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WORDS FROM THE EDITOR

Although we are well and truly used to extreme weather events in Australia, this summer seems to have reached new levels. Just before Christmas, Sydney was hit by a cluster of storms which included one of the worst hail storms in 20 years. Intense humidity conditions resulted in the creation of hail the legendary size of cricket balls, which ripped through roofs, smashing solar panels, cars and basically anything in its path. One suburb has been lovingly coined 'Tarpaulin Heights' as many residents are still living under a sea of blue tents awaiting repairs to their roofs.

The Insurance Council of Australia declared the hail event as a "catastrophe" with over 20 million dollars' worth of claims being lodged as a result of this half-hour storm.

Extreme heatwave conditions and intense storms clusters are not only creating havoc for insurers but also putting strains on emergency services, health care, electricity and water infrastructure. The record-breaking temperatures reached across many places in South Australia forced the emergency diesel generator into action. And with dam levels dipping below 60%, the Sydney Desalination Plant has been reactivated.

As climate continues to change, our buildings and infrastructure must remain smart and resilient.

In this issue, we explore further how research and new technology may help the built environment become more sustainable and resilient to climate change.

We also chat with the 2018 WMAA 'Women in the Environment' winner, Dr Helen Lewis, about her long history as a product stewardship advocate, how she first started out in the business and her thoughts about the challenges ahead for the resource recovery industry.

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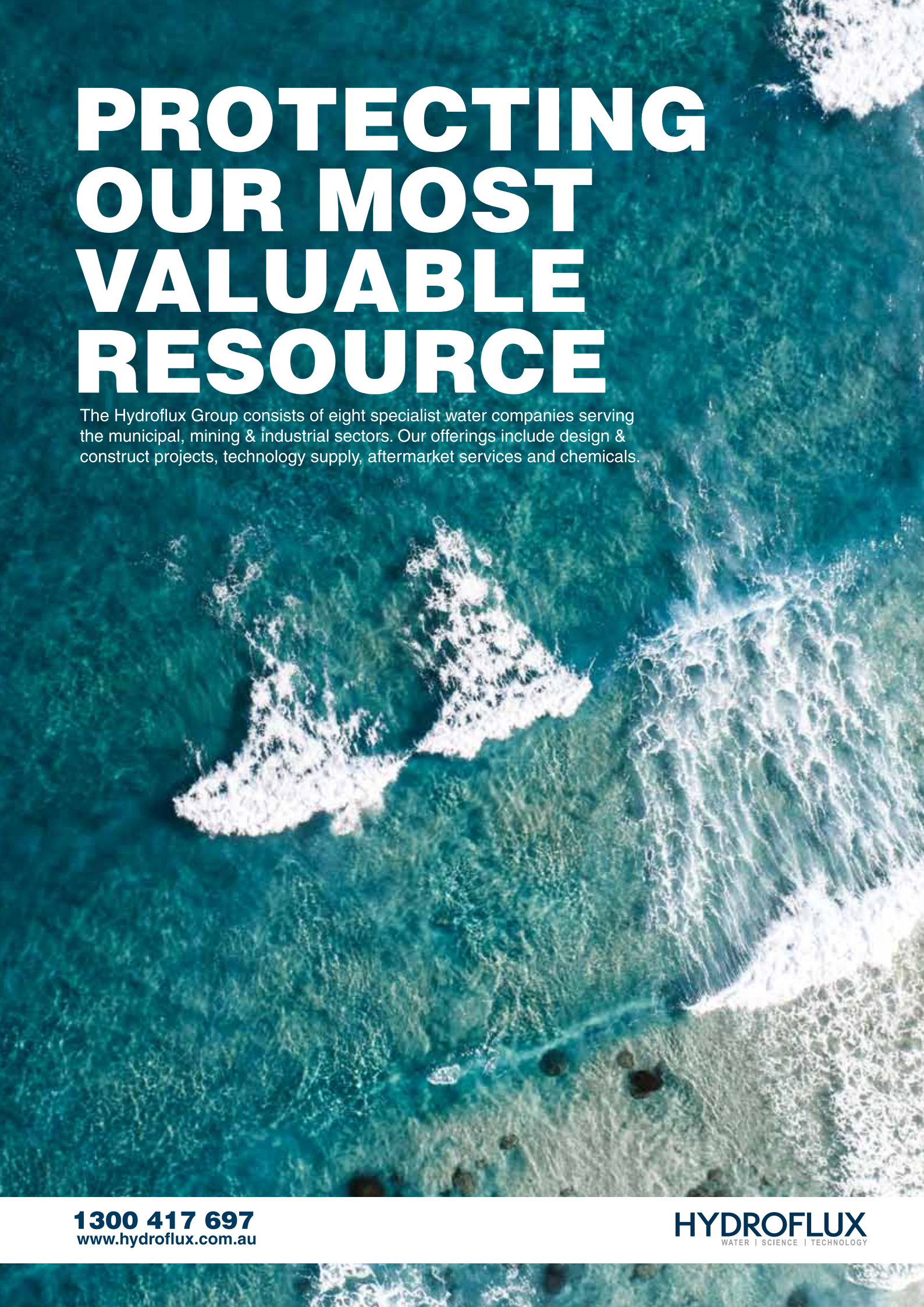
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Booming after the war… on waste

Winner of the 2018 WMAA* Women in Environment Award, product stewardship advocate Dr Helen Lewis^ said now is a great time to be involved in the resource recovery industry and she'd like to encourage more women to get involved in the industry and aim for higher profiles.

> **"Battery stewardship programs can add value by providing a way of accessing raw materials, such lead, nickel or cobalt, at a more stable price rather than relying on fluctuating commodity markets.**

Over the last 12 months, Dr Lewis has seen a significant shift in the mindset of industry, government and consumers when it comes to waste matters. This has provided great momentum for the resource recovery industry, which is now ripe for the picking.

The reason for the momentum is threefold, according to Dr Lewis. She said greater government and industry awareness has resulted from 'China's wake-up call' (referring to China's National Sword policy, which stopped 1.25 megatonnes of recyclables previously exported to China). Secondly, there has also been a push for recycled content in packaging, with the release of sustainable packaging targets late last year from Australian Packaging Covenant Organisation (APCO). Thirdly, she believes community awareness has peaked thanks largely to ABC's *War on Waste* programs. "Some companies have told me they need to have extra staff on standby to deal with the bombardment of calls and questions from customers after each episode aired," Dr Lewis said.

Back to the future

Even back in the '90s when Dr Lewis first started out in the product stewardship field, industry had been under pressure to do something about waste and litter; however, there was not quite the same amount of community support that we're experiencing now. "It just so happened that the program I was first involved with [in the plastics industry] was about product stewardship, but it wasn't called that at the time," she said.

"[The program] was about setting up recycling programs, litter education and a whole lot of issues that have now come back into the fore.

"I started out on a one-year program, stayed for five and I've been in product stewardship ever since."

She then went on to manage an eco-design research and training program at RMIT University, which allowed her to work closely with manufacturers and establish a real insight into how product design and industry can play a crucial role in improving recycling.

But her watershed moment came in 2010, when she secured the role as CEO at Australian Battery Recycling Initiative (ABRI). Dr Lewis recalls that at the time hazardous battery waste hadn't been addressed, except for lead acid batteries, and there was a real gap in product stewardship.

For six years Dr Lewis and a very active group of industry and government members got their teeth stuck into designing a product stewardship program for batteries, making sure that batteries were firmly on the policy and industry agenda. Although the groundwork has been laid, there is still more work to be done to establish a successful product stewardship program as battery recycling is still only at around 5–10% in Australia. So what's the secret to a successful program?

Model success

"Product stewardship looks carefully at the life cycle impact as well as recycling and waste management," Dr Lewis explained. "We look at how the product can be designed so that it has the least impact at end of life. It really is the only way forward for a lot of complex products that are in the waste stream, such as electronics and batteries."

At ABRI, Dr Lewis conducted research into various regulatory and funding models to determine how to design a battery stewardship program that could work for everybody — industry, government and consumers. "The challenge [for product stewardship programs] is to build them into 'business as usual' and work out how these programs will be funded.

Regulation would have been easier, Dr Lewis admits. "But we have a reluctance in this country to regulate, so we have to be clever about how we can build [product stewardship] into new and innovative business models.

continued over ›

**On 1 January 2019, the Waste Management Association of Australia (WMAA) changed its name to the Waste Management and Resource Recovery Association of Australia (WMRR).*

^Dr Helen Lewis is the principal of Helen Lewis Research, an environmental consultant specialising in product stewardship and sustainable packaging. She is also an Adjunct Professor with the Institute for Sustainable Futures (ISF). For six years until November 2016, she was chief executive of the Australian Battery Recycling Initiative (ABRI). Prior to that, she was director of the Centre for Design at RMIT University where she managed an innovative research, consulting and training program to promote more sustainable design of buildings, products and packaging.

"The programs that work well are set up with that whole different perspective — adding value, not just a cost."

For example, battery stewardship programs can add value by providing a way of accessing raw materials, such lead, nickel or cobalt, at a more stable price rather than relying on fluctuating commodity markets, Dr Lewis explained. They can also contribute to a company's reputation and build customer loyalty by providing a convenient and environmentally responsible recycling service.

Shared responsibility

In Australia, Dr Lewis believes the product stewardship business models need to be designed around a shared responsibility between industry and government.

"Municipal councils have a critical role to play in the waste management system but a lot of product stewardship programs in the past haven't engaged as much as they should have with councils.

"It should have been more of a partnership rather than last-minute," she said.

What concerns Dr Lewis now is the growing amount of complex waste still ending up in landfill. "You see [it] all the time on the footpath as hard waste. It's a terrible waste that these products just get crunched up and sent to landfill."

Dr Lewis suggests that it may be a good idea for councils to build on the momentum and start putting a bit more pressure on companies to set up product stewardship programs, "whether it's carpet, textiles or furniture manufacturers, all the type of things that we see on the nature strip that really could be recycled.

"A little bit of lobbying from the council's point of view could help because, after all, they are the ones that have to deal with it so the pressure should be put back onto industry.

"They can also play a role in putting product stewardship more firmly on the federal government's agenda so that we get more national leadership."

Getting on target

Although previously not a fan because of its relatively high cost, Dr Lewis sees the Container Deposit Scheme (CDS) as a positive step as it, too, is helping to change the consumer's mindset and get them into the habit of taking things back. "We should be able to build on that mindset shift for all sorts of other products, such as clothing, batteries, mobile phones and other small electrical items that can be easily carried to a drop-off point," she said.

Through her more recent role as Adjunct Professor with the Institute for Sustainable Futures (ISF), Dr Lewis was involved with the research behind the new APCO sustainable packaging framework.

"The packaging targets, while voluntary, are already starting to drive a lot of change.

"Ultimately, we may need more regulation, but I think the targets alone are really motivating industry to do a lot more."

Building on the momentum

From a corporate branding perspective alone, product stewardship can be a real positive. "Consumers now really do want companies to do the right thing and respect companies that do."

After 20 years in the environmental management business, Dr Lewis said: "Now is the time for us to capitalise on the momentum to generate change."

The APCO 2025 National Packaging Targets include:

- **100% of all Australia's packaging will be re-usable, recyclable or compostable by 2025 or earlier.**
- **70% of Australia's plastic packaging will be recycled or composted by 2025.**
- **30% average recycled content will be included across all packaging by 2025.**
- **Problematic and unnecessary single-use plastic packaging will be phased out through design, innovation or introduction of alternatives.**

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Building cities changing climate

Dr Anna Hurlimann and Dr Georgia Warren-Myers, University of Melbourne

Our cities are responsible for a large chunk of the world's greenhouse gas emissions, so the way we plan and construct them has to adapt to the future impacts of climate change.

