of other providers."

The future of waste collection services

Given Adam's in-depth experience with technology at East Waste and Tweed Shire Council, he has come to appreciate the opportunities it offers for analysis and informing future strategy. He says that the next big thing in waste collection services will be 'incentivising' – offering benefits to people who use their collection bins correctly.

Adam believes that using the data obtained in delivering the service will help councils create educational campaigns that encourage residents to improve their recycling behaviour.

"Sometimes poor recycling or use of bins is down to a lack of knowledge or appetite," says Adam. "We can analyse down to the street and household level through our data, which means spend on education and promotion can be more targeted. Councils can then offer incentives to households who maximise their recycling and reduce their waste."

East Waste's next step is working with its member councils to plan and deliver the waste education and incentivisation component.

Adam Faulkner, now CEO of East Waste, has introduced GPS and RFID bin tracking technology in NSW and South Australia.

Did you know...

East Waste provides kerb-side collection of household waste, dry recyclables, green organics and hard waste collections for six member councils and other clients around Adelaide, South Australia.

Southern Oil Hydrotreater Plant

Wagga Wagga, NSW

WITH THE CAPABILITY TO BLEND CRUDE OIL FROM A VARIETY OF WASTE AND GREEN RESOURCES TO CREATE RENEWABLE FUEL, SOUTHERN OIL IS RIGHTLY PROUD OF ITS NEW HYDROTREATER PLANT AND ITS POTENTIAL FOR AUSTRALIA'S FUEL MARKET.

The new $2.2-million hydrotreater plant was built on Southern Oil's existing refinery site in Wagga Wagga.

The employees at Southern Oil are passionate about the environmental and economic efficiencies of turning waste resources into a valuable product. By opening Australia's first fuel refining plant to process crude oil from waste and green sources in May, they are truly practising what they preach.

The new $2.2-million hydrotreater plant was built on Southern Oil's existing refinery site in Wagga Wagga. Its addition puts the New South Wales town firmly on the alternative fuels map in Australia.

The original processing facility was opened in 2001. It collects and re-refines about 8 per cent of Australia's annual waste lube oils from engines, hydraulics and gear oils from Hunter Valley mines, vehicle service centres and other commercial businesses. The first plant produces no waste, and the end product has a significantly smaller carbon footprint than crude base oils.

Wagga has a sister plant, the Northern Oil Refinery in Gladstone, Queensland. These are the only facilities in the country producing a fully re-refined lube oil accredited for global use by a major international oil company. Together they have the potential to process 38 per cent of Australia's waste lube oil.


The Hon. Michael McCormack MP (left) and Southern Oil Managing Director Tim Rose at Southern Oil's hydrotreater launch.

Southern Oil's opportunity to consolidate its environmental credentials came two years ago, when London-based Hydrodec approached it about taking over its hydrotreater facility in Young, two hours up the road. Hydrodec wanted to develop its UK and US assets based on the New South Wales technology, but considered it too small to be viable.

"We were able to cut a deal to bring the plant to our Wagga refinery site and keep it operating," says Tim Rose, Southern Oil's CEO. The plant's intellectual property, originally developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), now belongs to Hydrodec, who licenses its technology.

After moving the plant to Wagga in March, it took six weeks to reconstruct it on site. Southern Oil officially took over the hydrotreater in April and it was formally commissioned on 8 May. It has five employees, three who came from Hydrodec, making a total of 40 staff at the site. Southern Oil and Hydrodec continue to work together to develop its capabilities.

How the technology works

With the drive for renewable fuel, a number of small, alternative crude oil producers have set up around Australia. These innovators produce crude from sources including algae, wood and agricultural waste, human waste and processed tyres.

"These technologies can create crude oil, but it usually contains significant impurities," says Tim. "These affect the combustion efficiency and storage stability of the end product."

The hydrotreater uses a process called hydrogenation. This extracts the impurities, such as oxygen and nitrogen, and replaces them with hydrogen to produce a cleaner-burning, stable petroleum product.

"The result is a direct alternative to the traditional fossil fuels found in cars, trucks and planes across Australia," explains Tim.

The hydrotreater offers domestic refining capability to local producers of bio and green crude oils. Although their technologies are viable, previously there hadn't been a refinery to process their products and enable production on a commercial scale.

"Now they have access to a refinery, while we can test the market and supply chain as we look to invest further in a new industry for Australia," adds Tim.

Currently, the main customers for the fuel are small businesses using it for stationary engines and boilers. However, Tim says that the next step would be to process it for the general transport market.

Catering to a refined market

Southern Oil is eyeing the Royal Australian Navy as a viable market for its aviation fuel. At full operational capacity, the hydrotreater could easily supply the Navy's annual demand for jet fuel. Southern Oil is focusing on producing a military-specification product, but that comes with certain challenges. For instance, it requires extensive testing and a lengthy approval process with not only the Australian defence authorities, but NATO and relevant US agencies as well.

"An added complication to supplying for the military and general aviation sector is that you can get accredited for a one source crude, but not a blended feedstock," explains Tim. "We need to convince the buyers that we have a process for creating a suitable fuel from a variety of sources. Then we need approvals to use it."

As a result, it could be up to five years before the hydrotreater fuel is approved for military use.

Southern Oil hopes to develop a large-scale fuel refinery based on alternative crudes within five years, but this would require a $150 million investment.

In the meantime, Southern Oil is also working with aviation companies, such as Qantas, GE and Boeing.

