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WORDS from the EDITOR

There's been plenty of focus on the circular economy in Australia — so what is it and how will it help with climate change?

The main focus of the circular economy is to ensure products are designed to stay out of waste.

Some products are designed with a so-called built-in obsolescence factor to make sure a product has a pre-determined lifespan. While this might make sense from an economic perspective, it doesn't make sense for the environment as it creates an unnecessary waste of resources, which are often sent to landfill.

For a circular economy to exist, products must be designed to be durable, recyclable and reusable, and thus to continually circulate throughout the economy.

Sounds pretty simple but in order for it to actually work there needs to be help from government in the form of a carrot-and-stick approach.

The carrot: Well, this could come in the form of developing profitable markets for the end products and incentives for including recycled product within new products; government grants for circular economy projects; and awards and recognition for achievements.

The stick: This could be more obvious in the form of targets, rules to phase out hard-to-recycle products, and regulations with fines for not complying.

We currently have many targets set under Australia's National Waste Policy — recover 80% of all waste by 2030; halve the amount of organic waste sent to landfill for disposal by 2030; product stewardship regulation; and national standards for kerbside recycling collection and materials recovery facilities.

These targets have inspired many of the projects featured in this issue.

With a national goal to reach net zero greenhouse gas emissions by 2050 now set, hopefully there will be a whole new wave of sustainability projects to come.



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Go green - sustainable optimisation of conveyor lines



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Hermes fulfilment centre is one of Europe's largest and most advanced facilities. During a recent modernisation project, SEW-EURODRIVE's MOVI-C® all-in-one solutions MOVIGEAR® performance significantly improved the conveyor lines' energy efficiency.

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The changing role of Australian CFOs





Once perceived as the guardians of company funds and in charge of financial reporting and forecasting, 43% of Australian business leaders feel that today's CFOs are placing greater emphasis on solving business problems, according to data from Anaplan, a cloud-based planning platform.

Over the last year, CFOs have been crucial to helping organisations navigate the pandemic and recovery. This has been recognised by their colleagues, with 70% of business leaders saying over the last 12 months CFOs played a key role in keeping up with regulatory changes and 67% felt they were key in meeting customers' changing needs as well as facilitating hybrid work.

When reflecting on the past 12 months, almost half (46%) of CFOs found that keeping up with regulatory changes proved to be "extremely challenging" while 36% and 31% thought the same of addressing supply chain shortages and meeting customers' changing needs, respectively.

This data was revealed in a report commissioned by Anaplan, in partnership with Deloitte, to explore the evolving role of the CFO, and the opportunities that come with this transition. Conducted by The Harris Poll, the survey respondents included more than 100 senior departmental leaders and CFOs across Australia, and 700 total participants globally.

Key role in ESG initiatives

As companies place greater emphasis on Environmental, Social and Governance (ESG) initiatives, business leaders in Australia have high expectations of their CFOs.

86% of business leaders in Australia believe that it's the responsibility of the CFO to select the right resources to effectively execute on ESG strategies. In the same vein, 85% of Aussie business leaders expect their CFOs to play a key role in setting the business's sustainability and ESG strategy.

However, Australian CFOs' self-reflections about the role they've played on ESG to date are not aligned with the rest of their

leadership teams. While almost four in five (79%) Australian CFOs feel that they have played an essential role in managing their company's ESG initiatives, only half (52%) of their fellow C-suite team felt the same.

Planning crucial to CFO's evolving role

The current business environment requires leaders to be confident in their ability to quickly adjust plans according to ever changing realities. However, planning — and therefore, strategic decision-making — has historically been a siloed and highly manual process. It's therefore unsurprising that a majority (89%) of CFOs and their senior colleagues agree that recent challenges — such as the transition to hybrid work and supply chain volatility — could have been improved with stronger communication.

Business leaders must revamp their approach to planning to be more collaborative, agile and real time, but the research revealed CFOs and senior colleagues both realise this requires an improvement in people dynamics (89%), technology (79%) and processes (86%).

In terms of what Australian business leaders hoped to see their CFOs doing, 32% of business leaders said they'd like to see them spending more time collaborating with other business units.

Commenting on the findings, Andy Thiss, Area Vice President, Anaplan, said, "The role of the CFO has changed immensely as businesses grapple with the many challenges that have been thrown at them these past few years. While their role used to be centred around company finances, these findings show that there is an expectation for CFOs to stretch beyond that focus, and help the company drive long-term goals. From breaking down silos, to navigating uncertainties and meeting ambitious ESG goals, the role of connected planning in assisting CFOs with these challenges is paramount."

For the full details, visit <https://www.anaplan.com/resources/research-report/awaken-the-potential-of-the-modern-cfo/>.

PPE waste can make for stronger concrete

RMIT researchers have discovered that disposable personal protective equipment can be used to make concrete stronger.



One of the most obvious material impacts of the COVID-19 pandemic has been the waste it produces: personal protective equipment (PPE) such as single-use masks are used and sent to the incinerator or landfill — or worse, make their way onto footpaths, roads and waterways.

Now researchers from RMIT University have developed a solution that can use disposable healthcare materials like masks, gloves and isolation gowns as a strengthening ingredient for concrete. The studies found shredded PPE could increase the strength of concrete by up to 22% and improve resistance to cracking.

Medical waste is a natural side effect of sanitary healthcare environments but COVID has been a major source of it since the pandemic began. About 54,000 tonnes of such waste is now being generated each day in the form of protective gear.

Three papers have been published by the RMIT scientists across three journals (*Case Studies in Construction Materials*, *Science of the Total Environment* and the *Journal of Cleaner Production*) looking at how to deal with this waste.

The three studies looked respectively at disposable plastic isolation gowns, nitrile gloves and surgical masks that had been shredded and added to concrete at various volumes between 0.1 and 0.25%.

The findings report various physical attributes of concrete could be improved: rubber gloves boosted compressive strength by up to 22%; isolation gowns increase resistance to bending stress by up to 21%, compressive strength by 15% and elasticity by 12%; and face masks improved compressive strength by 17%.

Of course, for sanitary reasons the waste equipment is quarantined and washed prior to being used.

The RMIT team's industry partner, Casa-fico, which concentrates on recycling waste

into construction material, is now planning on using the findings of these studies for a field project.

"We urgently need smart solutions for the ever-growing pile of COVID-19 generated waste — this challenge will remain even after the pandemic is over," said first author, PhD researcher Shannon Kilmartin-Lynch.

"Our research found that incorporating the right amount of shredded PPE could improve the strength and durability of concrete."

Joint lead author Dr Rajeev Roychand said construction industries would be able to both play a part in reducing waste while also benefiting from its strengthening properties.

"While our research is in the early stages, these promising initial findings are an important step towards the development of effective recycling systems to keep disposable PPE waste out of landfill," Roychand said.

Corresponding author and research team leader Professor Jie Li said PPE waste, both from health care and the general



Image credit: RMIT University

public, represents a substantial problem for the environment and a challenge to be surmounted.

"We have all seen disposable masks littering our streets, but even when this waste is disposed of properly it all ends up in landfill," Li said.

"With a circular economy approach, we could keep that waste out of landfill while squeezing the full value out of these materials to create better products — it's a win on all fronts."

The team will next be looking into combining the different sorts of healthcare waste to see how different ratios of the material can benefit the concrete, with field trials on the horizon.

The researchers are hoping to collaborate with businesses and organisations in the healthcare and construction industries to further develop the research.

RMIT University
www.rmit.edu.au



Image credit: RMIT University

The RMIT team's concrete that was made using PPE.