Worldwide, buildings are responsible for 19% of greenhouse gas emissions and our cities are responsible for up to 70%.

So, designing buildings that produce fewer greenhouse gas emissions is vital to help limit global warming and the threats it poses. But we also need to ensure buildings are designed and constructed to cope with our changing climate conditions to bolster their longevity.

This means the construction sector has a significant role to play in mitigating and adapting to climate change.

The urgency of rapidly reducing greenhouse gas emissions was highlighted in the bleak prognosis from the recent Intergovernmental Panel on Climate Change (IPCC) special report.

The IPCC report, released last year, states that "limiting global warming to 1.5°C would require rapid, far reaching and unprecedented changes in all aspects of society".

This includes changes in the way cities currently function, including land use, energy, industry, buildings and transport.

Our research identifies several barriers inhibiting the construction industry's response to adapting to climate change.

The current regulatory framework is a key hurdle that many stakeholders within the Australian construction industry raised in our interviews. The National Construction Code doesn't explicitly address climate change.

Updating the regulations is an opportunity to set new benchmarks for the industry. The National Construction Code and its associated standards need to be reviewed and strengthened to ensure climate change adaptation and mitigation are addressed.

In the absence of any updated regulations, another barrier is the lack of client demand for buildings to be designed and constructed to address climate change. This sits alongside the perceived additional cost of building and including these mitigation and adaption measures.

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> **"It's critical the construction code is updated to ensure that new buildings going up now address the changes we know are occurring and will continue to escalate in the future.**

Australia's National Construction Code doesn't explicitly address climate change.

Yet many people we interviewed say better regulation to address climate change would be beneficial. This would create a 'level playing field' for the industry and encourage innovation in the sector.

Significant climate change impacts will happen within the life cycle of buildings that are being constructed now. So it's important to design for these changes today.

For example, considerations need to be made now to ensure gutters and drains are built to a size that can cope with bigger rainfall events, and to ensure that our homes stay cooler for longer during increasingly hot summers.

Preparing for our new extremes

Unless we rapidly reduce our greenhouse gas emissions, we will all face significant and catastrophic impacts including increasing drought periods, a spike in the number of extreme heat days, increasing rainfall intensity and a rising number of extreme events like floods, cyclones and bushfires.

These changes will influence the way our economy and society function.

To limit warming to 1.5 degrees (above pre-industrial levels) by 2100, and to limit climate change impacts, we need to reduce our global greenhouse gas emissions, fast — to 50% by 2030 and net zero emissions by 2050.

As the IPCC's special report says, achieving this goal will require a rapid transformation of our urban infrastructure systems including transport, the layout of our cities, and the design and construction of buildings.

If we construct buildings that are unable to withstand future weather conditions, we'll need more electricity to heat and cool our homes and workplaces.

Ignoring future climate change in construction will mean many buildings become redundant.

But where we build will also be important; the further out, the more likely we'll see more transportation-related greenhouse gas emissions, like travel modes for work and leisure. We will need to facilitate city growth on sites that aren't vulnerable to future risks such as sea level rise.

In addition, risk to operational capacity and building obsolescence will become key considerations for owners and occupiers alike, requiring forward planning and construction of buildings to withstand and cope with future challenges.

Australia is going through a significant period of population growth. This translates to a large volume of construction, like dwellings and associated urban infrastructure, which is underway in many parts of the country.

It's critical the construction code is updated to ensure that new buildings going up now address the changes we know are occurring and will continue to escalate in the future.

Ignoring future climate change in construction is likely to end with many buildings and infrastructure projects becoming redundant, expensive to run or maintain, or even uninhabitable. This creates a plethora of problems for current and future generations.

Our research found all disciplines involved in creating a built environment have a role to play in addressing climate change — architects, urban designers, planners, engineers, builders and constructors are all integral to making a change.

Understanding how these sectors integrate and influence each other, and how they operate within policy and regulatory frameworks, is crucial to reduce greenhouse gas emissions and so limit the harsh consequences of irreversible climate change.

The research was conducted by Dr Anna Hurlimann, Professor Valerie Francis, Dr Georgia Warren-Myers and Dr Geoff Browne from the University of Melbourne's Faculty of Architecture Building and Planning. It was funded by The Multiplex Research Program Award.

University of Melbourne
www.unimelb.edu.au

Sensor technology
to manage sewer network

South East Water has reinforced its commitment to a healthy and livable Frankston community with a series of sewer management programs designed to minimise the impact of spills on the environment. These include working closely with Frankston City Council to better communicate and manage significant sewer spills, and deploying a sensor technology on the region's sewer network.

South East Water's General Manager Future Water Strategy Phil Johnson with Frankston City Council Deputy Mayor Cr Colin Hampton.

Working with Council allows the organisations to be closely aligned with improved communications to minimise any potential impacts on local waterways, creeks, the beach and the communities who use them, should a significant spill occur.

Responsibilities between the two organisations include:

- coordinating clean-up responses to minimise any impact on the community;
- working together to inform the community of any impacts on beaches or waterways;
- working with key stakeholders to minimise any impacts of a spill;
- maintaining contact throughout spill and clean-up activity, 24 hours a day if necessary.

South East Water has also started deployment of Advanced BlokAid technology in the Frankston area. Developed by South East Water, the sensor technology is installed at the top of manholes and monitors sewer levels, flow rates and detects corrosive gases. Data is sent in real time to South East Water's operations team to detect and remove blockages before a spill occurs.

This technology has already helped South East Water detect blockages and prevent potential spills in its network, and is expected to have a positive impact on the Frankston area moving forward.

South East Water's General Manager Future Water Strategy, Philip Johnson, said his organisation is pleased to work together with Council to minimise spills to the environment.

"We're committed to reducing the number of spills in our network to zero. In the meantime, our collaboration with Frankston City Council allows us to act faster than ever to protect people's health and limit the impact of significant sewer spills on the environment," said Johnson.

The Mayor of Frankston City Council, Cr Colin Hampton, said Frankston City is known for its beautiful beaches and photo worthy creeks, which are huge attractions for visitors and locals alike.

"Protecting our waterways is incredibly important, and we are pleased to be working with South East Water so that we are prepared should the worst happen. By working together we can reduce impact to the community and environment as quickly as possible," added Cr Hampton.

In addition, South East Water is implementing a proactive Sewer Cleaning Program, which targets sewers that have had previous blockage history to prevent a recurrence.

South East Water has also committed to minimising sewage spills to the environment through its Five-year Customer Commitment. This includes committing to donate up to $10,000 to a community group affected in the event of a dry weather spill that results in a beach closure.

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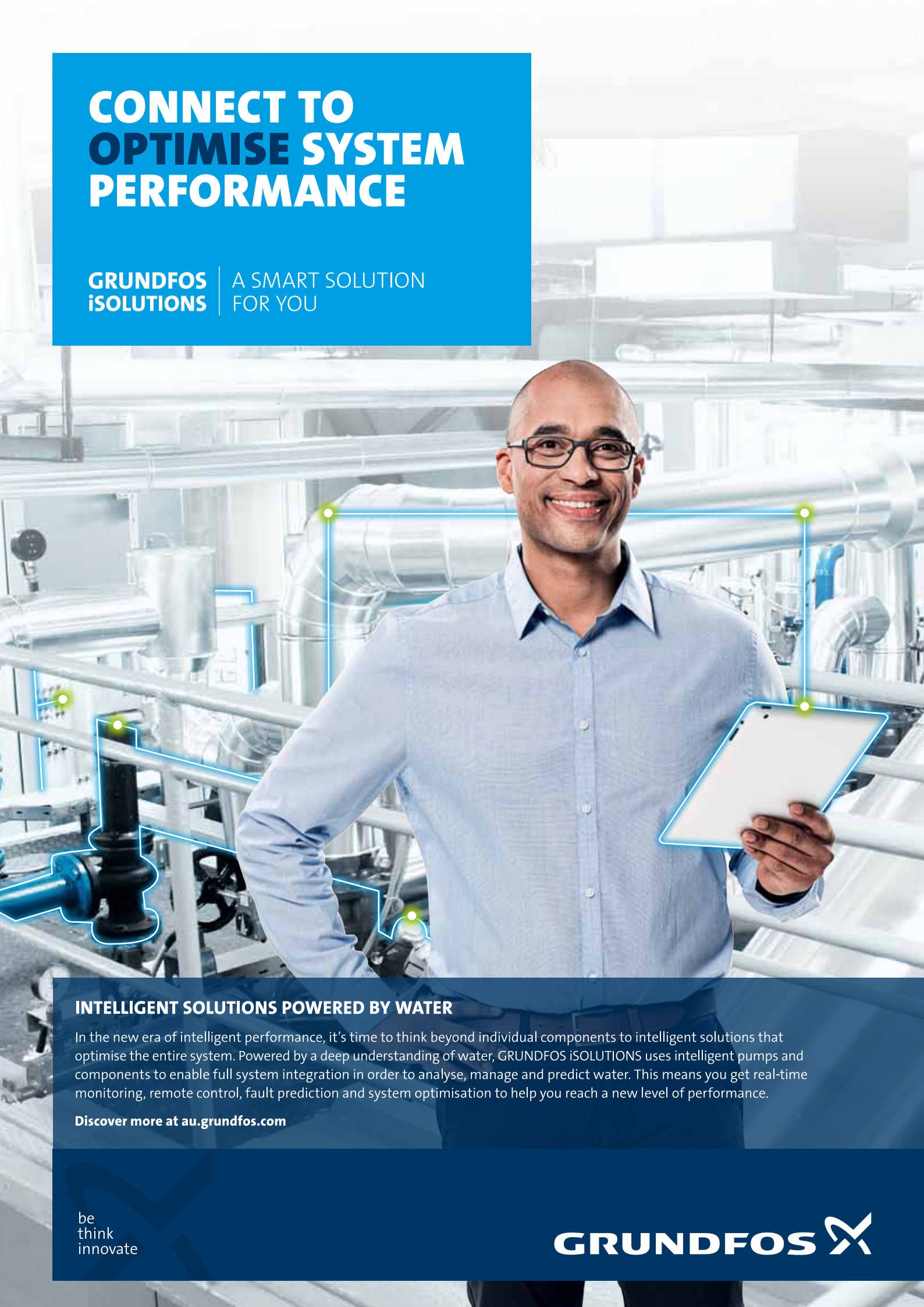

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Coca-Cola Amatil to roll out 10,000 solar panels

Energy services company Verdia has been selected to manage a 10,000 solar panel rollout across the bottling operations of Coca-Cola Amatil. The project is part of an estimated 68 MW of behind-the-meter solar PV systems being developed and installed by Verdia across Australia, covering the property, manufacturing, agribusiness, government, education, health and aged-care sectors.

Coca-Cola Amatil's 3.5 MW solar PV system will be installed across three sites in three different states over the next 8–10 months. Covering a total of around 2 ha, the project will help to cut the company's annual energy costs by up to $1.3 million.

"This is one of the biggest rooftop programs in the country — we're installing enough solar panels to cover 42 average suburban blocks," said Verdia CEO Paul Peters.

"By mid 2019, Coca-Cola Amatil will be drawing around 14% less energy from the local electricity grid across these three sites. They're replacing it with power from the sun, which equates to a reduction of 4163 tonnes of greenhouse gases each year."

An aerial view of the 1.7 MW solar array that is set to be installed at Coca-Cola Amatil Eastern Creek Distribution and Warehouse Centre.