"They're showing the most interest because they have set targets for using certain amounts of biofuel in their planes," says Tim. "If we can meet the military specification, we can meet everything else for other users."

Tim also sees the hydrotreater becoming a niche supplier, catering to strategic industries like mining and agriculture.

"Those businesses are about the size to justify building a small refinery on site, and they are expressing an interest in green fuels," Tim says.

Southern Oil continually focuses on research and development. In terms of the hydrotreater, Tim says the research team is working on "a Swiss army knife of refining" to create one refinery for a variety of crudes. At the same time, the development team is investigating other opportunities for this technology in the end market, such as plastics, cosmetics and textile industries.

"Like any business, we identify needs or gaps in the marketplace and apply our skills, knowledge and innovation to deliver a commercial solution," says Tim. "We want to be thought leaders in the sector and deliver better standards and practices that achieve better business and environmental outcomes."

The plant's future

Underpinning Southern Oil's enthusiasm for the hydrotreater is its commitment to the environmental aspect of its business. Tim says his team gets annoyed when resources that could be turned into something valuable go to waste. He firmly sees the company in the waste management space.

Southern Oil believes the hydrotreater is the missing link between the alternative fuel promise and conventional fuel delivery. It is a commercial refinery, with the ability to supply up to 6 million litres of military and commercial grade fuel each year at full capacity. Along with its sister plants, it can provide a reliable domestic source of fuel and reduce the need for oil imports in Australia.

"In the case of alternative fuels, you just have to look to the challenges Australia faces in its fuel security and the potentially significant implications these challenges have for the nation's economy and defence," says Tim.

Currently in Australia, the majority of feedstock for domestic crude refineries is imported. The country is reliant on secure shipping lanes and a constant supply, which could easily be affected by a supply disruption.

"As a country we don't stockpile fuel or oil, and available supply can be as little as a few days," says Tim. "But in the hydrotreater, we have the technology to reverse this trend and produce clean, green fuels from domestic renewable sources."

Tim emphasises that the company's investment in the hydrotreater is only the first step in its ambitions for alternative crude processing. Southern Oil hopes to hone the technology to the point where it can build either a full-scale biofuel refinery at its existing sites in Wagga or Gladstone, or a couple of smaller refineries close to feedstock and end markets.

"Our goal is to develop a large-scale fuel refinery based on alternative crudes within five years," Tim says. "But to support that major investment, we need to prove market demand and ensure a genuine supply chain."

That investment would be in the region of $150 million. To justify that outlay, Southern Oil hopes to land a 10-year supply contract with the Australian Defence Force. This would secure an end market. However, it needs a coordinated approach between feedstock producers, the end-users and regulators to allow it to progress in that direction.

"The future is exciting," says Tim. "We've got a good refining pedigree and committed investors. We've got the will, the technology and the people. We just need a few things to fall into place to make this happen." ■

LEGISLATING THE PATH TOWARDS A zero WASTE SOCIETY

THE STORY OF SOUTH KOREA'S APPROACH TO LEGISLATING WASTE MANAGEMENT SHOWS WHY RESOURCE RECOVERY NEEDS TO TAKE CENTRE STAGE IN THE FUTURE OF THE INDUSTRY.

At just over 100,000 square kilometres, South Korea could fit into Australia almost 77 times. Across this relatively small land mass, the Asian economic powerhouse is home to over 50 million people, around half of whom live in the Seoul capital area, the second largest city in the world with more than 25 million residents.

It's facts like these that make the concept of proper waste management an imperative for the South Korean government. Since the mid-1980s, South Korea has seen its landfill rates drop from over 90 per cent to under 10 per cent, while its recycling rates have grown from under 10 per cent to over 80 per cent.

While Australia has made great strides towards reducing landfill rates, in South Korea's shadow, it still has a way to go. Figures from the Australian Bureau of Statistics show the country is still sitting at 58 per cent recovery rates and 42 per cent of waste disposed to landfill. Although much of this is generated by the construction industry, households still account for around 27 per cent of total waste generation.

The story of how South Korea managed to so successfully turn around its landfill rates was put forward by Professor Yong-Chil Seo, of the Department of Environmental Engineering in Yonsei University, and associates, in a paper published in the *Journal of Material Cycles and Waste Management* last year. In their article 'Past, Present and future of waste management in Korea', Yong-Chil, alongside Won-Seok Yang, Jun-Kyung Park, and Se-Won Park, found

Professor Yong-Chil Seo, Yonsei University

that the government's approach to legislation has played a central role in transforming the country's approach to waste, setting the path towards a zero waste society.

Although the introduction of new technology has been pivotal, as Yong-Chil tells *Waste Management Review*, the government had to first adopt a new paradigm in terms of how it saw its waste.

"I think both technology development and legislation have affected the decrease in landfill by increasing recycle rate," says Yong-Chil. "However, the legislation came first to be enforced with supporting technology and utilisation."

> "I think both technology development and legislation have affected the decrease in landfill by increasing the recycle rate."
>
> Professor Yong-Chil Seo,
> Department of Environmental Engineering in Yonsei University

From seclusion to reduction

Yong-Chil outlines that a pivotal moment in South Korea's waste management was the Waste Management Law, which came into effect in December 1986. The law replaced the Filth and Cleaning Law (1973) and the Environmental Protection Law (1963) that had regulated general waste and industrial waste, respectively, in South Korea until that point. These previous management principles were essentially about encouraging the population to ensure their waste looked "nice and not dirty", explains Yong-Chil. For industrial waste, the laws were mainly about the protection of hazardous material.