Old tyres make strong walls



istock.com/hellor

A study from University of South Australia researchers has analysed the structural integrity of walls made of tyres packed with earth, finding that they may represent a useful way of using a material that is otherwise an environmental concern.

When they are no longer safe for use on cars, trucks and other automobiles, end-of-life tyres represent something of a sustainability problem. They do not naturally break down, cannot be easily recycled into other materials and take up a lot of space. Australia alone generates 55 million of these tyres per year. As such, finding practical uses or methods of reusing them is a point of constant research.

Tyres have long been used as building materials. However, since their structural integrity had not been properly analysed, their use by architects and engineers has been limited.

The South Australian research team, which was supported by Tyre Stewardship Australia, evaluated the viability of tyres that had been filled with earth and then closed up with cardboard, creating what is known as a tyre-encased-soil element, or TESE. The researchers created a wall with these TESEs and applied various stress tests in order to understand exactly how they could function as building materials.

According to Dr Martin Freney, one of the study's authors, the tests revealed that the wall was as structurally sound as conventional walls used in homes.

"The wall we tested was the first of its kind to be scientifically tested in this fashion, and all the data indicates tyre walls can be extremely strong and safe structures," Freney said.

"While that structural integrity has been observed for many years in applications such as the retaining walls in earth-sheltered,

Earthship homes, the lack of supporting data has prevented wider uptake of tyre walls by engineers and architects, and we're hoping this study will change that and expand the range of projects in which these walls are used."

The research even suggested that walls constructed using the TESEs would have some benefits over conventional ones, such as their drainage capacity or shock-absorbing ability.

"Not only are the tyre walls as structurally sound as concrete or wood sleeper retaining walls, they are also extremely resilient," Freney said.

"Unlike a concrete wall, we found these walls have the ability to 'bounce back into shape' following impact, such as from an earthquake.

"And if a drainage material such as recycled concrete rubble or crushed bricks is used to fill the tyres, they also offer excellent drainage, which can be a major consideration in many retaining wall scenarios. Furthermore, the use of recycled fill materials reduces the environmental impact of the wall."

While only one wall composed of TESEs was analysed during the study, modelling suggests other designs would be viable too. The researchers think that old tyres would thus make for a useful and sustainable building material.

"We really believe this research provides a strong evidence base for the expanded use of tyre walls in housing and other applications, and the next step will be to engage with an industry partner to develop a range of real-world applications for tyre walls."

The research was published in *Engineering Structures*.

University of South Australia

www.unisa.edu.au

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Circular construction: making bricks from industrial waste

Firing bricks and making mortar and cement can be costly, but organic chemists at Flinders University are working on more sustainable alternatives — focusing on building materials made from waste products.

In another move into the circular economy, researchers from the Flinders Chalker Lab have used low-cost feedstocks to make lightweight but durable polymer building blocks which can be bonded together with an adhesive-free chemical reaction.

Their latest study tested the strength of these materials and explored ways they can be reinforced in construction.

Matthew Flinders Professor of Chemistry Justin Chalker said the need to develop sustainable building materials is increasingly important, with cement, iron and steel production accounting for more than 15% of global CO₂ emissions each year.

"In this study, we tested a new type of brick we can make from waste cooking oil, mixed with sulfur and dicyclopentadiene (DCPD). Both sulfur and DCPD are by-products of petroleum refining.

"The bricks bond together without mortar upon application of a trace amount of amine catalyst.

"All the starting materials are plentiful and can be classified as industrial waste.

"This research is part of a larger effort to move towards a sustainable built environment," said project leader Chalker.

The Chalker Lab's new polymer research team at Flinders University's College of Science and Engineering is collaborating with Clean Earth Technologies for further development scale-up and possible commercialisation.

Chalker Lab research associate Dr Maximilian Mann said as well as repurposing waste materials into value-added construction materials, the polymer bricks' sulfur-sulfur bond means they can be bound together without mortar.



istock.com/Eomeren

"The bonding in this novel catalytic process is very strong, producing a sustainable construction material with its own mortar which will potentially streamline construction," Mann said.

First author Paris Pauling said the research is an excellent example of new scientific developments in sustainable materials science.

The latest research tested the new bricks' mechanical properties and looked at ways to reinforce them in construction, including with carbon fibre fillers. The findings are published in the journal *Macromolecular Chemistry and Physics*.

Flinders University
www.flinders.edu.au

Going full circle: from fruit waste to food packaging

The European ECOFUNCO project's goal is to use waste from the agricultural and food industry, in this case seeds and skins from tomatoes, watermelons and apples, to extract high-value compounds that are subsequently used in packaging for food and personal hygiene use.

Obtaining new, more sustainable and recyclable materials and contributing to the circular economy are two of the main aims of the project, explained by M Carmen Garrigós, principal researcher of the University of Alicante (UA) involved in the project.

UA's NANOBIOPOL group has carried out the extraction of the active compounds present in the agri-food waste. By using sustainable extraction techniques based on microwaves and



istock.com/Dan Fotica

ultrasound, it has managed to obtain new extracts with high added value (proteins, cutin, polysaccharides, polyphenols, fatty acids). These compounds have enabled the development of antimicrobial and antioxidant coatings for personal hygiene products such as tissues, as well as plastics for active packaging of fresh products,

and single-use cartons (trays, plates, cups) with improved water-barrier properties.

In addition to obtaining products with new advantages and taking advantage of the biomass generated in the agri-food sector, all the products developed with the compounds extracted by the UA researchers are recyclable and biodegradable

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On the road to greater water resilience

Water is fundamental to the health of our climate, ecosystems, cultures, communities and livelihoods. But the intensifying climate crisis is producing more extreme water events and increasing the damage, disruption and loss they cause to our communities — in 2021 alone, 100 million people globally were affected by floods, storms and droughts.

Australians have not escaped the personal and financial aftermath of these events. The Millennium Drought in south-eastern Australia stretched from 1997 until 2009 and saw the area's lowest annual rainfall since the beginning of the 20th century. The Murray-Darling Basin and much of the agricultural land in the southern states were decimated.

Earlier this year, regions in northern New South Wales and southern Queensland were battered by storms and flooding. By early August 2022, insurance claims for flood damage in these areas topped \$4.8 billion according to the National Insurance Brokers Association.

The floods are now Australia's second-costliest natural disaster — only the Eastern Sydney hailstorm of 1999 has cost more.

A time to act

The recent Aquanomics report by GHD clearly underscores the urgent need to take robust action to build water resilience and mitigate the frequency and potentially catastrophic impacts of these climate events.

Aquanomics research shows that between now and 2050, future droughts, floods and storms could result in a total loss of AU\$452 billion to Australia's GDP. Added to this are the hard-to-measure social and psychological impacts on those caught up in these events.

"Within Australia, a perfect storm of conditions is creating very real pressures on our water system and communities," said GHD's Lindsey Brown, Australian Market Leader — Water.

"Due to climate change, we are seeing flood and drought cycles at a much higher rate of occurrence than before. We have a growing population, which means more impervious area; we have more people with more water needs to be met; and there is a more sophisticated understanding from communities about what they expect from their water systems."

An environmental, social and economic lens

Key to addressing this perfect storm is improving Australia's water infrastructure and exploring how Australia can better manage its water resources while maximising environmental, social and economic benefits.

"Australia's water infrastructure is built for yesterday's climate. It is built for a climate that we're continually moving further and further away from," Brown said.

She explains that an integrated circular water system with a more adaptive and collaborative approach to water management is the way forward.