Site location	Size of solar PV	MWh production pa
Eastern Creek (NSW)	1717 kW	2446 MWh
Kewdale (WA)	692 kW	1112 MWh
Richlands (Qld)	1118 kW	1715 MWh
Total	3527 kW	5273 MWh

Verdia completed site inspections, electrical connection investigations, engineering designs and financial modelling as part of the scoping work for the project. It will then manage more than 50 contractors and suppliers working across NSW, Queensland and Western Australia to fast-track the project delivery. Verdia will continue to monitor and maintain the systems.

Coca-Cola Amatil's Managing Director for Australian Beverages, Peter West, said the investment made sense both commercially and environmentally, noting, "On current figures the installation will pay for itself in six to seven years and is expected to provide an additional $14 million benefit over its lifetime.

"We're also committed to obtaining at least 60% of our energy needs from renewable and low-carbon sources by 2020.

"So this installation is a win-win for us, and congratulations to the team at Verdia for helping make it a reality."

Verdia
verdia.com.au

Melbourne Museum enlists Siemens for solar array

Siemens is helping Museums Victoria progress towards a brighter and more sustainable future, with the state-owned cultural institution installing what is believed to be the biggest solar array in metropolitan Melbourne.

Museums Victoria is the largest public museum organisation in Australia and attracts approximately 2.5 million visitors each year across landmark buildings including the Melbourne Museum, Scienceworks, the Immigration Museum and the Royal Exhibition Building.

The solar array project, which kicked off on 18 November, saw helicopters transport 1350 solar panels from the grounds of Carlton Gardens to the roof of the Melbourne Museum. The plan is to eventually install a total of 2700 solar panels across four of Museums Victoria's iconic sites.

The installation is part of a broader partnership between Siemens and Museums Victoria which has already seen new LED lighting, chillers and water systems, and building management systems installed at the organisation's iconic locations. Once complete, the initiative will help cut the organisation's emissions by 35%, saving 4590 tonnes of carbon dioxide emissions per year — the equivalent of 983 cars' worth of emissions a year.

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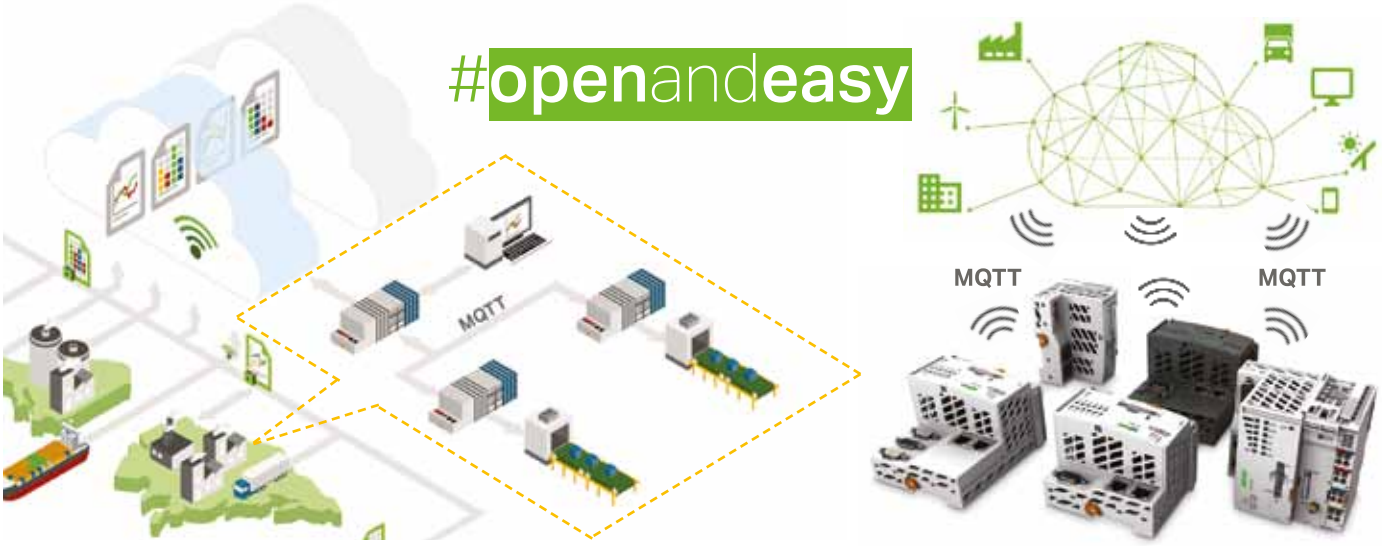

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Where do our cities rank globally for sustainability?

As the Australia Pacific region continues to grow in importance on the global stage, it will become ever more critical that the region's leading cities learn from each other and continue to innovate, develop and evolve. Key to this is sustainability.

But what makes a city sustainable? Is it a focus on traditional 'green' sustainability, economic strength or how livable the city is for people? We believe it is a mix of all three.

The latest Arcadis Sustainable Cities Index, which ranked 100 of the world's leading cities on three pillars of sustainability (People, Planet and Profit), found that Australian cities are behind several others in the region and across the world.

Where did Australian cities rank?

Sydney topped the ranking for Australia at #34, with London coming in at #1 globally. European cities dominated the top of the overall index, occupying eight of the top 10 spots. Australian cities all scored middle of the road on the index, with Canberra coming in at #35, Brisbane #44 and Melbourne not making the top half at #56.

While not a cause for alarm, these rankings reinforce that Australian cities need to improve to compete on the global stage. Our cities must continue to focus on improving their long-term sustainability, resilience and performance to remain commercially attractive.

What can we learn from our neighbours?

In comparison, Asia's two leading financial centres, Hong Kong and Singapore, made it

into the top 10, with Singapore ranked #1 globally in the Profit sub-index with ease of doing business being a strong performer for the city.

While vastly different in terms of culture, economies and politics, a key take-out from the report was the importance of integrated, efficient and smart infrastructure.

Hong Kong has long been famous for its world-class infrastructure, but as one of the planet's most densely populated cities, it faces unique challenges in providing an efficient transportation system to meet the needs of its 7.4 million citizens. Some of these lessons are critical for Sydney and Melbourne, which are in the middle of the largest infrastructure boom in recent memory. Projects such as Sydney Metro and Melbourne Metro will transform movement across these two cities; however, they should continue to look at how Hong Kong has used this infrastructure as an opportunity to deal with its citizen connectivity, wealth-gap and affordability challenges.

Australian cities, particularly in Sydney and Melbourne, have addressed some of this in recent years by shifting their focus from just green sustainability to social sustainability. Both government and private developments are increasingly focusing on how projects can better improve communities, including financial gains and community wellness. This isn't just putting a park or garden next to a train station but looking holistically at a local community and how it interacts with transit hubs from the perspective of the citizen.

This shift in priorities is reflective of a broader 'consumer first' mindset that is driving major developments across the nation, ultimately creating stronger communities as a result of major projects.

This mindset shift, along with the nation's strong focus on developing integrated transit systems, addressing affordability and embracing sustainability in construction, are all positive signs for future improvement across the three pillars.

What defined the cities at the top of the index?

The cities at the top of the index have succeeded in achieving a degree of sustainable balance not only due to an historic economic legacy, but also due to far-sighted decisions taken to manage the long-term impacts of growth.

London is one of few high-performing cities in the index with relatively similar scores across the three pillars of sustainability, even though it still faces huge challenges associated with affordability and congestion. Most highly ranked cities scored well in one or two pillars. This means that even a high score in the Sustainable City Index does not offer any room for complacency. Also, high- and middle-ranking cities need to improve their performance across all pillars.

The report also highlighted the impact the rapid rollout of digital technologies has on citizens' experience of the city, and on the relationship between the city and its people. Resiliency data for flooding or super storms, digitised utility bills and personalised mobility apps for mobility as a service (MaaS) are some examples of successful urban digital tools. Nevertheless, technology is not yet able to mitigate some of the ordinary urban discomforts, such as traffic jams, a lack of affordable transport options, the absence of sufficient green space or the uncertainties caused by ageing infrastructure, among others.

Key to improvement is a focus on well-planned long-term resilience, even if cities are subject to short-term changes and trends. The successful path to long-term resilience requires the support and involvement of citizens, while at the same time, cities can also learn from each other.

Sustainable Cities Index Australia Pacific: www.arcadis.com/SCI18_AU.

Arcadis Pty Ltd
www.arcadis.com

Being part of the Smart21

The Sunshine Coast is one of three Australian regions named in the Intelligent Community Forum's (ICF) Smart21 Communities for 2019, recognising it as a global leader in smart technology and innovation. It's the fifth time in six years that the region has earned a place on the list.

Steve Baxter pictured with Nambour State College teacher Shane Cunningham and students Jessica Poole and Ray Steele at the MTTA awards.

Headquartered in New York, the ICF is a global movement of 180 cities, metro regions and counties with a mission to make everyone's home town a great place. The ICF studies and promotes the best practices of the world's intelligent communities as they adapt to the new demands and seize the opportunities presented by information and communications technology.

The Smart21 are selected from hundreds of submissions, which are reviewed over an eight-month process by ICF analysts led by former Cisco Executive and Westchester County (New York) CIO Dr Norman Jacknis. Each submission must provide quantitative and qualitative data to demonstrate the delivery of initiatives aligned to the six intelligent community indicators: broadband, knowledge workforce, innovation, digital equality, sustainability and advocacy.

The 2019 winners were announced at an ICF event held in Hamilton, Ontario on 25 October.

"Being part of the Smart21 demonstrates that we are delivering world-class initiatives across all of the six intelligent community indicators, and ones that will benefit the community well into the future," said Sunshine Coast Mayor Mark Jamieson.

"The International Broadband Submarine Cable, which is set to be operational by mid-2020, is just one example which will further assist us to build a healthy entrepreneurial ecosystem.

"The 2019 theme of infinite learning is consistent with our objectives for our region. "The skills required in the workforce are changing and to meet the changing landscape there needs to be programs that can support the young and old as they manage their way through that transition.

"As a council we support a number of initiatives, including Level Up, RoboCoast, Mayor's Telstra Tech Awards (MTTA) and GovHack.

"Our highly successful Sunshine Coast Regional Innovation Pipeline Team (SCRIPT) program incorporates the Smart21 principles to drive economic outcomes that will support our existing innovation ecosystem to grow exports, create new jobs and attract talent and business expansion to the region."

Local entrepreneur Emma Baxter, founder of YOUtax, said SCRIPT and the Level Up program have enabled her company to provide extra value to clients and service them in a more simple and convenient way, thanks to the implementation of a number of digital systems for a superior online service.

Jessica Poole, Anto Thomas and Ray Steele, from Nambour State College, meanwhile benefited from the MTTA program. They developed a concept called 'Driving Mate', which offers incentives for people to put their phone away behind the wheel, and received a Highly Commended award for their efforts — as well as the opportunity to meet with entrepreneur and investor Steve Baxter.

Sunshine Coast Innovation Centre CEO Mark Paddenburg said being a Smart21 community has helped to reinforce the Sunshine Coast's strong reputation as a dynamic hub for innovation and entrepreneurship.

"Our region has a unique entrepreneurial ecosystem where industry contemporaries collaborate, and where innovation, new ideas, entrepreneurs and start-ups are actively supported and encouraged," Paddenburg said.

"And with the backing of international awards like this, we will continue to grow."

For the next phase in the ICF awards program, seven communities will be selected as the Top7 Intelligent Communities of 2019 on 11 February 2019. One of the Top7 will be named the Intelligent Community of the Year on 13 June during an awards dinner at the 2019 ICF Global Summit, New York.

"We know there will be strong competition for the Top7, but we feel our region is up for the challenge," Mayor Jamieson said.