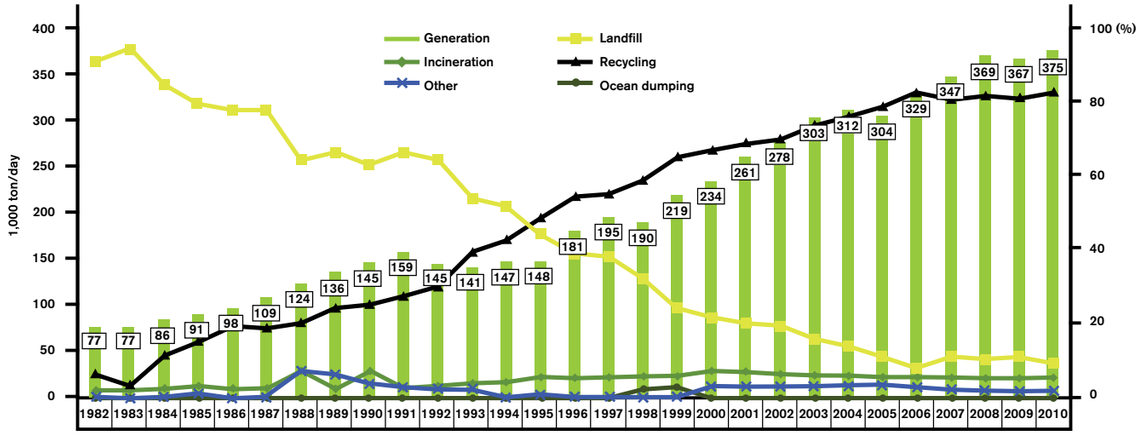
The Waste Management Law introduced in 1986, however, provided a framework that waste management was not just about containment, but about reducing waste in general. It applied what was becoming a global standard in waste management: the hierarchy of the three 'Rs': Reduce, Reuse, Recycle.

"The 3Rs as the first priorities were more essential in Korea, due to [limited] land with no places to dispose of [waste] and the high price of land, which could promote to drive such 3R practices more efficiently," says Yong-Chil.

With this approach in place, Yong-Chil explains the government was then well positioned to enact supporting legislation, and fund projects that promoted this approach to waste.

"With this concept and legislation that followed the Waste Management Laws… the government had put in a lot of effort to promote the technology development and utilisation by funding the installation of large-scale commercial plants, and the research and development

WASTE GENERATION AND RATE OF TREATMENT OPTIONS (1982–2011)



Source: 'Past, Present and Future of Waste Management in Korea' *Journal of Material Cycles and Waste Management* 2014.

Did you know...

South Korea is currently looking to pass legislation that will view waste as a resource, rather than as something to be limited or contained. The Promotion Law for Achieving a Resource Circulation Society was proposed to congress in 2014, covering the following:

1) Establishing a waste management plan for the next 10 years by local and central governments, setting a goal of resource circulating rates and regulating the performance of resource circulation industries in the regions;

2) Promoting the use of resource circulation products;

3) Assessing the resource circulation capability of consumer products;

4) Issuing certificates for circulating resources (products);

5) Charging a disposal tax for landfill waste and incineration waste facilities without heat recovery; and

6) Providing funds and technologies for industries engaged in circulating resources.

of recycling, incineration, and intermediate treatment from the beginning of the 1990s until 2005," he says. "Most incineration plants and recycling facilities were constructed in this period, and the research and development projects on new technology were driven and supported by the government of South Korea."

Polluter pays

One important law the government introduced during this period was the Act on Resource Saving and Recycling Promotion, enacted in 1992. This law was fundamental in reducing household waste by introducing a volume-based garbage rate system for household waste, using the concept of polluter pays. Under the law, each household needed to buy designated garbage bags at a supermarket and could only discharge waste using the prepaid bags.

At the industrial level, in the same year the government introduced legislation to promote extended producer responsibility (EPR). Under the previous system, industrial waste was only legislated where is constituted a hazard. Under the new framework, all waste produced at the production level was classified as industrial, regardless of weather it was hazardous or not, making companies fully accountable for all the waste they produced. The EPR system was further articulated to apply to e-waste, through the Resource Circulation Act of Electric & Electronic Products and Automobiles.

Through this legislation, Yong-Chil explains that the South Korean government created an essential framework to direct funding towards supporting innovations that would help the nation's people and industries comply with the new laws.

"Such legal systems enhanced the technology development, by constructing facilities and conducting research and development," he says. "Such efforts decreased landfill rates by increasing recycling rates between 1990 and 2005."

South Korea has made impressive strides in waste management, with landfill rates dropping from 90 per cent in the mid-1980s to under 10 per cent today.

IMAGE: somyot pattana / Shutterstock.com

Resource circulation society

South Korea is now looking to take the next step in waste management, by once again fundamentally changing how it views its waste. While the 1986 law shifted the concept of waste from something that needed to be controlled and contained, to something to be reduced, a new set of laws will now consider waste as an important national resource.

The legislation entitled 'The Promotion Law for Achieving a Resource Circulation Society' integrates all existing laws, taking the fundamental approach that waste needs to be used more efficiently. Yong-Chil explains that the law, proposed to congress in late 2014, is looking to set a waste management plan for the next 10 years for local and central governments by setting a goal of resource circulating rates, while also regulating the performance of resource circulation industries in the regions.