"Because of the extreme events we are now witnessing, we need to be bolder and consider more extreme solutions and options that we haven't put on the table before," Brown said.

"It's time to move beyond the traditional large-scale engineered interventions. While these will continue to play a role, we need to reframe our thinking and embrace a long-term, strategic view of resource management. We are already on that journey, but we need to lean further into developing interconnected and holistic systems. This requires a change in mindset, so water is seen as a valuable asset, not a commodity."

The trifecta

GHD's Aquanomics report outlines three key principles to start conversations about doing things differently and growing momentum to build and maintain Australia's water resilience.

Adapt:

This involves adapting to current and emerging climate trends, rather than repeating yesterday's infrastructure. And considering ways to conceive, design and build water infrastructure that is cognisant of future extreme events.

"This may mean making more short-term investments with 10- or 20-year horizons instead of spending big on infrastructure that will last for 60 or 80 years. In other words, in some cases it may be appropriate to spend less money upfront on more staged approaches that leave more options," Brown said.

Adaptation could also include building moveable infrastructure that delivers

a more decentralised approach to water management.

"These are things the water industry already does in some areas, but we need to scale up and make it business as usual, rather than the exception," Brown said.

Optimise:

Improving the efficiency and responsiveness of water systems has the potential to be a game changer in boosting resilience, and in many cases makes economic sense.

"We don't have a blank cheque to build the water infrastructure of the future. We work in an existing paradigm and have to get the most from what we have," Brown said.

Emerging technologies like automation, AI and machine learning have a key role to play in enhancing the efficiency of existing water infrastructure. For example, smart devices and sensors allow utilities to monitor assets in real time, enabling more effective maintenance and managing capacity when floods occur.

The Murrumbidgee Irrigation Area (MIA) scheme is one example of an optimisation success story. One of the most diverse and productive regions in Australia, around half the 378,911 hectares in the MIA are irrigated and the area is home to more than 50,000 people with most jobs tied to the water system through farms and industry.

Since 2013, extensive modernisation works have replaced and automated ageing water delivery infrastructure, saving hundreds of gigalitres of water and increasing food security.

Australia is also looking at wastewater treatment plants nationally to assess the potential for water to be reused for agricultural purposes or for generating hydrogen for energy.

Prioritise:

The water industry is naturally a circular industry and has been operating in partial circularity for decades, through end-of-line, biosolid and waste-to-energy solutions.

New thinking is opening opportunities to prioritise circular principles throughout



Australia's water infrastructure is built for yesterday's climate. It is built for a climate that we're continually moving further and further away from.

GHD's Lindsey Brown, Australian Market Leader — Water

the lifecycle of operations and beyond, connecting the water industry to the broader economy to unlock more sustainable outcomes.

"We need to prioritise solutions that are regenerative and circular, that are deeply connected to place and that have more scope for community benefit," Brown said.

This is illustrated in the billion-dollar wastewater treatment system in Upper South Creek in Sydney. The Upper South Creek Advanced Water Recycling Centre will be able to treat up to 70 megalitres of wastewater each day and will produce treated water suitable for recycling and environmental flows, renewable energy and reusable biosolids. It will also incorporate infrastructure to help environmental water and wet weather flows.

Similarly, Barwon Water has joined local councils in Victoria to transform 40,000 tonnes of organic waste into 8000 tonnes of high-value soil enhancers, including biochar, for local agriculture. Biochar helps soil retain moisture, making it more climate-resilient. The waste processing also generates renewable electricity to power around 500 homes.

Voices at the table

Shaping and delivering greater water resilience is a multifaceted puzzle and it requires ideas, insights and innovations from multiple stakeholders. Government and water institutions need to work alongside communities and Australia's traditional landowners.

"Community has a huge role to play — after all, they are going to bear the costs and live with the risks. The good news is communities today have a more powerful voice and are much more informed and engaged," Brown said.

"As part of this, traditional owners are also critical to discussions — their knowledge, voice and influence over the process is very important."

The endgame

So, what does Brown see as the ultimate goal of water resilience?

"For me it's about reaching a state where there's enough water for everything we need and it is produced in a sustainable way — we have enough for drinking, recreational use, the environment and for cultural uses. And we also have water for decarbonising the economy," she said.

"Most importantly, we need to achieve this in a way that doesn't overburden our environment, that's affordable and that makes the best possible use of everything we have."

Brown adds that focusing on water resilience isn't optional.

"We know with reasonable certainty that climate impacts are getting worse, becoming more extreme and happening more often. The sooner we can be ready and adapt, the sooner we can protect ourselves," she said.

"Our Aquanomics report is designed to spark this important conversation and provides a robust point of comparison. The changes we need to make will cost money — but not changing will cost much, much more."

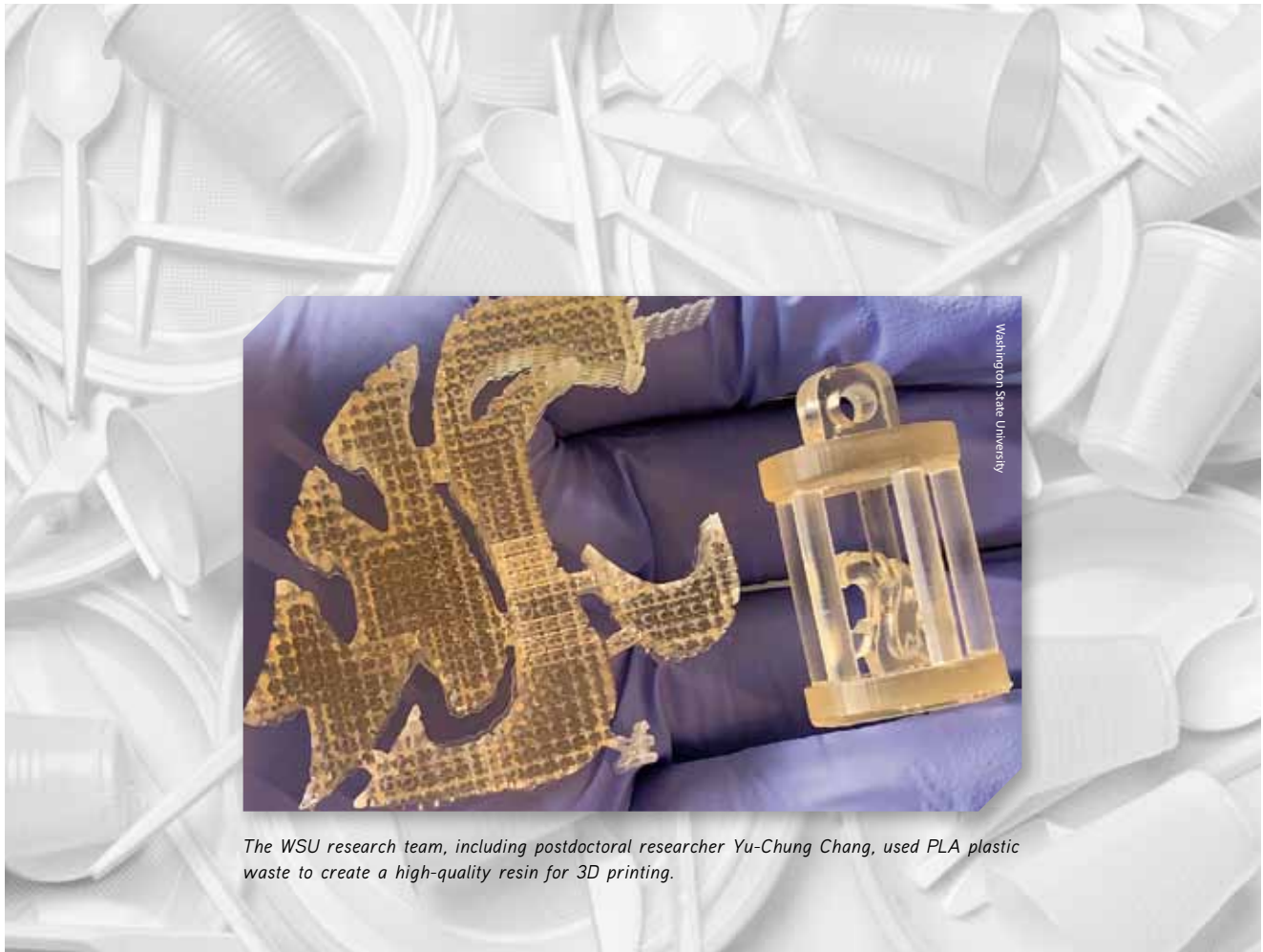
Read more at aquanomics.ghd.com.