Other Australian cities included in this year's Smart21 include Adelaide and Prospect, both in South Australia. The full list of communities is as follows:

- Abbotsford, British Columbia, Canada
- Adelaide, South Australia, Australia
- Binh Duong Smart City, Vietnam
- Chiayi City, Taiwan
- Chicago, Illinois, USA
- Curitiba, Paraná, Brazil
- Greater Victoria, British Columbia, Canada
- Hudson, Ohio, USA
- Issy-les-Moulineaux, France
- Keelung City, Taiwan
- Moscow, Russia
- Nairobi Country, Kenya
- Prospect, South Australia, Australia
- Rochester, New York, USA
- Sarnia-Lambton County, Ontario, Canada
- Sunshine Coast, Queensland, Australia
- Surat, Gujarat, India
- Tainan City, Taiwan
- Taoyuan, Taiwan
- Westerville, Ohio, USA
- Winnipeg, Manitoba, Canada

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Weather data helps factory reduce energy consumption

Chemical and consumer goods company Henkel has announced the positive results of implementing smart home technology in its manufacturing plants. Henkel uses Netatmo's Smart Home Weather Stations in all 31 of its laundry and home care factories to correlate weather data with potential procedures and changes to its manufacturing processes.

The Smart Home Weather Station consists of two components: an indoor and an outdoor module. Henkel uses the smart device to analyse the outside temperature, humidity and relative air pressure at the company's production sites and correlate the data with energy consumption. The stations connect with Henkel's monitoring system through the Netatmo API (app programmable interface) to retrieve, process and analyse the data against other factors inside the factories.

The data is helping Henkel to understand the impact weather has on energy and utility consumption; as a result, limited natural resources such as gas and water can be used in a more efficient and sustainable way. The weather stations also add value to Henkel's product quality: for example, gathered data helps to better predict changes to the production area and its materials due to humidity. This is particularly important for products that are highly sensitive to these factors, eg, dishwasher tablets.

"We see potential to reduce our global energy consumption by 3–5%," said Johannes Holtbrügge, Senior Manager Digital Transformation at Henkel.

For example, at its production factory in Düsseldorf, Germany, Henkel increased the burner efficiency of its spray tower for producing power detergents by 5%. Additionally, the company optimised the process for the gas burner for the tower and the temperature control along the entire drying process.

Factories can therefore use easily available products like Netatmo's to analyse their current situation and derive appropriate measures for energy and utility consumption programs. According to Netatmo CEO Fred Potter, "This shows yet another way our products can help communities beyond home customers."

Henkel Australia Pty Ltd
www.loctite.com.au

Major Australian brewery supplied with solar power

Nine months after signing a 12-year power purchase agreement (PPA) with renewable energy provider BayWa r.e., Carlton & United Breweries (CUB) has begun using solar power for its brewery operations.

The PPA entitles CUB to 74,000 MWh per year of renewable energy — enough to power 7500 homes — from BayWa r.e.'s newly completed solar farm in Karadoc, Victoria. The 112 MW solar farm, which at 269 ha is the largest in Northern Victoria, was constructed by Melbourne-based Beon Energy Solutions and achieved full energisation in November, enabling CUB to begin sourcing renewable energy generated at the farm.

"This is an important step towards achieving our commitment to source 100% of our electricity from renewables," said Peter Filipovic, CUB's Business Unit President.

"In addition to our PPA, we will soon be installing solar panels at our breweries.

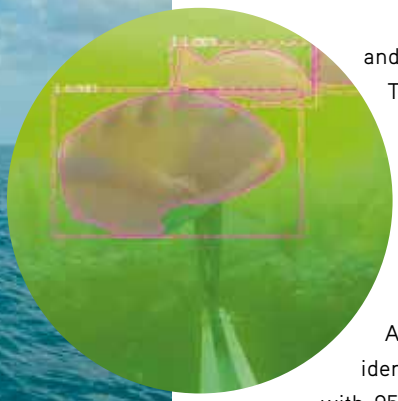
"Everyone has a responsibility to play their part to tackle climate change. CUB is no different.

"The investment also stacks up when you look at the reduced price we will be paying to power our operations. Moving to renewable energy will ensure that we have certainty of supply and pricing."

Matthias Taft, a board member at BayWa AG, commented: "This is a great milestone for BayWa r.e. in Australia. Since entering the market in 2016, we have become active in solar and wind development as well as the solar installer wholesaler market.

"With Karadoc coming online, the partnership we have with CUB is a great example of how corporations are taking an active lead in driving the renewable transition in Australia.

"We are delighted to be playing our part in supporting CUB in realising its renewable energy goals."



AI monitors marine health in Darwin Harbour

The Northern Territory has deployed a Microsoft AI solution to help monitor and manage marine health by rapidly analysing underwater video captured around Darwin Harbour.

The Northern Territory boasts healthy populations of species such as sharks and sawfish, with its fish and marine resources supporting customary use, commercial and recreational fishing as well as tourism. The value of goods and services produced by the Territory's primary industries and fisheries reaches over half a billion dollars each year.

Unable to enter the water directly because of risks posed by saltwater crocodiles and sharks, scientists from the Department of Primary Industry and Resources (DPIR) previously attached underwater cameras to buoys in protected reefs off Darwin. They then spent tens of hours watching footage in order to spot and count fish.

The new open source AI platform, developed in association with Microsoft and available on GitHub, automates this laborious process of counting local fish stocks by progressively learning to identify different varieties of fish. It is able to analyse hours of video in minutes, freeing up scientists for more valuable ecosystem sustainable management work.

"Cloud computing and AI are combining to support scientists to gain a deeper understanding of fish populations," said Microsoft Australia National Technology Officer Lee Hickin. "Freed from the mundane aspects of counting and identifying fish, scientists can instead take the insights from the AI solution and focus on making informed decisions that have significant environmental and economic impacts."

Using Microsoft Azure AI services, the first iteration of the system was up and running in a month. The solution was widely deployed within six months, and its identification powers have been progressively enhanced using machine learning ever since. The AI system is now able to identify a fish in a video with 95–99% accuracy.

DPIR fisheries scientist Dr Shane Penny said that two particular species — the golden snapper and black jewfish — have been closely monitored with the technology, as research has proven that these commercially and recreationally important species have been overfished around the greater Darwin area. DPIR Chief Information Officer Rowan Dollar is meanwhile keen to explore the potential regulatory applications of the technology; for example, keeping an eye on the commercial catch.

"We could look into setting up a camera on a trawler that's out at sea and doing on-the-fly identification of the catch, so we can start measuring by catch," he said. "We can start being able to identify that in real time, to help better manage those fisheries."

Further potential applications across the NT are already being considered, including monitoring feral fish in the freshwater systems and cattle movements across the Territory.

The solution also has global conservation potential as it can be trained to spot an array of different animal and fish species, using techniques similar to those used for facial recognition in social media. The fact that it is open source meanwhile creates potential for similar platforms to be deployed in different settings around the world, to support important scientific endeavours that will benefit the Earth's environment and humanity.

"It's important for every government jurisdiction, regardless of who you are or where you are, to be using technology to gather and analyse data," said Dollar. "It'll help you be more efficient and give better value back to your stakeholders."

Microsoft Pty Ltd

www.microsoft.com.au

Nestlé taking steps to eliminate plastic waste

Nestlé has announced a series of specific actions towards meeting its April 2018 commitment to make 100% of its packaging recyclable or re-usable by 2025, with a particular focus on avoiding plastic waste.

According to Nestlé CEO Mark Schneider, "Our broader vision and action plan outline our commitment and specific approach to addressing the plastics packaging waste issue.

"While we are committed to pursuing recycling options where feasible, we know that 100% recyclability is not enough to successfully tackle the plastics waste crisis. We need to push the boundaries and do more. We are determined to look at every option to solve this complex challenge and embrace multiple solutions that can have an impact now. We believe in the value of recyclable and compostable paper-based materials and biodegradable polymers, in particular where recycling infrastructure does not exist.

"Collective action is vital, which is why we are also engaging consumers, business partners and all of our Nestlé colleagues to play their part."

Seeking to address the multifaceted issue of plastic pollution — a goal which requires a holistic view and a well-orchestrated effort — Nestlé has announced tangible steps to pioneer alternative materials, shape a waste-free future and drive behaviour change.

Pioneering alternative materials

In December 2018, Nestlé announced the creation of its Institute of Packaging Sciences to evaluate and develop various sustainable packaging materials and to collaborate with industrial partners to develop new packaging materials and solutions.

Between 2020 and 2025, Nestlé will phase out all plastics that are not recyclable or are hard to recycle for all its products worldwide. In doing so, the company is rolling out alternative packaging materials across its global product portfolio and establishing partnerships with cutting-edge packaging specialists:

- Starting in February 2019, Nestlé will begin to eliminate all plastic straws from its products, using alternative materials like paper as well as innovative designs to reduce littering.
- Nestlé will also start rolling out paper packaging for Nesquik in the first quarter of 2019 and for the Yes! snack bar in the second half of 2019. Smarties will start rolling out plastic-free packaging in 2019 and Milo will introduce paper-based pouches in 2020.
- Nestlé Waters will increase the recycled PET content in its bottles to 35% by 2025 at the global level and will reach 50% in the US, with a specific focus on its iconic brand Poland Spring. In addition, Nestlé Waters will increase the recycled PET content for its European brands Acqua Panna, Buxton, Henniez and Levissima to 50% by 2025.
- The Nestlé Institute of Packaging Sciences is exploring new paper-based materials and biodegradable/compostable polymers that are also recyclable, among other alternatives. This could become a valuable option in places where recycling infrastructure does not yet exist and will not be available for some time.
- Nestlé has formed a global partnership with Danimer Scientific to develop a marine biodegradable and recyclable bottle for its water business. Danimer Scientific, based in the US, is a pioneer in creating more

sustainable and more natural ways to make plastic products.

- Nestlé has initiated a collaboration with PureCycle Technologies to produce food-grade recycled polypropylene (PP). PureCycle Technologies is commercialising recycling technologies which can remove colour, odour and contaminants from plastic waste feedstock in order to transform it into virgin-like resin. Polypropylene is a polymer commonly used for packing food in trays, tubs, cups and bottles.

Shaping a waste-free future

As well as delivering on its 2025 commitment, Nestlé has a longer-term ambition to stop plastic leakage into the environment across its global operations. This will help avoid further accumulation of plastics in nature and achieve plastic neutrality.

The company has also become the first food company to partner with Indonesia's Project STOP — an initiative to prevent the leakage of plastic into the ocean by developing partnerships with cities and governments in Southeast Asia. Project STOP is creating sustainable, circular and low-cost waste systems that capture as much value from waste as possible, supporting the many existing local initiatives and informal waste pickers in Indonesia's coastal areas. Over the coming months, Nestlé will take the learnings from this project to other countries where it operates in an effort to deliver 'plastic neutrality' in those markets.

Driving new behaviour

Aware that addressing the plastic waste challenge requires behaviour change from all of us, Nestlé knows there is no better place to start than from within its own company:

- All 4200 Nestlé facilities worldwide are committed to eliminating single-use plastic items that cannot be recycled. These items will be replaced by materials that can easily be recycled or re-used, and provide the proper means to collect and handle such materials.
- Nestlé employees in all locations worldwide and at all levels will dedicate their volunteering days to the removal of litter and participate in clean-up activities on World Ocean Day on 8 June 2019. To lead the way, Nestlé's executive board and employees at the company's global headquarters in Switzerland will volunteer to clean the shores of Lake Geneva in May 2019.

Responding to the plastic waste challenge and striving for zero environmental impact in its operations is an integral part of Nestlé's commitment to creating shared value for shareholders and society. The company is particularly dedicated to accelerating action in tackling the plastic waste issue and reporting on its progress publicly.