The law will be important in promoting the use of resource circulation products. It will try and solve the dilemma that many companies face in struggling to find a market for their recycled materials.

"The recycled market needs to be promoted and the collection rate for industrial wastes such as [e-waste] and industrial product wastes must increase. Some recycled products cannot easily find a proper market," says Yong-Chil.

The new law will also further articulate the concept of extended producer responsibility by assessing the resource circulation capability of consumer products, and issuing certificates for circulating resources.

Currently, the South Korean government requires energy recovery from waste combustion. The new law will provide another mechanism to enforce this rule, by charging a disposal tax for landfill waste and incineration waste facilities that don't apply any energy recovery.

Finally, the new law will create a framework to ensure companies engaged with resource recovery are getting the support they need. The law will provide supporting funds and technology for industries actively circulating their resources.

Zero waste society

With the new legislation under way, Yong-Chil says that South Korea is on a steady path to becoming a zero waste society. The government has set a goal to accomplish a 3 per cent landfill rate and 87 per cent recycle rate by 2020. While the ratification has been slightly delayed due to "some conflictions between stakeholders", Yong-Chil is confident the law will pass. In less than a decade, South Korea could be taking the lead in showing how legislating resource recovery is the future of responsible waste management.

"It may be a bit extended to the year 2025 to achieve this goal, which could be the reference point [for South Korea] to become a zero waste society," concludes Yong-Chil. ■

/ ENVIROLOCK

Envirolock is a novel, cost-effective solution to keeping garbage in wheelie bins and litter off the streets.
As wheelie bins are commonly left out for several hours before waste collections, their contents are exposed to windy weather, inquisitive animals and other people.
Envirolock secures wheelie bin lids, keeping them closed should they fall over and safe from interference. The lock also prevents overfilling, which improved recycling behaviour in the council areas where it was trialled.
Designed and manufactured in Australia, Envirolock is made from recycled plastic and straightforward to fit to standard wheelie bins. The lock disengages when pressure is applied to the bin sides by a garbage truck's lifting arm.
Using Envirolock across a bin network can contribute to cost savings on cleaning contracts after storms and reduce return trips by street cleaners to collect loose litter.
www.envirolock.com.au

/ HIAB MULTILIFT FUTURA

Hiab, a leading provider of on-road handling equipment, is launching its new generation skiploader – the Multilift Futura. The Futura is quicker to install than its predecessors and includes 100 innovations designed for improved productivity, safety and flexibility. This includes the new FlexControl system, which allows the user to customise the skiploader with options such as in-cab, radio remote and outside controls, and on-board weighing. SkipTop is a new bolt-on automatic feature to cover any load quickly and safely.
The redesigned EvoLight steel construction provides 300-500 kilograms more payload. This allows drivers to carry more while saving fuel and reducing CO2 emissions.
Additionally, the Futura's SwanNeck design has extra-long reach, coupled with firm stability for container handling over fences and obstacles.
As with all Hiab equipment, it is built to last, and is easy to maintain and service.
The Multilift Futura skiploader is available to order now. Hiab plans to hold test-drive days with a demonstration unit across the country throughout the second half of 2015.
www.hiab.com.au futura.multilift.com

/ HAZIBAG

Hazibag has made a big impact in the hazardous waste handling sector since finishing as Runner-up Innovation in the 2012 Australasian Waste and Recycling Expo Awards.
Originally created for the safe packing and transportation of asbestos, Hazibag is certified by the National Association of Testing Authorities and carries the European "CE" conformity marking.
It has an internal sealable bladder and outer skin to securely contain asbestos and other forms of solid dangerous goods. This prevents any chance of accidental exposure, making it a safer method to contain, transport and deliver hazardous waste. It also eliminates the need for a steel container bin for transportation and can be placed directly on the collection vehicle for disposal.
The Australian-designed flexible intermediate bulk container (FIBC) is tested and approved under United Nations recommendations for the transport and containment of "Packing Group II and III" solid dangerous goods. Its final certification makes it suitable for a variety of dangerous goods and hazardous waste.
Hazibag also holds public liability and product insurance for Australia and globally. This covers any costs in the unlikely event of the container failing.
www.scribalinternational.com.au

/ IVECO ACCO

The new generation of Iveco Acco compactor trucks started rolling off the production line earlier this year. The 2015 range is the result of a two-year planning and research process, and aims to keep pace with the needs of the waste industry.
The Acco has a GVM of up to 30 tonnes, and is full of updated safety features to help the urban driver, including park brake alarm, anti-lock braking and a toughened cab.
Designed and built at Iveco's factory in Dandenong, Victoria, the Acco is the only truck assembled from scratch in Australia, meaning buyers benefit from fast vehicle delivery times. It also provides a greater opportunity to customise on the production line to suit the truck's intended use. Bolt holes and other fastening points can be modified. The positioning of auxiliary components, such as fuel, air tanks and exhaust systems, is variable.
In addition, 85 per cent of the Acco's components are sourced in the country. This ensures strong stock levels for replacement parts, which helps reduce downtime for maintenance – an important factor for refuse collection fleet managers. It also has a new three-piece steel bumper. In the event of the inevitable scrape or bump, each part is available separately and replacement is more cost-effective.
Iveco's main focus when updating the Acco was improving functionality, reliability and safety. It remains fit for purpose in the waste transport sector.
www.iveco.com.au

Hooked into a successful partnership

VEOLIA AND WEST-TRANS ENJOY AN ENDURING BUSINESS PARTNERSHIP, WHERE THEY WORK TOGETHER TO INNOVATE FLEET EQUIPMENT SOLUTIONS.