GHD's Lindsey Brown,
Australian Market
Leader — Water



Recycling a bioplastic into 3D printer resin



The WSU research team, including postdoctoral researcher Yu-Chung Chang, used PLA plastic waste to create a high-quality resin for 3D printing.

istock.com/PaperKites

Washington State University scientists have developed a way of converting polylactic acid (PLA), a bio-based plastic that is used in filament, plastic cutlery and food packaging, into a printable resin by breaking it down into its constituent chemicals.

"We found a way to immediately turn this into something that's stronger and better, and we hope that will provide people the incentive to upcycle this stuff instead of just toss it away," said Yu-Chung Chang, a postdoctoral researcher in the WSU School of Mechanical and Materials Engineering and a co-corresponding author on the work. "We made stronger materials just straight out of trash. We believe this could be a great opportunity."

Although it's bio-based, PLA is categorised as a number seven plastic that doesn't break down easily. It can float in fresh or salt water for a year without degrading. It is also rarely recycled because, like many plastics, when it's melted down and re-formed it doesn't perform as well as the original version and becomes less valuable.

"It's biodegradable and compostable, but once you look into it, it turns out that it can take up to 100 years for it to decompose in a landfill," Chang said. "In reality, it still creates a lot of pollution. We want to make sure that when we do start producing PLA on the million-tons scale, we will know how to deal with it."

The researchers describe their method in the journal *Green Chemistry*. It involves breaking down the long-chain of molecules

that makes up the PLA into the monomers which are used as basic building blocks of other plastics.

The method does not require high temperatures and takes about two days to complete. Additionally, aminoethanol, the chemical that is used to break down the PLA, is fairly inexpensive.

"If you want to rebuild a Lego castle into a car, you have to break it down brick by brick," Chang said. "That's what we did. The aminoethanol precision-cut the PLA back to a monomer, and once it's back to a monomer, the sky's the limit because you can re-polymerise it into something stronger."

When the basic building blocks have been extracted from the PLA, they can be chemically reorganised into a liquid resin to be used as an ink for 3D printers. Testing revealed that the ink was as strong as those commercially available, meaning that

these plastics could be recycled as a way of producing stronger material.

The researchers believe they will be able to apply their method to the recycling of polyethylene terephthalate (PET) plastic, as it is chemically similar to PLA, and hope to pursue this in the future.

Washington State University
<https://wsu.edu/>

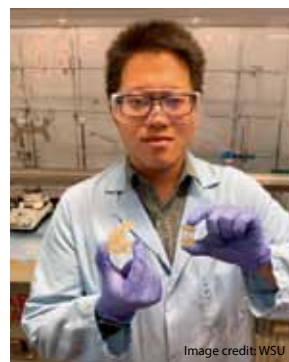


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Eat local food to fight climate change

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Researchers have suggested that adopting a 'locavore' diet — that is, eating only food produced within a 100 miles, or 161 kilometres, radius — could substantially reduce carbon emissions from food production.

University of Sydney scientists looked at the amount of carbon emissions that were produced by the transport of food, finding that almost a fifth of emissions from the global food system come from transport alone.

"Our study estimates global food systems, due to transport, production and land use change, contribute about 30% of total human-produced greenhouse gas emissions. So, food transport — at around 6% — is a sizeable proportion of overall emissions," said Dr Mengyu Li, who is the lead author of the study. "Food transport emissions add up to nearly half of direct emissions from road vehicles."

Nutritional ecologist and co-author Professor David Raubenheimer said: "Prior to our study, most of the attention in sustainable food research has been on the high emissions associated with animal-derived foods, compared with plants.

"Our study shows that in addition to shifting towards a plant-based diet, eating locally is ideal, especially in affluent countries."

The researchers used a framework called FoodLab to calculate emissions from food transport. It turns out that roughly three gigatonnes of emissions is produced by the transport of food, which means it accounts for 19% of food-related emissions. This value is also somewhere between 3.5 and 7.5 times higher than had previously been estimated.

China, the United States, India and Russia produce the most emissions from transporting food and high-income countries in general produce a disproportionate amount of these kinds of emissions. In fact, countries such as the United States, Germany, France and Japan constitute 12.5% of the world's population but generate 46% of food transport emissions, and Australia is the second-largest exporter of food transport emissions, due to the breadth of volume of its food production.

The kind of food being transported defines its levels of emissions. The transport of fruit and vegetables generates almost double the amount of emissions of their production and accounts for over a third of food transport emissions.

"Since vegetables and fruit require temperature-controlled transportation, their food miles emissions are higher," Li said.

The researchers think that eating locally may be the solution to this problem. They

calculated that if everybody only ate locally grown food, emissions would reduce by 90%, down to 0.38 gigatonnes. However, this isn't a realistic proposition globally, since many regions are unable to be entirely self-sufficient in food supply. It could be implemented selectively though.

"For example, there is considerable potential for peri-urban agriculture to nourish urban residents," co-author Professor Manfred Lenzen said. Importantly, richer countries can reduce their food transmissions through investing in cleaner energy for vehicles and incentivising food businesses to use production and distribution methods that emit less.

"Both investors and governments can help by creating environments that foster sustainable food supply," Lenzen said.

"Changing consumers' attitudes and behaviour towards sustainable diets can reap environmental benefits on the grandest scale," said nutritional ecologist and co-author Professor David Raubenheimer. "One example is the habit of consumers in affluent countries demanding unseasonal foods year-round, which need to be transported from elsewhere.

"Eating local seasonal alternatives, as we have throughout most of the history of our species, will help provide a healthy planet for future generations."

The research was published in *Nature Food*.

Smart bins installed on NSW Central Coast

Smart solar-powered bins that crush garbage to increase the amount of waste they can hold are being installed in Lake Macquarie.

The RAY Smart Solar Powered Compacting Bins have been designed to improve the environment by preventing overflowing garbage being released into the lake. The first bins have been installed along the esplanade at Warners Bay Foreshore, with another expected for Toronto Foreshore in the future.

If the bins are successful, others could be installed elsewhere in the area.

"Not only will this be able to store more waste with a smaller footprint, but having a strong sealed hatch as a lid ensures no items will blow out into the lake," said Lake Macquarie City Council Waste Strategy Coordinator Hal Dobbins.

Each bin can hold 1200 L of general waste, compared to a conventional bin's limit of 240. This is achieved by compacting the garbage using the bin's solar-powered crushing function.