INTELLIGENT BATHROOM MANAGEMENT SYSTEM

Caroma has announced the launch of Smart Command, an intelligent bathroom management system that harnesses the IoT to enable real-time remote monitoring, management and control of water use in commercial bathrooms.

The product empowers building owners to monitor and control water use in real time and make smarter decisions to conserve water and reduce maintenance costs, while improving hygiene, wellbeing and increasing facility uptime. Data collected continuously through the system can be accessed locally from a mobile app or integrated to existing building management systems or on cloud platforms to enable remote monitoring, faster fault diagnosis and accurate cleaning deployment.

Suitable for applications from retail outlets to airport lounges, the product features an intuitive, touchless design that promotes a hygienic environment and optimised cleaning, replenishment of consumables and improved uptime. It has been designed to open up coveted sustainability accreditation opportunities, from NABERS water efficiencies and WELL Standards, to Greenstar benefits, with micro metering that allows for correct benchmarking.

Real-time performance management ensures faults can be identified and rectified effectively, minimising water leakage and improving water conservation efforts. Beyond this, bathrooms can be optimised based on actual usage data; for example, if a building designer knows that the female bathrooms are used twice as much as the male bathrooms, they can allow for extra fixtures in their female bathroom designs for a better user outcome. The ability to monitor and influence behaviour could provide benefits in a range of specialist applications, such as the health sector, peak demand for bathroom facilities and general health behaviour change.

Caroma Industries
www.smartcommand.com.au

MULTIPHASE UPGRADE KIT FOR INVERTER

Selectronic's Advanced Multi-Phase Upgrade Kit for the SP PRO inverter allows for improved performance, increased flexibility, and quicker installation and set-up time. The upgrade kit includes advanced communications cards, communication cables and a simple firmware upgrade, which means that shunts and control wiring are no longer needed, therefore reducing installation time. Set-up and configuration time is also reduced via the installation wizard on the Selectronic SP-Link platform.

SP PRO inverters in a multiphase installation no longer have to be set up and configured individually; the upgrade kit has true primary-secondary configuration allowing the inverters to work as one 'brain' with multiple 'hearts'. The Select.live remote monitoring solution is also compatible, with only one unit needed to provide a performance summary of multiphase systems.

The upgrade also provides balanced generator loading across each phase and is compatible for grid fail generator backup (on 24 and 48 V models). The comms cards provided in the upgrade kit are 'future ready' for increased capabilities in paralleling, advanced micro-grids and managed batteries.

Selectronic Australia Pty Ltd
www.selectronic.com.au

Going full circle:
recycling cooking oil to grow more food

A new type of slow-release fertiliser that results in better plant health and less wasted nutrients has been invented at Flinders University by Dr Justin Chalker and his team in the Institute for NanoScale Science and Technology.

The fertiliser is released slowly into soils because it is encapsulated in a renewable polymer made from canola oil, which is an abundant food waste product.

"We are taking recycled cooking oil, converting it into a fertiliser component and using it to grow more food," Dr Chalker explained. "It's an important way to contribute to a circular economy."

Dr Chalker and his team have created a polymer from waste canola oil and elemental sulfur (a by-product from the creation of petroleum products) as an organic coating for the fertiliser components ammonium sulfate, calcium hydrogen phosphate and potassium chloride.

Nutrients from this slow-release fertiliser are released to the soil after water slowly dissolves and leaches the inorganic components from the polymer-nutrient block. In tests conducted on tomato plants, researchers found the nutrients were released in a controlled fashion, resulting in less wasted fertiliser and better health for the plants growing in this soil.

Results from this study are featured in a special New Talent issue of the journal *Organic and Biomolecular Chemistry* — which features Dr Chalker among selected leading young researchers from around the world.

The polymer, being formed from waste products that are abundant, is cheap to produce, making it an ideal solution for producing superior fertilisers that are a necessary part of meeting global food production demands, especially in areas with poor soil quality.

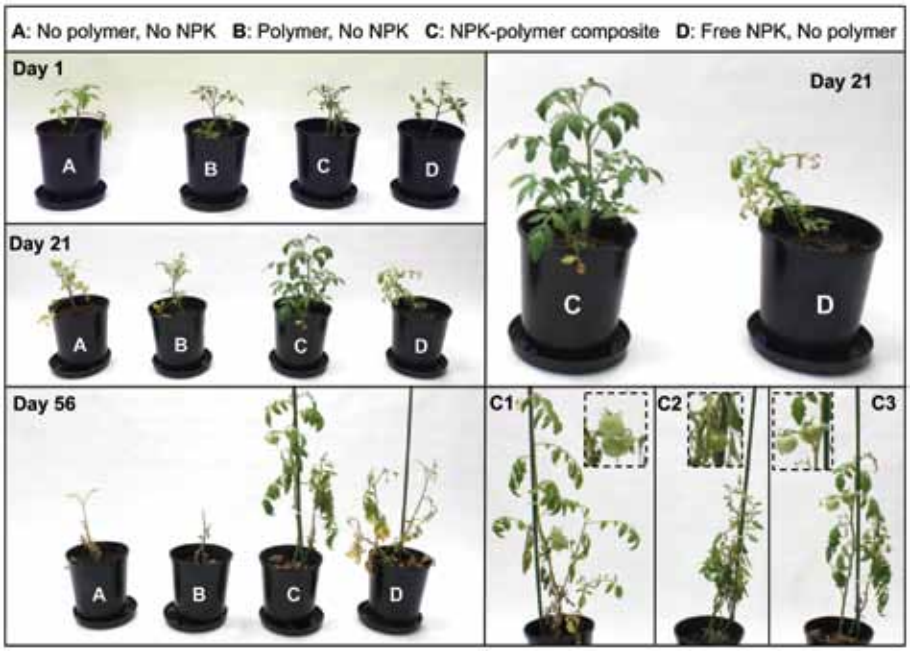
This invention builds on other successful products that Dr Chalker and his team have created through polymers using waste canola oil and sulfur — which have proved effective in removing toxic mercury from the environment and cleaning up oil spills.

A significant additional benefit of the polymer's slow-release qualities is that it prevents fertiliser run-off, which protects the environment, and greatly improves the efficiency of the fertiliser where it is most needed. An estimated 50% of fertilisers that are currently applied to crops are not used by the intended plants, due to leaching and run-off.

This study is a collaboration between Dr Chalker, Associate Professor Michael Perkins and several members of the Institute for NanoScale Science and Technology. The lead authors, Maximilian Mann and Jessica Kruger, are Honours students working in Dr Chalker's laboratory. Key contributions were also made by Dr Tom Hasell at the University of Liverpool. Dr Hasell and Dr Chalker recently won a $22,000 Royal Society International Exchange Grant, which allows researcher and student exchange over the next two years. Dr Hasell and one of his students, Jessica Smith, are both co-authors on this paper and visited Flinders last year.

The team's next step will be to conduct larger greenhouse studies of the fertiliser and its long-term behaviour in soils.

Flinders University
www.flinders.edu.au



Old clothes turned into building materials

UNSW researchers have developed a process to turn old clothing and textiles into high-quality building products such as flat panels, which have been lab tested for qualities such as fire and water resistance, flexibility, acoustics and load-bearing capabilities.

This follows a separate but related exercise that converted used glass into high-quality ceramics suitable for benchtops and tiles in kitchens and bathrooms that can come in all sorts of sizes, colours and finishes.

Professor Veena Sahajwalla with glass waste ceramic tiles.

Led by Professor Veena Sahajwalla, Director of UNSW's Centre for Sustainable Materials Research and Technology (SMaRT Centre), researchers have been scientifically reforming common waste items using prototype technology developed for a laboratory-scale 'green microfactory'. Prof Sahajwalla noted that, considering that the world's population is expected to jump from 7.6 billion to 9.8 billion by 2050, the Earth's resources need to be preserved and re-used rather than put in landfill or incinerated.

"It could be said that consumers and the fashion industry have a lot to answer for, given that clothing is now one of the biggest consumer waste streams, with 92 million tons estimated to be thrown out a year globally," she said. "The clothing and textiles industry is the second-most polluting sector in the world, accounting for 10% of the world's total carbon emissions."

Reforming old clothing and mixed waste glass into various high-quality building products represents a new way to convert low-value waste into high-value products and materials. This work builds on technology which can recover and reform materials from electronic waste at UNSW's demonstration e-waste microfactory, launched by NSW Environment Minister Gabrielle Upton in April 2018.

The demonstration microfactory showcases a process developed by the SMaRT Centre which transforms the components of discarded electronic items like mobile phones, laptops and printers into new and re-usable materials that can then be used to manufacture high-value products such as metal alloys, carbon and 3D printer filament. Prof Sahajwalla said green microfactories not only produce high-performance materials and products, they eliminate the necessity of expensive machinery, save on the extraction from the environment of yet more natural materials and reduce the waste burden.

"There is much that can be done right now given that scientifically developed, proven methods are currently available through our green microfactory technology," she said. "Rather than export our rubbish overseas and to create more landfill, green microfactory technology has the potential to enable small- and large-scale creation of newly manufactured products instead."

UNSW is now finalising a second demonstration green microfactory which converts glass, plastics and other waste materials into value-added products. Mixed waste glass is used to create engineered stone products, while wood, plastic and textile waste is used to create valuable insulation and building panels. These high-end composite products can have a wood veneer look or a ceramic-style finish.

The textiles materials have already tested well for mechanical performance properties including strength, flexibility and resistance. Further lab testing is required to explore these properties ahead of consideration of applying for any formal assessment against construction regulations.

UNSW Sydney

www.unsw.edu.au

New facility

to divert 90% of mixed waste from landfill

RRF concept drawing. Image courtesy of Bioelektra.

Shoalhaven City Council is entering into a long-term contract with Bioelektra Australia to build and operate a new waste processing facility that uses state-of-the-art technology to solve a landfill problem that all local governments in Australia face.

"The Shoalhaven ... [is] running out of landfill space, and in 12 years' time, it is predicted we will reach capacity at our West Nowra landfill facility," said Mayor Amanda Findley.

"The introduction of this new facility is projected to extend the landfill life of the Shoalhaven to more than 50 years."

To be constructed on council-owned land adjacent to the West Nowra landfill site, the Resource Recovery Facility (RRF) will have the ability to sort all the contents of the Shoalhaven's mixed-waste (red) bins, with a capacity of 100,000 tonnes per year. Operating with Bioelektra Group's technology, everything that can be re-used or recycled will be extracted in one process.

The process involves sterilising and drying the waste to eliminate odours, before the dry material is sorted through a series of screens into its separate recyclable components. Plastic, glass, metals and organics are all recycled into various products, including construction aggregate, bricks, render and glass wool. Any unrecycled reject material returned to landfill is inert, reducing environmental risk.

Council resolved unanimously to adopt the new technology at a meeting held in October 2018, with Findley describing it as "an Australian first in waste management" and "a giant leap forward for how Shoalhaven manages waste".

"This state-of-the-art facility will be Australia's first advanced treatment plant capable of diverting 90% of mixed waste from the landfill," she said.

The reduction in landfill waste is projected to reduce the council's levy bill to the NSW Government by nearly $7 million per year. Construction of the facility will also open up 200 job opportunities, with ongoing jobs expected for over 30 people.

Works will commence in 2019 and the facility is expected to be fully operational by late 2021.

Forestry waste turned into transport fuels and chemicals

VTT Technical Research Centre of Finland has developed a new technique based on gasification, which offers a sustainable way to turn forest industry by-products — such as bark, sawdust and forestry waste — into transport fuels and chemicals. The technique is said to reduce carbon dioxide emissions by approximately 90% compared to fossil fuels.