As a waste transport manager, it's rewarding to work with a trusted supplier in creating new and successful concepts to develop a fleet, as Veolia in Queensland can attest.

The environmental service company's waste management operation in Queensland currently runs a fleet of more than 100 vehicles, which includes front and rear lift refuse units, hooklift and skip loader vehicles, as well as vacuum tankers. These operate across sites in Brisbane, Townsville, Mackay, the Gold Coast, and regional locations.

Nigel Golder is responsible for fleet management and procurement for Veolia in Queensland. He has worked closely with trusted suppliers, such as West-Trans, to introduce innovative equipment into the company's fleet. These include waste units featuring specialised hooklifts, skip loaders, load cells, custom toolboxes and other user-friendly applications that have enabled efficiencies throughout the local operations.

Recently, Veolia introduced a Volvo FM truck fitted with an HL20a hooklift, which included an innovative modification developed by Sydney-based West-Trans. According to Veolia, this fit-for-purpose equipment is the result of months of preparation and strategic collaboration between the two organisations.

"It's about helping Veolia to become not only the best, but also the most efficient waste collection fleet in Australia," says Nigel. "Our partnership with West-Trans is one reason we can fulfil a number of big waste contracts across the state."

Nigel explains that the two companies have been doing business for more than a decade. Veolia has bought numerous West-Trans equipment products, ranging from hooklifts and skip loaders to Danish HMF cranes, for which West-Trans is the Australian dealer.

The new HL20a hooklift is proving a big success for Veolia due to its built-in combination with a tri-axle dog trailer used for carrying an assortment of waste bins ranging from 12 to 30 cubic metres.

Since the new combination was delivered in April this year, Nigel says the West-Trans hooklift has significantly increased productivity.

"As a result of the truck and dog combination, our drivers can now complete up to 20 drop-offs and deliveries each day, more than double what we would do with our older vehicles," he explains.

West-Trans's willingness to customise certain features on the hooklift has been a major component of this improved performance.

"When I approached West-Trans with the idea of fitting load cells into this new combination, its engineering team was all ears," says Nigel. "While load cells are not new to the industry, it was certainly a first for Veolia's Queensland division."

He reveals that he consulted with other industry specialists on their weighing systems before asking West-Trans to incorporate it into the combination.

The load cell option proved to be a wise choice for Veolia's fleet.

"It's all come together nicely. The hooklift can accommodate different bin sizes and the combination itself can carry a payload of up to 27.5 tonnes," says Nigel. "From a safety perspective, the load cells can also monitor the weight of the waste, which promotes a safe and zero-harm approach for our drivers."

The focus on developing an industry-leading fleet is at the forefront of Nigel's procurement processes. He commends West-Trans's efforts for turning his vision into reality.

"Veolia is an advocate of using the latest in load-handling technology, but you need companies like West-Trans to complete the picture," Nigel explains. "The best part about this hooklift combination is that each one of our drivers can step into the vehicle and operate it."

Nigel states that since Veolia put the HL20a into service, its drivers have complimented its user-friendliness and how it helps them to remain safe, as they can control everything using a remote control inside the cab.

"The design is not overly complicated and that's what we like about it," says Nigel. "The last thing you want to do is to waste time fiddling around with the unit, and we simply cannot afford to, with multiple customers and sites to visit each day across all parts of the state."

Veolia Queensland commends West-Trans's flexibility in being able to customise its products before and during the life of the unit, based on the requirements of the job.

"You deal directly with the manufacturing arm of the business in Sydney and they're willing to listen to your requests and make changes if needed," he concludes. "That's what we appreciate about them."

"From a safety perspective, the load cells can also monitor the weight of the waste, which promotes a safe and zero-harm approach for our drivers."

From left to right: Nigel Golder, Veolia's Equipment and Procurement Manager – Queensland, with Grant Sweeting, Product Specialist – West-Trans, Queensland.

NSW EPA
launches risk-based licensing system

The NSW Environment Protection Authority's (EPA) new risk-based licensing system came into effect on 1 July.

From now on, all holders of environment protection licences in NSW will be subject to the new licensing requirements, which involve risk assessments. This affects companies including waste processing facilities, which may create air, odour, water and noise emissions.

EPA officers complete the risk assessments in consultation with licensees using an assessment tool the agency developed. The process considers the following factors:

- the day-to-day operations at the site, including the type and nature of emissions;
- the risk of a pollution incident and the site's proximity to sensitive environments; and
- the licensee's environmental management performance.


David Fowler, EPA Director – Reform & Compliance

The assessments also allow licence holders to discuss their premises' environmental performance and any improvements required with their assessor.

Under the new system, a licensed facility with poor environmental management practices based near a residential area and drinking water catchment will be assessed as a higher environmental risk than one similar in a less sensitive site.

"This is a significant and positive change to environment protection licensing that means licensed activities will receive a level of regulation based on the risk posed to human health and the environment," said EPA Director – Reform and Compliance David Fowler.

Licence fees will now take into account a licensee's environmental performance. This provides an added incentive to improve environmental performance and outcomes.