Each device contains a 60 W solar panel which charges a battery that can run for up to four weeks with little to no sun.

Additionally, sensors inside the bins will alert the council



when the bin has reached 80% capacity so a collection can be organised.

Lake Macquarie Mayor Kay Fraser said: "Warners Bay is a very popular destination which is close to cafes, restaurants, a large picnic area and a shared pathway, so these bins will efficiently store a large amount of waste where it's needed."

"Another device will be installed at Toronto Foreshore in the coming months to reduce litter in the area, which has recently become popular since the installation of a new town green and picnic area."

"I would encourage residents to take advantage of these public bins and properly dispose of waste to prevent litter."

The \$30,000 bin project was funded through the Waste Less, Recycle More initiative and a Community Building Partnership grant.

Jodie Harrison MP Member for Charlestown said: "I was very pleased to support Council's request for funds for this innovative solution for waste in the local area."

"More and more people are coming to the lake to relax with family and friends, so it's important to keep the area clean and well maintained for people's enjoyment."

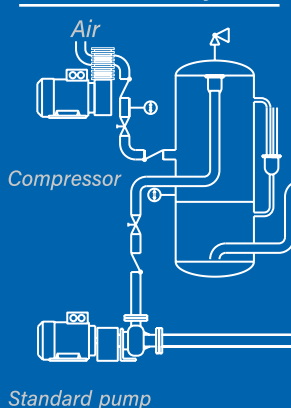
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**HYDRO
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Bottom ash recycling facility approved by EPA Vic



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An \$8 million bottom ash recycling facility has been approved by EPA Victoria. It is claimed to be the first facility of its kind to be approved for construction in the state and will be located with the Maryvale energy from waste (EfW) facility.

The facility will process bottom ash, recovering a range of metals before transferring them for recycling.

The remaining inert materials will be suitable for processing in the manufacture of Maryvale Recycled Aggregate (MRA), a product that can be used in road construction as a sustainable alternative to traditional asphalt. The recycled aggregate will be aligned with VicRoads Class 3 and Class 4 aggregate performance standards, which are used in Victorian road construction.

The Maryvale EfW project is being planned and constructed by Opal, Veolia and Masdar Tribe Australia. Located at Opal Australian Paper's Maryvale Mill in the Latrobe Valley, the EfW facility will use non-recyclable residual waste to produce steam and electricity to supply the mill. The Maryvale EfW project has EPA and council regulatory approvals for construction.

Jonathan Mayberry, General Manager, Business Development at Veolia, said that securing the EPA approval to build a

bottom ash recycling facility marked a positive development for the project.

"EfW facilities are a proven and reliable solution that derive valuable energy from non-recyclable residual waste," Mayberry said.

"Of the 325,000 tonnes of waste the Maryvale facility will accept every year, some 96% will be diverted away from landfill. Approval to integrate the bottom ash recycling facility further strengthens the project's environmental credentials by allowing approximately 60,000 tonnes of aggregates and approximately 6000 tonnes of metals to be recycled and recovered."

David Jettner, Opal's General Manager Corporate Development & Strategic Projects, said that integrating the bottom ash recycling facility further strengthens the Maryvale EfW project's alignment with circular economy principles.

"The bottom ash recycling facility will create additional jobs and add economic value for the Latrobe Valley. Importantly, together with the Maryvale EfW facility, it will bring innovative and emerging industries to the region," Jettner said.

Opal.

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Circular plastics economy

Sustainable wastewater treatment designs for recycling industry

Recent growth in Australia's plastics recycling industry has meant a surge in demand for efficient and sustainable wastewater and wash water technology.

"The Australian Government is aiming for 70% of plastic packaging to be recycled or composted by 2025, leading to significant growth in the plastics recycling industry," said Michael Anderson, GM of Aerofloat.

Over the last decade, Aerofloat has created sustainable wastewater treatment designs for major waste and plastics recycling businesses across Australia.

"We've been on the pulse of the plastics recycling technology for years, working with industry leaders including Astron Sustainability, a subsidiary of Pact Group, and Recycled Plastics Australia."

Australia's future zero-waste target coupled with a critical shortage of off-shore waste disposal options has forced the government to proactively drive the plastics recycling industry.

"The Chinese Government's decision to no longer accept Australia's plastics waste has effectively fast-tracked this industry within Australia," Anderson said.

"The Australian Government has offered grants to promote a circular plastics economy in response and we've seen the industry seize these exciting opportunities."

Pact Group Australia capitalised on the government grant scheme with its Circular Plastics site in Albury and has embarked on two additional plastics recycling facilities in Victoria. Aerofloat's design ensured an effective solution for its Albury site and has developed new sustainable solutions for the two Victorian plants.

In Albury, clean wastewater from the system is either re-used as wash water within the plastics recycling facility or discharged to sewer. Aerofloat worked closely with council to ensure its strict guidelines around managing microplastics in its inland waterways were met.

"We ensure that our technology is on point for the needs of the plant whilst also collaborating with councils to ensure the local guidelines are met," Anderson said.

Both new Victorian sites for Pact Group require new wash lines, with the feeding plastic material coming from both the Material Recovery Facility and general kerbside recycling waste pick-ups.

"At the new Victorian sites, Pact Group will be manufacturing rPET food-grade resin for beverage bottles and creating washed PET flake for use in rPET sheet thermoforming," he said.

Aerofloat's knowledge in developing the technology to meet the industry's needs has been taken advantage of by Pact Group. Aerofloat's solution means a significant reduction in water use at the sites whilst

ensuring the final wastewater is compliant with Greater Western Water's guidelines when it leaves the site.

"The system allows us to recycle higher quality water back into the wash line to minimise chemical use and conserve water," Anderson said.

Aerofloat also recently worked with Astron Plastics in Cheltenham to increase the capacity of its wastewater treatment plant following the installation of a new wash line. The solution ensured compliant wastewater that can be reused as wash water within the recycling plant, and an odour-free end product. Any excess wastewater was compliant for discharge to sewer. Aerofloat's design also provides for future expansion of the facility.

The facility supplies resin from recycled plastics to Pact Group, who can then include it in a large range of food-grade and non-food-grade packaging. The process ultimately meets Pact Group's vision to create a circular economy.

Aerofloat continues to work closely with the industry to continually improve on and innovate new technology to support Australia as it moves towards its zero-waste target. The company has been awarded for its innovative approach to tackling plastics recycling issues and offers unique, patented designs that support the booming industry.

Aerofloat (Australia) Pty Ltd
www.aerofloat.com.au



LOAD BUTTON LOAD CELLS

The Interface Load Button Load Cells are one of the smallest load cells in both diameter and height.

The specialised 'miniature' stainless steel load cells are small in design size but have a large range of measuring capacities, from 5 to 50,000 lbf. The spherical radius design of the compression load button load cells is frequently used in confined spaces providing good precision force measurement solutions.

They are also suitable for use in OEM applications, like medical devices, drones, industrial automation, packaging and robotics. The engineered product designs of these smaller applications require high-performing load cells, like the LowProfile pancake-style load cells, in a much smaller construction. Load button load cells are also commonly used in test and measurement projects.

The Interface Load Button Load Cells are available in LBM and LBS models, with diameters ranging from 25 to 96 mm and heights from 10 to 38 mm.