The new approach uses gasification to turn biomass into intermediate products — liquid hydrocarbons, methanol or methane — in production units integrated with communal district heating plants or forest industry power plants. The intermediate products are processed further in oil refineries to make renewable fuels or chemicals.

According to the International Energy Agency, modern bioenergy plays a key role in building a cleaner and more sustainable energy system. Bioenergy is needed, in particular, for reducing emissions from air transport and shipping and as a backup fuel for road transport as more electric cars are introduced. The use of forest industry by-products as raw materials does not impact on the carbon sink effect of forests, and they do not compete against forest industry raw material procurement or food production.

Image credit: VTT.

The development of gasification technology takes place in VTT's Bioruukki piloting centre in Espoo, Finland.

VTT developed and piloted the new gasification process and evaluated the competitiveness of plants based on the technique in the course of a recently concluded project called BTL2030. The distributed generation process developed by the project team makes efficient use of the energy content of biomass. Approximately 55% of the energy content is turned into transport fuels and a further 20–25% can be used to provide district heating or to produce steam for industrial processes.

The process is based on VTT's low-pressure, low-temperature steam gasification technology, simplified gas purification and small-scale industrial syntheses. Thanks to the small-scale approach, the heat generated by the process can be used throughout the year, and the process can be fuelled with local waste. The small scale has also made it easier for VTT to secure funding for its first plant.

The BTL2030 project team estimates that the production costs of transport fuels made from domestic waste would amount to 0.8–1 per litre of petrol or diesel. The technology is set to become considerably more competitive as the costs of the raw materials of competing technologies increase, and the process is expected to be highly competitive at least from the year 2030 onwards. Even in the short term, the ultimate competitiveness of the technique hinges on the prices of crude oil and carbon dioxide quotas as well as the taxation of renewable transport fuels.

In addition to transport fuels, the biomass gasification technique can be used to produce renewable raw materials to replace oil and natural gas in various chemical industry processes. Synthesis gas applications, on the other hand, could help in the attainment of several circular economy goals, such as close-loop recycling of plastics and other packaging materials.

The development of gasification technology is set to continue through two EU Horizon 2020 projects coordinated by VTT. The projects focus on gas purification and increasing the efficiency of synthesis technology and aim to demonstrate the performance of the entire biofuel chain at VTT's Bioruukki piloting centre in Espoo, Finland. Another solution under development is a flexible hybrid process based on biomass and solar and wind energy, which can either be run on just biomass or be boosted with electrolysis. This provides an efficient way to store solar or wind energy as a renewable fuel and could as much as double the renewable fuel output of the biomass sources available.

Massive solar rooftop powers world record breakfast

Primo Smallgoods is now home to what is claimed to be Australia's largest single rooftop solar installation, which was recently introduced at the company's factory in Wacol, Queensland.

With global meat production being responsible for nearly 15% of the world's carbon emissions, and electricity usage at the Wacol site sitting at 38,000 MWh per annum, Primo partnered with CleanPeak Energy and Todae Solar on the solar installation in order to maintain a sustainable business and future. Covering roughly 25,000 m^2 — approximately 75% of the factory's roof — the 3.2 MW system will generate 4869 MWh of power in its first year and save 1.2 million tonnes of CO_2 over 20 years, the equivalent of powering 20,032 homes for one year.

To celebrate the rooftop's installation, Primo Foods treated its factory workers to a massive feast — achieving a world record for the largest serving of breakfast rolls in the process.

The never-before attempted Guinness World Records title used over 140 kg of Primo shortcut bacon, 2160 eggs and 2100 rolls, all topped off with a choice of BBQ or tomato sauce. Cooked on barbecues powered by energy from the new solar panel system, the breakfast rolls were enjoyed by Primo workers, with the remainder donated to Foodbank to support people in need.

"To see 2091 breakfast rolls cooked purely off solar energy was truly remarkable," said Brian Sobel, official adjudicator for Guinness World Records. "Congratulations Primo Foods on your official Guinness World Records title."

Primo Smallgoods

www.primosmallgoods.com.au

CO_2 recycling and pressure measurement in space

In September 2018, a Japanese H-IIB rocket launched the HTV supply vessel containing the ACLS (Advanced Closed Loop System) module destined for the International Space Station. The ACLS is tasked with 'recycling' CO_2 from the air in the spacecraft and generating fresh oxygen for the crew by means of electrolysis. Swiss manufacturer KELLER has developed and manufactured highly reliable absolute and differential pressure transmitters to regulate these processes.

The International Space Station moves around the Earth at some 400 km above its surface. As barely any oxygen is present at this altitude, it must either be supplied from the ground or generated on board. Bringing oxygen to outer space is expensive, with transportation costs for 1 kg of payload coming in at around EUR 33,000. It is therefore a good idea to try to process the air exhaled by the astronauts in order to generate oxygen that can be inhaled again.

This is the purpose of the ACLS, which was transported to the American Destiny module (US laboratory) on 22 September 2018. Airbus developed the ACLS on behalf of the European Space Agency (ESA).

In the ACLS cycle, oxygen is generated by the carbon dioxide from the cabin air being turned into methane and water using hydrogen obtained from splitting water molecules and adding energy. The electrolysis process extracts breathable oxygen from the water.

According to Airbus, the system is designed for a crew of three astronauts and saves 450 kg of additional water load per year. At full performance, the ACLS extracts 3 kg of CO_2, supplies 2.5 kg of oxygen and produces 1.2 kg of water each day.

The ACLS requires extremely reliable components to ensure that these processes run safely, and KELLER won the contract to develop the pressure measurement technology. The project

posed some extreme challenges as, at 400 km above the Earth's surface, components cannot be replaced within a reasonable period of time if they fail. KELLER's contribution to this mission comes in the format of absolute and differential pressure transmitters that work in the range of 50 mbar to 20 bar at 0–110°C.

"With its pressure transmitters that can undertake the most varied tasks in numerous types of aircraft and contribute to the security of all manner of systems thanks to their reliability, KELLER has proved that the demands imposed on sensor lifetimes (MTBF) in actual operations are many times greater than they need to be," said Jürg Dobler, Managing Director of KELLER.

Bestech Australia Pty Ltd
www.bestech.com.au

LAUNDER COVERS FOR WASTEWATER TREATMENT

Controlling the growth of algae in the secondary clarifier effluent stream, specifically in the launder, is one of the challenges the modern wastewater treatment facilities is facing, particularly in Australia.

CoverSweep Launder Covers inhibit the rapid growth of algae in the secondary clarifier effluent stream by preventing the direct contact of sunlight on the highly prone area for intense growth of algae. The system also prevents the entry of windblown debris like plastics, leaves and dust, etc.

The launder covers can also trap the emitted gases and localised odours which can potentially cause irritation during the treatment procedures. This is one of the many features that makes CoverSweep distinct from its counterparts, as it is not believed to be utilised in other systems.

The launder covers comprise numerous, highly durable parts fabricated to the outline of the clarifier. Each part is made to extend from the wall going inward over the weir and launder up to the scum baffle. The covers are resistant to corrosion and exhibit high durability as they are fabricated from stainless steel or fibreglass-reinforced plastic.

Hydroflux Industrial Pty Ltd
www.hydrofluxindustrial.com.au

Soft plastics and toner cartridges turned into asphalt additive

Recycling innovator Close the Loop has unveiled an upgraded manufacturing facility that could divert two-thirds of Australia's 300,000 tonnes of waste soft plastics sent to local landfill annually.

The new manufacturing line in Melbourne will produce TonerPlas — an asphalt additive that contains the equivalent of 530,000 recycled plastic bags, toner from more than 12,000 recycled cartridges and 168,000 glass bottles in every kilometre of two-lane road. In conjunction with Downer, roads featuring TonerPlas have already been laid in Melbourne and Sydney.

"Close the Loop has been at the forefront of the circular economy for more than 17 years," said Close the Loop Chairman Craig Devlin. "Our goal of zero waste to landfill has seen us partner with manufacturers through take-back programs across multiple sectors, including printer cartridges, cosmetics and batteries.

"TonerPlas is a great example of how valuable materials can be recycled to not just create new products, but better-quality products. The addition of TonerPlas improves the fatigue life of traditional asphalt by 65%, meaning longer-lasting roads at a cost-competitive price. It also offers superior resistance to deformation over standard conventional asphalt for withstanding heavy vehicular traffic."

Devlin said the opening of the line will enable the company to produce the additive on a commercial scale.

"At full capacity, our new manufacturing line provides us with the ability to produce enough TonerPlas in a year to pave a two-lane road from Sydney to Melbourne," he said. "That would contain the equivalent of 530 million recycled plastic bags, 168 million recycled glass bottles and 12 million recycled toner cartridges. That's more than 200,000 tonnes of soft plastics that currently go to landfill in Australia."

He added that policy changes in China had highlighted the importance of a local recycling industry and improved energy use across the design, use and re-use of products — a circular economy.

"Our new manufacturing capacity to re-use soft plastics and toner into TonerPlas is a great example of what local companies can do.

Craig Devlin opening the new manufacturing line.

However, Australia needs to coordinate and invest in infrastructure to build a viable recycling industry and divert problematic waste streams from landfill. Banning plastic bags is a start, but it doesn't solve the challenge, especially as plastic bags account for less than 5% of all waste soft plastics."

Waste soft plastics can be dropped off at REDcycle collection points, while used printer cartridges can be recycled at over 4000 public locations.

Close the Loop Limited

www.closetheloop.com.au

MARINE POLLUTION REMEDIATION COURSE

The OPEC Systems Shoreline Responders Course is a nationally accredited marine pollution remediation course, suitable for traditional land owners as well as employees from local government and ports and harbours.

When marine pollution events occur, they come with a significant financial and environmental cost. In addition to a direct impact on fish, sea mammals, birds, habitats and breeding grounds, unresolved spills can lead to long-term environmental consequences.

OPEC Systems' training package is grounded in industry-leading practices for incident response, allowing designated first responders to respond in an effective and efficient manner. Each course is specifically tailored to the local area, with a large majority of the training spent on beaches and foreshores, enabling participants to get maximum field time.

In the event of an oil spill, the company provides people with the skills to identity the oil type and foreshore substrates, and how to treat the impacted areas. The strong focus on field training means that participants have the practical skills to coordinate an effective response and return the marine environment to its original state.

The course is run over three consecutive days, with participants gaining a 'Certificate III — Shoreline Responder' and a Statement of Attainment. It includes modules in health, safety and risk controls; assessment strategies; and team leadership.

OPEC Systems Pty Ltd
www.opecsystems.com.au

COMPACT COMPRESSOR

The Mobilair 17 compact portable compressor features efficiency, manoeuvrability, high power and quiet operation.

With a flow rate of 1.6 m^3/min at 7 bar, the device is capable of powering breakers, drills, saws, grinders, impact wrenches and even impact borers. In addition, the 7 bar version is suitable for powering pneumatically driven pipe inspection robots. For added flexibility, the portable compressor is available in a 15 bar version.

At the heart of every model lies a powerful Kaeser screw compressor block equipped with the energy-efficient Sigma Profile rotors, which are said to achieve power savings of up to 15% compared with conventional screw compressor block rotor profiles. An air-cooled 4-stroke Honda petrol engine provides the necessary power via a maintenance-free v-belt drive system, ensuring power transmission between the engine, motor and screw compressor block.

The unit is user friendly when it comes to maintenance and handling: manoeuvrability on the construction site is made simple due to the long handle, pneumatic tyres, four convenient lifting lugs and a countersunk crane eye.

Kaeser Compressors Australia
www.kaeser.com.au

FOOD WASTE REDUCTION SYSTEM

WasteMaster Pacific has launched an innovative solution designed to reduce the amount of food waste going to landfill.