The licence administrative fees changes will come in on 1 July 2016 to allow licensees time to identify risks and implement plans to achieve improved environmental outcomes.

The EPA has carried out about 1,200 risk assessments since introducing them in September 2014, with the agency reporting largely positive feedback from licensees.

For more information on NSW EPA's risk-based licensing system see **www.epa.nsw.gov.au/licensing/assessprocess.htm**.

WA seeking feedback on draft composting rules

WA's Department of Environmental Regulation (DER) is seeking feedback on its draft regulations for composting.

The draft Environmental Standard (ES) for composting applies to aerobic composting operations. Specifically, it applies to premises that store organic material or waste for pre-processing, mixing, drying or composting to commercially produce of compost or blended soils.

The draft ES details minimum standards for composting facilities under the following categories:

- Location and site selection – sets appropriate separation distances from environmental receptors;
- Infrastructure – covers appropriate design, performance and construction of the composting hardstand, leachate collection and storage systems, and surface water controls;
- Operating methods – appropriate composting methods determined on a risk assessment of the feedstock received; and
- Products – products that have limits on pathogens and contaminants.

The draft ES also sets out standards for groundwater monitoring.

When approved, the new ES will be applied to both new applications and existing licences.

The consultation document is available at **www.der.wa.gov.au/our-work/consultation**. The deadline for submissions is Friday 21 August.

The Department is also expected to release its draft ES on rural landfills this month.

Victoria sets waste plan for **next 30 years**

THE VICTORIAN GOVERNMENT RELEASED THE STATEWIDE *WASTE AND RESOURCE RECOVERY INFRASTRUCTURE PLAN* (SWRRIP) IN JUNE. IT AIMS TO PROVIDE A WELL-PLANNED SYSTEM TO MANAGE THE STATE'S WASTE AND THE GROWING ECONOMY AROUND IT. ITS DETAIL IS OF INTEREST TO ANYONE WORKING IN THE WASTE INDUSTRY THROUGHOUT AUSTRALIA.

The Statewide Waste and Resource Recovery Infrastructure Plan (SWRRIP) is about planning Victoria's future infrastructure needs to cope with the projected population growth in the next 30 years and its associated waste, which is expected to rise to about 21 million tonnes a year by 2043. Of that, about 14 millon tonnes (based on a 66 per cent recovery rate) is potentially recyclable material. The government would like to see that percentage increase, so the SWRRIP is the strategy to realise that vision.

The draft SWRRIP was released for public consultation between September and December 2013. In finalising the plan, Sustainability Victoria considered feedback from 16 consultation workshops and 50 written submissions.

Four goals

To promote increased resource recovery, the SWRRIP has four goals:

1. **Landfills to become a last resort waste solution**

Landfills will only be for receiving and treating waste streams from which all materials that can be viably recovered have been extracted.

2. **Recovered materials are made available in marketable quantities**

Materials are made available to the resource recovery market through aggregation and consolidation of volumes to create viability in recovering valuable resources from waste.

3. **Fair, planned waste treatment**

Waste and resource recovery facilities, including landfills, are established and managed over their lifetime to provide the best economic, community, environment and public health outcomes for local communities and the state, and ensure their impacts are not disproportionately felt across communities.

4. **Informing future plans**

Targeted information provides the evidence base to inform integrated statewide waste and resource recovery infrastructure planning and investment at the state, regional and local levels by industry, local government, waste and resource recovery groups, government agencies and the broader community.

Seven initiatives

The SWRRIP will be underpinned by seven enabling initiatives:

Regional Waste and Resource Recovery Implementation Plans (RWRRIPs) – to be developed by seven regional waste management groups and, through them, councils, communities and industries, to identify local opportunities and requirements.

A Community and Business Waste Education Strategy – with a focus on helping companies and the wider public understand their roles and responsibilities in reducing and recovering waste.

The Victorian Market Development Strategy for Recovered Resources – aims to meet community expectations for a healthy environment (public health) and to stimulate markets for recycled materials.

The Organics Strategy – aims to balance community expectations and drive investment into more advanced treatment technologies to ensure the sustainability of the organics sector.

A Collaborative Procurement Framework – to support regional waste management groups in helping councils to offer larger contracts, which will stimulate investment.

An Investment Facilitation Framework – a government service to assist prospective sector investors through identifying opportunities and helping negotiate various government requirements.

A Waste Data Governance Framework – to provide standardised, timely and useful data to all stakeholders.

The entire SWRRIP is underpinned by "environmental justice" principles, where "the community must be involved in determining the waste and resource recovery priorities and have opportunities to participate in the decisions".

Two notable features of this government's priorities reflected in the SWRRIP are its apparent willingness to intervene to stimulate markets for recovered resources, and its commitment to environmental justice. The latter means any benefits and impacts are distributed proportionately, and that affected communities have a say in decisions about future systems.

Full information on the SWRRIP is available at **www.sustainability.vic.gov.au/swrrip**. ■

THE VICTORIAN WASTE MANAGEMENT ASSOCIATION'S EXECUTIVE OFFICER, **ANDREW TYTHERLEIGH**, PUTS THE PROVISIONS OF THE SWRRIP IN CONTEXT FOR THOSE WORKING IN THE INDUSTRY.

The SWRRIP is a positive move to provide a well-planned system to cater for Victoria's anticipated future waste requirements.

Its goals continue to shift the direction of waste towards diversion and re-use, while simultaneously protecting communities and the environment from the effects of past decisions.