The range includes: LBM Compression Load Button Load Cell with capacities from 25 to 50k lbf, environmentally sealed and temperature compensated; LBS Miniature Compression Load Button Load Cell with capacities ranging from 5 lbf to 1K lbf and as small as 3 mm in height; LBMP Overload Protected Compression Load Button Load Cell is overload protected, temperature compensated, has a small diameter and its capacities range from 0.01 to 100 kN; LBMU Ultra Precision Compression Load Button Load Cell has good accuracy with enhanced eccentric load rejection with capacities from 100 to 1K lbf; and MSC Miniature Column Compression Load Button Load Cell uses Interface's proprietary temperature-compensated strain gages — it has a small compact design with low deflect.

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DIFFERENTIAL PRESSURE TRANSMITTER



The Series MSX Magnesense Differential Pressure Transmitter now has optional BACnet and Modbus communications available immediately for use in building control applications. This option is selectable for the device under the optional feature designated as -COM. The option allows the device to communicate via selectable Modbus or BACnet communication.

For building pressure measurement applications, the series combines the stability and versatility of the original Series MS2 Magnesense II transmitter.

Applications include: filter monitoring in air handler units; building pressure in pharmaceutical/semiconductor cleanrooms; duct static pressure in commercial buildings; and air velocity/flow in VAV systems.

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SELF-PRIMING PUMP

Gorman Rupp Super T self-priming pumps are designed for efficient operation and can handle solids-laden liquids and slurries. The large volute design of the pumps allows automatic re-priming in an open system without the need for suction or discharge check valves. The pumps can be mounted above the wet well and have safety features to protect their operators.

Additionally, the Eradicator Plus is available for the 3", 4" and 6" self-priming pumps. It has been designed for installations where nuisance clogging is increasing downtime and maintenance costs.

For heavy-duty applications where municipal waste, wipes, industrial by-products, agricultural wastes and other organic solids are present, this product shreds the solids, allowing them to pass through the pump uninterrupted. This pump offers reduced maintenance periods and lower energy costs.

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LEADING ENVIRONMENTALLY SUSTAINABLE CHANGE IN THE MEDICAL WASTE INDUSTRY

Traditionally, the medical waste industry has not been associated with sustainability. Legislative requirements regarding treatment focusing on patient care and health has seen medical waste compliantly treated and disposed of in the safest manner for the community. Specifically, although single-use disposable containers do ensure a safe and pathogen free solution for sharps waste in sterile environments, the treated containers are problematic when disposed of in landfills. Stepping up to the plate, Med-X Healthcare Solutions, a relatively new kid on the medical waste block, has made significant inroads into providing a circular economy solution for the industry, which is about to revolutionise the sharps container market.

In an Australian first, Med-X has developed a 100% recyclable single-use sharps container system, aptly named SharpCYCLE™. The recovery of single-use sharps containers has been pioneered through Med-X's investment in innovative contactless process technology whereby collected single-use containers are robotically decanted, separated from their contents, granulated and blow moulded into reusable sanitary waste containers. Med-X has partnered with local Australian recyclers and plastic moulding companies to utilise extruded plastic pellets generated by the SharpCYCLE process in the manufacture of other recycled plastic products, creating a true circular economy.

Through the ground-breaking SharpCYCLE recycling system, the clinical waste segment represented by single-use sharps containers will be almost fully recoverable and diverted from landfill. "It is estimated that this recovery system will reduce sharps container landfill volumes by over 28%. This percentage will certainly grow as the market moves to the single-use container system now that there is a sustainable, recycled alternative," Van Karas General Manager of Med-X described. "Although there are good reasons to use single-use virgin plastic in sterile environments, the issue unfortunately until now has been the disposal methods both of which negatively impact our environment: incineration adding greenhouse emissions and/or landfill, contaminating our ground and water."

Around three quarters of the total sharps container market in Australia is currently held by the reusable container segment, which until now has been seen as the only alternative to single-use containers. "It's important to note, that the hygiene and safety benefits of a single-use sharps container cannot be denied as they reduce needle stick injuries and the potential for cross contamination. Furthermore, now that the impact of single-use containers on landfill is being addressed through the SharpCYCLE system, the single-use sharps container market segment is expected to grow even more," Karas said.

Investment in sustainable technologies such as SharpCYCLE comes as little surprise to those who know that Med-X and sister-company Shred-X are subsidiaries of Freightways Limited, a publicly listed New Zealand company with a strong commitment to carbon reduction and waste transformation. Shred-X was born of the paper recovery industry over 20 years ago, so the company's roots are firmly planted in sustainability and remain its mission today.

Staying true to its heritage, Med-X continues to ensure ethical disposal and wherever possible divert treated waste from landfill, finding innovative ways to transform waste into new products. From rethinking eco-friendly procedures and landfill diversion opportunities within the industry, Med-X already recycle medical equipment. The treated and shredded product is recovered by local recyclers, leading to a reduction in disposal costs and landfill volumes.

These waste transformation initiatives and the launch of the SharpCYCLE system are aligned to the Company's Vision and Mission of Preserving Tomorrow, Today for a Sustainable Future.

Med-X Healthcare Solutions — **Be Smart, Be Safe, Be Healthy**



Med-X Pty Ltd
www.med-xsolutions.com.au

Why manufacturing needs data-led sustainability goals

As a society, we're all working towards shared sustainability goals. Whether that's to limit global warming as outlined in the Paris Agreement, to make the switch to electrified transport or as part of nation-specific net zero targets, the world shares a common objective. But industry also has its part to play. In addition to focusing on global goals, manufacturers should have their own sustainability targets and crucially, these must be led by data. Anders Dellblad, Manager of Sustainable Supply at Sandvik Coromant, shares his advice for building achievable, impactful sustainability goals.



The Friedman doctrine, also called shareholder theory or stockholder theory, is a normative theory of business ethics advanced by economist Milton Friedman. In it, Friedman defines the sole purpose of a corporation as to create the greatest profit possible for shareholders. Today, this explanation is dated and arguably irresponsible.

Businesses still want their efforts to generate profit, that's non-negotiable; however, profit cannot come before people and the planet. Companies of all sizes, from all industries, are now focusing on another non-negotiable of business — sustainability.

Corporate sustainability goals often align with published, globally endorsed agreements such as those of the Paris Agreement and the United Nations' Sustainable Development Goals (SDGs). However, it is

also important to develop goals specific to your business that will help to improve its sustainability credentials while simultaneously supporting business growth. So how should manufacturing businesses go about creating their own objectives?

Make them personal

Ensuring sustainability goals reflect and influence a business's core processes is key. When forming a new sustainability policy, businesses are at risk of greenwashing — when a company spends time and money on marketing itself as environmentally friendly, rather than actually minimising its environmental impact.

So, where can manufacturers start? There is still some low-hanging fruit that any business can combat. For instance, setting up small-scale recycling projects or limiting paper in business meetings

are steps virtually any business can take. These are good entry points for introducing sustainable actions into a workplace, but they are not adequate to constitute a full sustainability strategy for manufacturing and engineering firms.

Ideally, sustainability efforts should target business function improvements that directly relate to an organisation's position in the market. At Sandvik Coromant, for example, our lifeblood is developing innovations for metal cutting — tools and inserts, such as turning grades and industrial drill parts.

Because our business relies so heavily on the sale of tools, we recognised we needed to make this area more sustainable. For several years, the company has offered a resilient carbide recycling program that allows customers to sell their used tools back to Sandvik Coromant so that they can be recycled. We also offer customers



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To track companies' net contribution to the UN SDGs, they are scored by their positive or negative contribution to each of the 17 goals. Specifically, the framework centres on a discussion paper that was developed in partnership with the OECD in 2018. Company policies, operations, products and services, and practices are analysed according to reported and publicly available information.