The WasteMaster system reduces the weight and volume of food waste by up to 80%, producing a compost-like and odourless residual material. This residual material can then be converted to biomethane, a renewable source of green power. The system thus provides a quick, easy, clean and green system for the management of food waste, which has the potential to reduce Australia's future carbon emissions.

In addition to providing equipment installation and training, WasteMaster Pacific will manage all collection services for its Australian clients, ensuring that all WasteMaster-processed food waste is converted into clean energy.

WasteMaster Pacific
www.wastemasterpacific.com.au

Sustainable bricks
made from recycled biosolids

Melbourne researchers have come up with a way to recycle the world's stockpiles of treated sewage sludge and boost sustainability in the construction industry, all at the same time — by turning biosolids into bricks.

RMIT University Associate Professor Abbas Mohajerani, with a biosolids brick.

Biosolids are a by-product of the wastewater treatment process that can be used as fertiliser, in land rehabilitation or as a construction material. Around 30% of the world's biosolids are stockpiled or sent to landfill, using up valuable land and potentially emitting greenhouse gases.

Researchers at RMIT University have now demonstrated that fired-clay bricks incorporating biosolids could be a sustainable solution for both the wastewater treatment and brickmaking industries. Lead investigator Associate Professor Abbas Mohajerani said the research sought to tackle two environmental issues — the stockpiles of biosolids and the excavation of soil required for brick production.

"More than 3 billion cubic metres of clay soil is dug up each year for the global brickmaking industry, to produce about 1.5 trillion bricks," said Assoc Prof Mohajerani.

"Using biosolids in bricks could be the solution to these big environmental challenges."

The research examined the physical, chemical and mechanical properties of fired-clay bricks incorporating different proportions of biosolids, from 10 to 25%. The results were published in the journal *Buildings*.

The research showed brick-firing energy demand was cut by up to 48.6% for bricks incorporating 25% biosolids. This is due to the organic content of the biosolids and could considerably reduce both the carbon footprint and costs of brick manufacturing companies. The biosolids bricks also had a lower thermal conductivity due to being more porous than standard bricks, transferring less heat to potentially give buildings higher environmental performance.

About 5 million tonnes of the biosolids produced in Australia, New Zealand, the EU, US and Canada currently go to landfill or stockpiles each year; using a minimum 15% biosolids content in 15% of bricks produced could completely use up this 5 million tonnes. Indeed, the results of a comparative life cycle assessment and an emissions study conducted as part of the research confirmed biosolids bricks offered a sustainable alternative approach to addressing the environmental impacts of biosolids management and brick manufacturing.

The biosolids-enhanced bricks also passed compressive strength tests, and analysis demonstrated heavy metals were largely trapped within the brick. Biosolids can, however, have significantly different chemical characteristics, so the researchers recommend further testing before large-scale production.

RMIT University

www.rmit.edu.au

Water purification with a graphene oxide membrane

Monash University engineers have created technology that can purify contaminated water, making it fit for consumption faster and more energy efficiently than ever before.

Using membranes made from graphene oxide, an atomically thin sheet where every atom is present on the surface and chemically inert so it doesn't react with other chemicals, the researchers have developed water treatment technology that can be manufactured using gravure printing — a widely available industrial printing process. The technology will directly benefit Australian and international companies seeking energy savings and other cost advantages in water and wastewater filtration and industrial processes associated with pulp and paper, food and beverage, inks, pigments and dyes, pharmaceuticals and metals.

"This Australian-made, world-first technology can be easily adapted by industries in everything from drinking water purification, to mining waste treatment, to food and beverage industry applications," said lead researcher Professor Mainak Majumder, from Monash's Nanoscale Science and Engineering Laboratory. He said the graphene oxide membrane technology offers an enormous cost advantage to industry due to its ability to reduce energy consumption during water filtration.

"Since the membrane can be produced using standard industrial printing processes, the technology is also highly versatile and cost-efficient," he said. "The graphene oxide sheets are layered into a structure that looks a little like puff pastry when viewed under a powerful microscope. Water and small molecules can flow around individual sheets or through pin-hole defects in the sheets and pass through the layered structure."

Dr Sam Martin, who leads Prof Majumder's membrane development team, said: "The gaps between the sheets are very small, around a one billionth of a metre, and permit only the smallest of molecules to pass, sieving out and rejecting the larger ones.

"Industry can use the new membranes where nanofiltration and reverse osmosis are currently used. The energy-efficient nature of the membrane makes it more cost-efficient than conventional membranes used in industrial processes."

Supported by funding from the Australian Government's Cooperative Research Centre (CRC) program of approximately $1.2 million, and with investment from industry partners Clean TeQ Holdings and Ionic Industries, the technology is now entering the commercialisation phase after undergoing seven years of research and development. Simon Savage, Managing Director of Ionic Industries, said people across the world will benefit from the technology.

"In wastewater treatment, the ability to remove pesticides and hormones is becoming more important, especially when water re-use is considered," he said. "In countries such as China, India and Africa, where access to fresh water for drinking, agriculture and industry is critical, the new membranes may be used to filter surface and ground water into drinking water."

Peter Voigt, founder and CTO of Clean Teq, added, "We aim to be manufacturing these membranes by the second half of 2019. We expect that the improved flux and the better robustness of the membrane will make the whole-of-life costs significantly lower than those currently in operation."

Monash University
www.monash.edu

Bomen Solar Farm to power corporate renewable PPAs

Business energy retailer Flow Power has welcomed Bomen Solar Farm to its growing portfolio of renewable generation for its corporate clients. Located north-east of Wagga Wagga, Bomen Solar Farm is expected to be completed later this year, at which point it will generate enough renewable energy to power approximately 35,000 Australian homes.

In agreement with developer Renew Estate — a joint venture between Wirsol Energy, Energy Estate and Beast Solutions — Flow Power will contract 69 MW of the output of the ~120 MW farm. This energy generation will power Flow Power's corporate renewable power purchase agreements (PPAs) and deliver low-cost solar power to its business customers for up to 10 years.

The first businesses to benefit from this agreement are winemaker Australian Vintage and snack food manufacturer Snack Brands. Australian Vintage, which signed a large-scale hybrid corporate renewable PPA last year, will power 90% of its Buronga Hill facility through 1.7 MW owned solar generation on site, along with a mix of wind and solar generation, the latter supplied by Bomen Solar Farm. Snack Brands is meanwhile the first business to enter into a five-year agreement with Flow Power.

Renew Estate Director Simon Currie said his company "highly values its partnership with Flow Power. Together, we will deliver renewable energy solutions to customers across Australia. I am a great fan of Australian Vintage and its stellar line-up, and my kids won't believe that our solar farm will help power the company that makes CC's, Cheezels and French Fries."

Bomen Solar Farm is Flow Power's first solar offering in NSW and will enable a greater number of local businesses to tap into the benefits of its corporate renewable PPAs. The retailer first introduced corporate renewable PPAs to the Australian market in 2017.

"This year, our renewable portfolio has grown exponentially," said Flow Power Managing Director Matthew van der Linden. "We're excited that Renew Estate and Bomen Solar Farm have come on board to help us fulfil our goal of delivering better renewable energy solutions to Australian businesses.

"We believe that supporting Australia's pipeline of renewable projects is the key to shaping a better energy future. These agreements are a crucial piece of the puzzle and will bring us closer to realising this future."

Flow Power

www.flowpower.com.au

ENERGY-SAVING LIGHTS FOR HAZARDOUS AREAS

The 6036 series LED-based tubular light fittings from R. STAHL can be used in Ex zones 1/21 and 2/22 and provide an alternative to typical linear luminaires. With a diameter of 55 mm, the lights are said to take up less than half the space required by conventional linear luminaires, and reach less than half their weight.

The lights are said to consume about half as much power, and the specific power consumption per 100 lx is just 1.5 W/m².

The tubular light fittings can be operated in a wide temperature range from -40 to +60°C. The maintenance-free units are suitable for general lighting purposes or for use as machine lamps. Due to their slim design, they can be installed in hard-to-access locations. Even at an ambient temperature of 60°C, they reach a lifetime of 80,000 h.

The vibration-proof units are IP66/IP67 protected by default, making them suitable for maritime applications. In addition to ATEX and IECEx certificates, they also feature certificates for many major markets (GOST, Gazpromnadzor, UL do Brasil, GL).

Control Logic Pty Ltd
www.controllogic.com.au

ROTARY SCREW COMPRESSORS

The latest generation of ESD series rotary screw compressors are equipped with Super Premium Efficiency IE4 motors, enabling users to enjoy low energy consumption. The compressors consume up to 8% less energy than the company's previous models, yet deliver 6.5% higher flow rates.

At the heart of every ESD system lies a flow-optimised rotary screw compressor block with energy-saving Sigma Profile rotors. The IE4 motors meanwhile comply with and exceed prevailing Australian GEMS regulations for three-phase electric motors.

The Electronic Thermal Management system delivers additional energy advantages, as do the environmentally friendly fluid filter and integrated Sigma Control 2 controller. Electronic Thermal Management consistently controls the oil temperature within a constant, safe differential relative to the dewpoint (condensation temperature) — which also helps avoid unnecessarily high screw compressor block discharge temperatures.

Kaeser Compressors Australia
www.kaeser.com.au

RECYCLING SYSTEM FOR TAKEAWAY CUPS

Detpak's RecycleMe System enables takeaway coffee cups to be saved from landfill and commercially recycled into copy paper, closing the loop for industry.

The takeaway coffee cups feature a lining that can be easily removed from the cup to ensure recyclability in standard pulping processes. The system is designed to promote a longer life for the paper cup fibre and supports a circular economy to keep products, components and materials at their highest utility and value for as long as possible.

Detpak has aligned with industry partner Shred-X to collect, count and recycle the cups as part of an existing national collection system in Australia. Shred-X will also be providing a collection service and recycling commitment for the coffee cup lids; the lids will be processed with confirmed end markets in Australia and via export.

Detpak Pty Ltd
www.detpak.com.au

Alternative fuel system for cement plant

Boral Cement has installed an alternative fuel system to power its cement plant in Berrima, NSW. Based on similar fuel systems in Europe and the UK, the company contracted Schenck Process Australia (SPA) to supply the technology and components for the feed system.

In development for almost three years, the new fuel system has been fully approved by the Environmental Protection Agency (EPA) and gives Boral license to burn up to 100,000 tonnes of mixed waste product, including wood waste (eg, sawdust, pallets, mill cut-offs), screened and processed refuse-derived fuel (eg, paper, cardboard, packaging and some plastics) and tyre chips, at its Berrima cement plant.

SPA's contract for the Berrima plant included the design, supply, installation and commissioning of all equipment and technology for the feed supply system, along with steel structure.

In operation, two Multibins receive the waste product, weigh it and feed it onto the tube belt conveyor. Believed to be the first tube belt conveyor in Australia, a conveyor of this type is ideal for containing and transporting light loads, similar to the waste product Boral is burning.

The tube belt lifts the feed 70 m — on a 30° incline — to be processed through a screw weightfeeder (to prevent surges and regulate the flow of the waste product) then delivered into the site's calciner kiln, which is operating at around 800°C.

A tube belt conveyor is ideal for containing and transporting light loads.

According to Boral, the 100,000 tonnes of mixed waste product — the fuel for the Berrima plant — will result in substantial reduction in coal consumption and a significant reduction in waste destined to be landfill. Production costs are forecast to fall, which will improve the company's competitiveness in a tight market.

Schenck Process has extensive international experience in alternative and biomass fuel feed systems and the company has designed and installed a number of systems for private and public sector clients in the US, Europe and the United Kingdom, including the giant Drax Power Station in Yorkshire.