They point to greater state government intervention in the market to address some key barriers to improved recovery of materials. These include relatively cheap landfill space, planning issues associated with their location, and lack of investment from local government due to supply issues and lack of knowledge on which to base decisions.

Industry generally supports any increased opportunities to identify new business, but is aware that the strategy is going to need strong and continued support from government to achieve long-term success.

What the goals do not reflect is a commitment to develop demand for recycled materials. Supply-side issues are pretty well understood. While getting the infrastructure and planning issues right is important, developing demand for recovered materials – especially those materials whose reuse capabilities are limited – is going to be the biggest challenge. This points to a strong need for research and development, as well as educating communities about recycling and reuse.

Andrew Tytherleigh, Executive Officer – Victorian Waste Management Association.

Resource recovery markets

It is interesting to look at the second goal, and how the SWRRIP might stimulate markets for recovered resources. This could be enabled through research and development, demonstration projects and industry grant programs to trial new methods and processes.

Markets for materials recovered from waste streams are currently generally confined to those products that are easily transformed. For example, paper and cardboard needs only to be collected and baled up, and plastics crushed and/or shredded and then reheated.

Material like tyres need to be broken down into component parts, such as the steel, fabric and rubber. The energy taken to deconstruct tyres is often greater than the calorific value of the material. Similarly, e-waste needs lots of energy and processes to recover the original metals.

Therefore, we can expect industry to invest in research and development where the risks appear manageable and the potential upside is better than their return on investment.

Looking at the "consolidation and aggregation of materials" aspect of this goal, in practice this would mean collecting lots of smaller amounts – for example from all the towns within a region – and transporting them to the regional hub. This suggests that adjoining shires might offer a joint contract to collect materials across their combined region.

Communities would not notice a difference at the collection level, as the service would continue to involve trucks emptying their bins.

Aggregration of the material at a centralised location might mean a bigger processing centre (to achieve economies of scale), which might impact the local community. Unfortunately, this could impact the success of the third goal.

Management and commitment

The "environmental justice" goal may be more problematic, as it is a relatively new concept.

It will be interesting to see how the competing demands between siting a smaller number of larger landfills or transfer stations and concentrating their impact can be reconciled.

On the downside, environmental justice has the potential to slow any waste infrastructure development if the process is not appropriately managed and resourced. It is time and labour intensive, and opens the process to NIMBYism (not in my backyard). Nobody wants a landfill anywhere near their home.

For the plan to realise its full potential, it will need strong commitment, including appropriate funding from both state and local governments. Environmental regulation comes at a significant cost and the community has to understand and support this direction. As a cultural concept, waste is like water and will always find the lowest level. The potential for evading costs associated with a clean environment and safeguarding the public health of communities is always present.Therefore, compliance and enforcement are also important aspects of the strategy going forward.

The plan will need to recognise the realities of recycling materials that currently do not have strong profitable markets in Australia, such as tyres, timber and electronic waste, unless waste to energy becomes a viable option. As much of this material is now exported in a semi-processed state, the strength of the Australian dollar, overseas demand and regulatory environment are all factors that will affect the viability of the recycling market.

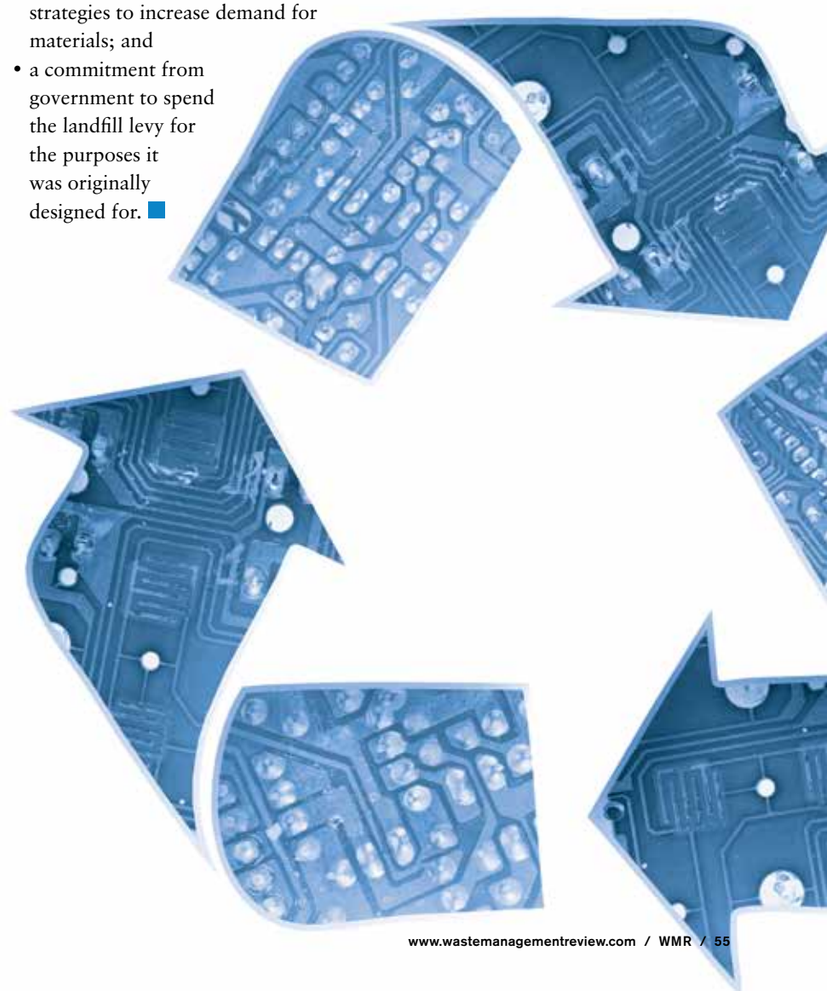
Conclusion

The SWIRRP is an exciting, visionary and ambitious plan. The Andrews government is to be commended for continuing the work commenced under the previous government and bringing it to its public release.