Time to analyse

Creating sustainability goals is critical, but without analysing progress and acting accordingly, a business will limit their effectiveness. In addition to looking at external sources for inspiration, data also provides a framework for these goals and is a key driver to keeping businesses accountable.

It's important a business first analyses where it is now — how much does it recycle? How much waste does its production process generate? Does it use any renewable forms of energy? Most manufacturing organisations will have several pieces of software that can provide this information, from manufacturing execution systems (MES), enterprise resource planning (ERP), right through to supervisory control and data acquisition (SCADA). Understanding your starting point, and evidencing it with data, will help inform your key performance indicators (KPIs).

Data shouldn't only be assessed when forming new goals. Manufacturers should continually monitor their progress at regular intervals and use their findings to inform whether they're on track to succeed, or if more action should be taken. Again, good software platforms should be able to provide historical data using Internet of Things (IoT) technologies.

Already, society is working together to meet many sustainability goals. The onus is also on business, especially those in the manufacturing industry, to craft their own goals that reflect their business. Having collective goals, and working to achieve them, is critical. However, no two companies are alike and it's equally essential that manufacturers of all sizes take time to create their own, personalised sustainability goals that drive efficiency and contribute to industry's greener future.

a tool reconditioning service, so that their worn but still usable tools can be returned to their original condition. Both of these services feed into our sustainability goal of becoming more than 90% circular by 2030.

Ultimately, aligning sustainability goals with your core business model will ensure their integrity, creating a connecting line between who you are and what you do. Having goals that support a company's existing model for profitability will make them easier to accept and integrate enterprise-wide.

Get the facts right

Sustainability goals need to be grounded by measurable facts. There are several frameworks manufacturers can take inspiration from, such as the WWF's Science Based Targets, which provide companies with a clearly defined path to reduce emissions in line with the Paris Agreement goals.

Targets are considered 'science-based' if they align with what the latest climate science deems necessary to meet the goals of the Paris Agreement — limiting global warming to below 2°C above pre-industrial levels and pursuing efforts to reduce warming to 1.5°C.

Another important framework is the UN's SDGs. Each of these 17 goals has specific targets that need to be achieved by 2030, including building sustainable communities, investing in innovation and infrastructure, and ensuring responsible consumption and production. It is clear that primary responsibility for achieving the SDGs lies with governments, but it is also widely understood that they will not be able to make the required level of change without the help of business. After all, business activity — both positive and negative — touches upon all the goals.

Pole position for EV charging



The Australian Renewable Energy Agency has announced funding for Intellihub; \$871,000 will be used to install 50 electric vehicle chargers on street-side power poles in New South Wales as a trial that could potentially result in wider adoption of EVs.

The chargers will be installed across nine local government areas to cater for EV owners who live in apartments, townhouses or units that do not have access to EV charging on-site.

The \$2.04 million project is supported by Schneider Electric, which is providing the infrastructure, and EVSE, which will manage the service.

Origin Energy will supply 100% GreenPower, meaning all of the energy required to charge the vehicles will be matched with the equivalent amount of certified renewable energy added to the grid.

The nine local councils taking part in the project include Waverley, Woollahra, Randwick, Lake Macquarie, Ryde, Singleton, Parramatta, Northern Beaches and Inner West.

One of the aims of the trial is to highlight that there are no regulatory barriers to using existing infrastructure for charging electric vehicles. It also seeks to understand the impact of these chargers on the wider electricity network.

If the trial proves to be a success, Intellihub will provide the service in a wider rollout on a commercial basis.

ARENA CEO Darren Miller said power pole charging could be an ideal way to increase access to public EV charging.

"Not all electric vehicle owners have the ability to charge their vehicle at home, which is why we're excited to partner with Intellihub on this trial that utilises street side power poles, providing a great opportunity to pair with EV charging," Miller said.

"We look forward to seeing the results of the trial from Intellihub and hope to see it rolled out right across Australia."

Intellihub CEO Wes Ballantine said: "It's expected that as many as 10% of new car sales in Australia will be electric vehicles by 2025. That equates to an extra 120,000 new EVs on our local streets each year. It's likely that many of these car owners may be unable to charge their EVs from home.

"Power poles line most of our public streets and that presents an opportunity for the EV charging market. They're an accessible, safe and practical option for EV charging."

Intellihub

www.intellihub.com.au

Combating plastic waste one coffee cup at a time

The Department of Defence (Defence) has been working with Veolia to reduce the amount of waste sent to landfill in the form of disposable coffee cups.

Veolia has partnered with Defence and the Army & Air Force Canteen Service (AAFCANs) to collect and recycle over 45,000 single-use coffee cups from the Williamtown RAAF base near Newcastle. This relationship is the first step in the process of completely removing this sort of plastic-lined, disposable cup across all Defence bases in Australia.

Such cups are classified as "hard to recycle" due to the specific treatment that they need to undergo in order to remove their plastic layer, which serves as a way of protecting the paper shell. Typically these cups are sent to landfill due to the difficulty of this process.

As part of the plan to tackle this problem, Veolia and Defence have instituted a trial of cups with removable linings, installing seven dedicated recycling bins for easier disposal. Over nine months, almost 50% of the coffee cups used on site were collected in these bins.

Tony Roderick, Veolia's chief operating officer for waste, said the results of the trial have been very promising.

"We have seen a clear, upward trend in the use of dedicated recycling bins by the men and women at Defence which is really encouraging and something we're confident will continue to grow," he said.

"It takes effort from everyone to drive environmental change. Working with Defence on this progressive initiative, we saw a peak rate of an incredible 82% recycling in the last month of the initial trial. This is what ecological transformation looks like."

Defence has introduced stronger policies since it introduced the recycling program, such as those that reduce waste and make waste management more efficient under its National Waste Policy Action Plan. This includes a goal to eliminate problematic and unnecessary plastics by 2025.

Roderick said the initial trial is just the first component of a larger sustainability strategy.

"Working closely with Defence, we are now looking to undertake a trial of compostable cups that will test new and better ways to reduce impact on the environment," he said.

"You can't help but be excited by the fact your caffeine hit doesn't have to come at the expense of the environment."

Veolia Australia and New Zealand

www.veolia.com.au



SWITCH TO ECO-CONSCIOUS PLASTIC ALTERNATIVES FOR THE 2025 NATIONAL PACKAGING TARGETS

Our use of plastic is increasing, and across the world it is predicted to double by 2040. The current rate of plastic recycling in Australia is approximately 13%, with more than 85% ending up in landfill and generating plastic waste.

Addressing the plastic packaging issue, the federal government introduced the 2021 National Plastic Plan, understanding that the entire plastic life cycle needs an overhaul, and plastic packaging needs to be designed to be reused, recycled, and recovered.

Part of the plan is the 2025 national packaging targets, where all packaging needs to be 100% reusable, recyclable or compostable. This means it's a critical time for organisations to start thinking now about their packaging and plastic needs, to start planning and switching to alternatives that will meet government targets.

Some of these targets will require significant changes within industry or require substantial new infrastructure to be built to collect and reprocess the used plastic. Some of the targets are small steps only, as their challenges are very complicated. For example, the recycling rate of soft plastic to go from unknown to 10%. All these factors mean that there is going to be a lot of plastic waste for many years into the future.

Buyer beware — what does the “green” label mean?

The labelling of “biodegradable” plastic products is often greenwashing and open to marketing manipulation. Many products labelled as “compostable”, “degradable” or “oxo-degradable” offer no more environmental benefits than a regular plastic bag, in fact, they could be more harmful to the environment, for example, a “degradable” plastic fragments into little pieces.