Schenck Process Australia Pty Ltd
www.schenckprocess.com.au

IN-GROUND GRAVITY GREASE SEPARATORS

ACO's range of in-ground gravity grease separators for trade waste is available with a total capacity of up to 5000 L. Wastewater containing fats, oils and grease (FOGs) and food solids enters the grease separator from the kitchen or food processing plant, with food solids sinking to the bottom of the unit under gravity. FOGs, which are less dense, float to the top and the treated wastewater flows into the sewer system.

Constructed from lightweight polyethylene or glass-reinforced plastic (GRP), the grease separators feature a smooth finish for easy cleaning and are corrosion resistant to cope with harsh environments. If buoyancy is a concern, the grease separator design includes external ribs that key into the surrounding soil to assist in preventing the unit from floating.

Lightweight and robust, the grease traps are easy to install and can be incorporated into the overall wastewater system at the design stage or as a retrofit or upgrade. ACO provides full installation and design support for the decision-making process including Revit models, drawings and installation guides.

The range of below-ground grease traps is now available in 3000, 4000 and 5000 L capacities for in-ground applications to complement the 1000, 1500 and 2000 L below- and above-ground units. A single access point in the below-ground units allows for easy access for maintenance and cleaning. ACO has a choice of access covers and reinforced precast concrete collars to provide protection of the grease traps for high traffic and load environments.

ACO Polycrete Pty Ltd
www.acoaus.com.au

PLASTIC FILM RECYCLING MACHINES

For companies looking to recycle plastic film waste, Polystar offers a range of one-step machines that are designed for the reprocessing of polyethylene and polypropylene flexible packaging material.

The machines are designed to be simple to operate and easy to maintain, all the while taking up minimal space and time. Their output comes in the form of high-quality plastic pellets that can be fed straight back into the manufacturing process, saving on raw material costs as well as on waste disposal.

This pelletising system — with its integrated cutter compactor — eliminates the need for pre-cutting in most cases and ensures the material spends less time in the extrusion process to minimise degradation.

In addition to the double degassing in the first extrude, the venting area — the connection between the first and second extruder — serves as a third degassing section (optional) to further remove the ink and extra humidity level from the material.

The unvented extruder has a short screw L:D ratio, in which the material travels in the extruder for the shortest time and distance. This results in minimal change in material property and higher output compared to a vented extruder. Furthermore, the repositioning of filtration before degassing ensures a good degassing effect, producing high-quality pellets from heavily printed material.

Applied Machinery Australia Pty Ltd
www.appliedmachinery.com.au

Microgrid project to power US Air National Guard base

Sydney-based energy storage company Ecoult, a subsidiary of East Penn Manufacturing, is supplying its technology to US defence contractor Raytheon for use in a new microgrid project.

The microgrid is being used by the US Department of Defense at the Otis Air National Guard Base on Cape Cod, Massachusetts, which will rely on the microgrid to provide reliable and secure power to its critical military infrastructure. There, a 1.6 MW/1.2 MWh Ecoult energy storage system, which uses the CSIRO-invented UltraBattery, will be connected to an existing 1.5 MW wind turbine and a 1.6 MW diesel generator.

An integrated power and energy management controller (IPEM) provided by Raytheon coordinates the supply of electricity from local microgrid assets like wind, solar, battery storage or generators, and matches it with building loads. The Otis Air National Guard Base system will support the military base with continuous microgrid backup power in the case of grid failure, through a combination of high penetration wind, energy storage and minimal use of diesel generators.

This will be the first wind-powered microgrid in the US Department of Defense and the first US military facility cyber-secure connection to an independent system operator. The project has the potential to significantly enhance US energy security with sustainable backup power systems, targeting a five-year simple payback by providing additional services to the electric grid.

"We're excited to have had the opportunity to work for Raytheon on this project and to support them in the supply of their microgrid solution," said Ecoult CEO John Wood. "Our team has had the invaluable opportunity to work with its Australian technology, alongside the OTIS base personnel, Raytheon and organisations like MIT Lincoln Labs and the US National Renewable Laboratory."

Ecoult

www.ecoult.com

SOLAR ENERGY SYSTEM

Trina Solar is moving into the Australian household sector with the launch of Trinahome, helping to boost demand in Australia for rooftop solar by giving households an easy solution.

The product is an 'all in one' solution, which means all the components — the solar modules, inverter and mounting — come from Trina Solar. This means the whole system is backed by one supplier, and all the components are designed to work together seamlessly to provide good efficiency.

Trinahome is a 3 to 10 kW system, depending on the roof size. It comes with a hybrid inverter so that users have the flexibility to feed excess electricity into the grid or use that electricity to recharge the batteries in an energy storage system.

The system can also be installed in one day, depending on the weather and roof size. It is suitable for residences as well as small to medium-sized businesses.

Trina Solar
www.trinasolar.com.au

MACHINE TO SEPARATE GLASS FROM MSW

TOMRA Sorting Recycling has introduced AUTOSORT COLOR, a machine that works in combination with AUTOSORT LASER to effectively separate glass from municipal solid waste. The product achieves purity rates greater than 95% at high throughput rates, even when input materials are wet, dusty or dirty.

Although glass waste is collected separately in many countries, a significant amount of recoverable glass nevertheless remains mixed in with municipal solid waste (MSW) from households and businesses. The product enables sorting operations to extract and sell this glass, which would otherwise fail to make it through to the recycling process.

It helps sorting businesses minimise the risks of disruption, downtime and repair costs arising from damage to components in sorting machines not intended for glass. It additionally enables financial savings downstream of the sorting process, because household waste containing glass can result in higher incineration costs. Extracting more glass from MSW will also reduce landfill costs.

The first step in the process of removing glass from MSW is pre-treatment. After the MSW passes through a bag opener, conventionally the fine fraction (0–80 mm) is screened out. This fraction is then split into three categories by a double-deck vibrating screen: fine fractions of 0–8 mm diameter, such as organic waste and sand, a middle fraction of 8–60 mm and an oversize fraction of 60–80 mm.

In the second step, the middle fractions, which contain the highest glass content, are subjected to density separation. This removes the lighter fractions and sends the heavier fractions to the AUTOSORT LASER unit. Here a combination of laser (LAS) and near-infrared (NIR) detection technologies enables the separation of glass from the rest of the materials.

In the third and final step of the process, the AUTOSORT COLOR machine classifies the glass fractions with a high-performance camera and separates any remaining impurities from the higher-quality glass. The result is the recovery of resaleable glass with a consistently high purity of more than 95%.

TOMRA Sorting Solutions Pty Ltd
www.tomra.com

Does recycling make cents?

Richard Fine

Eliminating separate waste streams can save on costs and improve recycling rates by 25%.

South Australians have high expectations that our environment will be sustained for future generations, and the state has consistently been a national leader in environmental management policy. So it's no surprise that SA has achieved the highest per capita recycling rate nationally.

While the percentage of waste going to landfill has decreased, waste tonnage overall is growing with the economy and population. Recycling doesn't change the amount of waste created. Instead, it minimises resources lost by diverting material from landfill and transforming it into a new material. Sounds good in theory, but two basic questions about recycling persist: is it really good for the environment and does it make economic sense?

Recycling is generally desirable, but it's not automatically good and efficient and cheap. It takes a significant upfront capital investment to implement a state-of-the-art single-stream recycling program, and the success of the program depends on a real market for the recycled materials. It's a total economic system.

We need to start to work together and recognise we need a new approach. Recently, some large corporations and small entrepreneurs have taken steps to resolve Australia's recycling crisis. Some of the proposed solutions appear to be viable; however, on further investigation, it is clear that certain recycling solutions, no matter how well intentioned, are simply a marketing ploy based on impractical and unsustainable models.

Let's talk about the poster child of waste and excessive consumption — the takeaway coffee cup. While grassroots movements call for an outright ban, governments consider placing a tax on their use and multinationals publicly commit funding to develop solutions, some companies have proposed bespoke recycling solutions that focus only on takeaway paper cups.

There are a number of potential limitations with this model. It's estimated that a single truckload is capable of transporting 16 to 20 tonnes of cups (6 million cups). That equates to approximately 216 trucks loads per year to transport all the cups used in Australia. The waste will have to be transported, in some cases, long distances in order to get to the recycling facility. Transportation of waste results in cost overheads, fuel and associated carbon emissions and congestion on the roads.

One should question the wisdom of deploying fleets of large, fuel-hungry trucks that duplicate the routes already driven by garbage trucks to take one specific product to a reprocessing facility — located significant distances from the source of the waste — and require additional energy that contributes to the carbon footprint of the product.

Two of the three current cup recycling offerings being promoted as solutions require additional funding or subsidies in order to remain commercially viable.

The only practical, scalable and commercially viable solution to diverting cups from landfill with a positive environmental outcome is commercial composting. The technology to produce compostable cups is available to all cup manufacturers.

The benefits of using compostable packaging are obvious: convenience and an uncomplicated collection process that doesn't attract hefty additional fees. It facilitates the diversion of organic waste from landfill, so there's no need to separate out your food scraps and clean and sort different plastic items — simply dispose of all food scraps and compostable packaging into one bin. The recycling is done locally and there is strong demand for the end product — high-quality compost.

Eliminating the need to separate waste streams can improve recycling rates by up to 25%, according to research by the Solid and Hazardous Waste Education Center at the University of Wisconsin. Another benefit is efficiency — collection costs account for 50 to 60% of the cost to recycle material, which means efficiency in collections is crucial. Besides saving money, this increased efficiency — along with greater volumes of materials — ensures more waste is diverted from landfill.

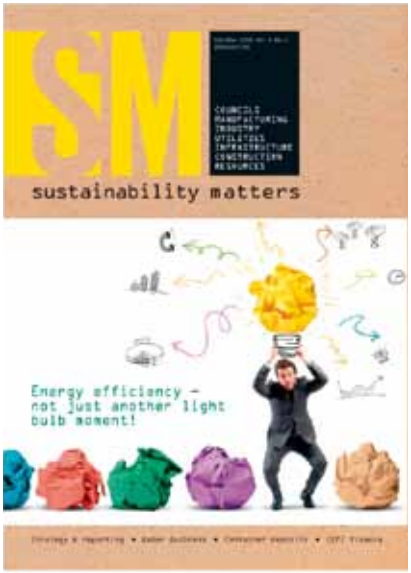
In many parts of the country, the greatest barrier to widespread composting is the lack of composting facilities and organics collection and transportation infrastructure. There are businesses that are actively working to remove these barriers and expand the availability of composting throughout the country. For instance, BioPak's Compost Service is now available across 1300 suburbs in nine major cities in Australia — diverting food scraps, organics and certified compostable packaging from landfill.

Humanity needs to avoid the unnecessary use of plastics. Single-use food packaging that will be contaminated with food residue after use cannot be recycled in conventional facilities and should not be made from durable materials derived from fossil resources. Compostable packaging is the proven solution as we kick our plastic addiction and stem the flow of plastics into the ocean. Now is the time to adopt more sustainable packaging solutions and zero-waste targets that will subsequently drive economic growth.

Richard Fine is founder and Sustainability Director at BioPak.

FREE

to industry and business professionals



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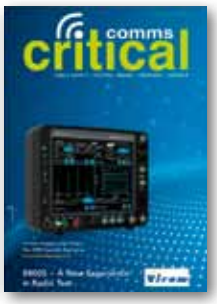

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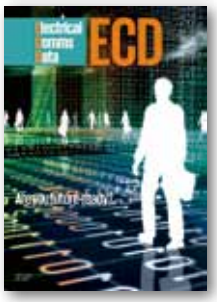

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