Nevertheless, the plan's success will come down to:

- adequate resourcing of the government bodies charged with its implementation (Sustainability Victoria and the waste management groups);
- the commitment of local government and industry to invest and plan;
- the acceptance of communities to balance their expectations;
- the success of market development strategies to increase demand for materials; and
- a commitment from government to spend the landfill levy for the purposes it was originally designed for. ■

"The SWIRRP is an exciting, visionary and ambitious plan. The Andrews government is to be commended for continuing the work commenced under the previous government and bringing it to its public release."



AUSTRALASIAN WASTE & RECYCLING EXPO 2015
12-13 AUGUST

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AWRE brings together the industry's most influential waste and recycling professionals for two days of sharing innovation developments and industry insights, as well as opportunities for networking.

www.awre.com.au

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9-11 SEPTEMBER

Cairns, Australia

The Queensland branch of the Waste Management Association of Australia (WMAA) is hosting the WasteQ Conference. The WMAA is the peak body for all stakeholders in the waste and resource recovery industry. This year's WasteQ will feature a strong program of speakers, covering topics under the theme is "Regional Waste Management – Opportunities and Challenges".

www.wasteq.com.au

WMAA 2015 VICTORIA STATE CONFERENCE
5-7 OCTOBER

Melbourne, Australia

Attracting Waste Management Association of Australia (WMAA) members and speakers from across Victoria, the theme of this year's conference is "Realising a circular economy".

www.wmaa.com.au

INTERNATIONAL SOLID WASTE ASSOCIATION 2015 CONFERENCE
7-9 SEPTEMBER

Antwerp, Belgium

The ISWA conference attracts waste professionals, industrialists, policy makers and industry innovators at all levels from around the world to advance discussion about the circular economy and making the most of our resources and waste.

www.iswa2015.org

WASTE & RECYCLE 2015 CONFERENCE
8–11 SEPTEMBER

Fremantle, Australia

The Waste & Recycle Conference brings together guest speakers and delegates to exchange ideas and information about the latest international and local waste and recycling methods.

www.wasteandrecycle.com.au

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Expected to be the biggest renewal of this event to date, the International Waste Management and Landfill Symposium focuses on advances in waste management science and technologies, sharing experiences and case studies from across the globe.

www.sardiniasymposium.it

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DIARY

If you are organising an event and would like it to appear in *Waste Management Review*, please email the Editor at **annmarie.unwin@primecreative.com.au**

Does social media
have a place in improving bin behaviour?

When speaking to anyone leading or innovating in the waste industry, the shared, repeated message is that the general public needs to be engaged for recycling and resource recovery to be successful.

But whose responsibility is that? And what is the best way to do it?

For the most part in Australia, local government is taking ownership of educating residents about the importance of using their waste collection amenities correctly. As councils have limited funds for marketing, social media have become the go-to channels for such communication campaigns.

The Australian Centre of Excellence for Local Government (ACELG) undertook research with councils in 2011-12 about their experiences with social media. The report concluded that councils have "much to gain from using social media", and that "a strategic approach to social media can achieve effective outcomes in engaging with communities".

One council in Victoria has successfully tapped into this trend. Its video, featuring a real-life refuse collector, to engage residents with the value of their waste and recycling service has gone viral.

Moreland City Council featured a side-load driver and operator in the first of a series of films aimed at promoting the value of local government services to the community. The innovative *It's dirty work* video shows Keith "The Garbo" Lawson at work on his green waste collection round, sharing his thoughts on the realities of his job and his contribution to a vital public service.

Keith "The Garbo" Lawson was the star of Moreland City Council's waste collection video, which went viral.

"Our objective was to personalise the service, whilst getting across the message about the cost of providing it against value for money," explains Moreland City Council Marketing and Communications Manager Marco Bass. "Our waste services management recommended Keith because he was articulate about his role and enthusiastic to be part of the campaign."

The video became a significant social media hit, with over 7,000 views on Facebook and over 700 likes, shares and comments to date.

"Keith's personality gives a face to waste collecting, in presenting the service from his point of view: how he likes doing his work but raise awareness of things that make the job difficult," Marco says. "That seems to have struck a chord with the community."

After seeing residents' response to the subject, the council immediately followed up with a *10 things you need to know about waste* guide, which it published on its website and in the local *Moreland Leader* newspaper.

"The public reaction was so positive that we piggybacked on it with the '10 things' guide," Marco says. "This aimed to help residents better understand what waste they should put in which bin and what materials can be recycled, as well as some weblinks to other useful information about our waste services."

Moreland City Council's experience with Facebook bears out ACELG's assertion that using social media can be a valuable tool in communicating with the general public. Although, ACELG does add that organisations need to have additional channels for targeting residents who don't have internet access.

Nevertheless, it appears that when it comes to communicating about waste services, using social media is anything but rubbish.

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