How Biogone's innovative technology is different

Melbourne-based business, Biogone, is leading plastic technology in Australia with an organic additive to help plastic biodegrade at an accelerated rate when it's disposed to a modern landfill. Co-founders John Mancarella and Ross Headifen believe if single-use plastics must be used, then they should be made to be recyclable in line with the 2025 national packaging targets, plus biodegrade where they will be disposed of — which could be in a landfill if they are not recycled.

The difference between Biogone plastic and conventional plastic is when the plastic is disposed to landfill. The Biogone organic additive is a special food source for microbes and is mixed with the raw plastic material at product formation time. The naturally occurring microbes in landfill seek out the food and start to digest it. The enzymes the microbes secrete in

that process, breaking the surface polymer chains down so the microbes can then digest them too.

Biogone plastic biodegrades at approximately 90% faster than conventional plastic, breaking down to a humus like sludge (an excellent soil conditioner). No air or sunlight is required, so the biodegradation can occur in landfill. A conventional plastic takes hundreds of years to break down, while slowly releasing the biogas to the atmosphere. The accelerated biodegradation rate of Biogone plastic means the methane gas is released over a much shorter time.

Biogone plastic is recyclable with other soft plastics and retains all its original mechanical properties, such as strength, colour, impermeability, shelf life and recyclability and does not fragment to microplastics.



How can Biogone help my business become more responsible?

Biogone offers a wide range of cost-effective landfill-biodegradable everyday plastic products, helping businesses make the switch to more eco-friendly plastic alternatives.

Biogone believes they have the best solution until we advance the plastic recycling industry and move towards a more complete circular economy.

Explore the Biogone product range at biogone.com.au so your business can work towards meeting and even exceeding the 2025 National Packaging Targets.



Biogone
www.biogone.com.au



Tidal turbine to light the Thames



A small proportion of the River Thames is to be illuminated using power generated by the flow of the river itself, as Kingston University tests prototypes of a new hydroelectric turbine design.

Based on the traditional water wheel, the new design is mounted on a vertical axis that sits on a pontoon. On this will be an array of test sensors and monitors, including a TorqSense wireless torque sensor from Sensor Technology Ltd.

The turbine under test has been developed by Hales Marine Energy near Eastbourne on the English south coast and is expected to be deployable in tidal seas as well as rivers. Designed to fit on a submergible tank, the turbine will sit on the sea bed and can be floated up to the surface when required. The unit under test is 1 m diameter and produces about 1 kW but the design is scalable — 5 m turbines suitable for inshore deployment would generate round 20 kW; smaller units would be suitable for river use.

With access to the test site being by small boat, Rod Bromfield, Senior Lecturer of the Faculty of Engineering, Kingston University knew that his test regime had to be both simple and comprehensive.

“The critical measurement is torque, as this indicates the power we can derive from the system. We had to be certain that we would get continuous measurements over an extended period of time, because we need to map power production against actual river flow. Also, for this technology to succeed in the emerging green power market it must be capable of continuous and predictable energy production,” Bromfield said.

One of the engineering issues that Bromfield faced was the relatively slow revolution of the turbine — in this test below 50 rpm. This helped define the choice of the TorqSense, but it is also a key feature of the Hales turbine — the slow speed means less stress on moving parts and therefore less servicing. It also minimises habitat disturbance, so that the ecological impact is low.

“When I contacted Sensor Technology I was very concerned about vertical mounting and harsh environment performance,” Bromfield said. “Fortunately there have been TorqSenses installed vertically, including several high up on vertical axis wind turbines, where they have to withstand gales, hurricanes and lashing rain.”



“To overcome the high resistance on the wheel blades that on one side are trying to move against the water flow, they are shaped and hinged to present a minimum resistance. The large blade area on the drive side produces very high amounts of torque (rotational force) at low speed, in the range of 10–20 rpm.

“Coupled with modern permanent magnet generators that can start producing electricity rotations as low as 2 rpm, my turbine can offer the possibility of tidal generation worldwide,” Bromfield said.

“Water is nearly 800 times denser than air so it carries far more energy, making water turbines a very attractive alternative to wind energy.”

The simplicity of the design, its robustness and low maintenance, relative ease of installation could also make it suitable for deployment in remote and less developed areas.

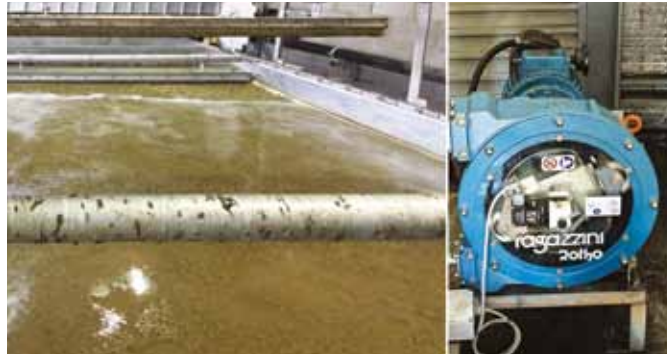
Sensor Technology Ltd

www.sensors.co.uk



Modernising an abattoir's pump technology

A Queensland abattoir was looking for a solution for its DAF tank sludge and scum transfer. It had previously used submersible pumps and double diaphragm pumps, but with limited success. A Hydro Innovations pump specialist recommended the use of a Ragazzini peristaltic (hose) pump for the application.



service life. It is also fitted as standard with a leak detector that instantly detects a damaged hose. The leak detector stops the pump and sends a warning signal. Pumps are mounted on stainless steel base frames and are supplied with 316SS ports.

The pump was duly ordered and installed. An operator at the plant commented: "It was

Ragazzini hose pumps are positive displacement pumps using a set of rollers to compress an elastomeric tube that pushes the fluid contained within it. This means that no mechanical moving parts are in contact with the fluid being pumped, and there are no valves or seals to ever replace. And because the pumps use rollers and not 'shoes', the casing does not need to be filled with an expensive lubricating fluid.

Solution

The abattoir needed to transfer up to 10 m³/h of the sludge, so Hydro Innovations recommended the Ragazzini MS3 peristaltic pump with fully cast casing, cast iron rotor and cast iron rollers.

The pump only needed to run at the slow speed of 26 rpm to meet the duty, so the pump is expected to have a long

easy to install and works very well, with little maintenance. A great feature is not having to fill the roller section with glycol, and the quiet operation of the pump."

The operators at the abattoir are very pleased with the solution and have since rolled out the new technology to its other branches around the country.

Ragazzini pumps are available in sizes ranging from 10 mm ports up to 150 mm, with flows from 0.2 L/h up to 180 m³/h, and with pressures to 15 bar. Various pump hose materials allow pumps to move abrasive fluids, corrosive fluids, fats, oils, along with FDA-approved hoses for foods and pharmaceutical products.

Hydro Innovations

www.hydroinnovations.com.au



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WaterGroup is now a reseller of the Landis+Gyr W350, a network-enabled, ultrasonic, fully integrated smart water meter.

The smart water meter is used to obtain 24/7 visibility of water use.

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It features the option to have both an embedded pressure and network leak or vibration sensor, allowing utilities to get on the front foot with leak reduction programs.

WaterGroup Pty Ltd
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The Series PMI Particulate Matter Transmitter is designed to measure indoor air quality by detecting particulate matter in an office environment or HVAC duct. Using laser scattering technology, the device can measure particles as small as 0.3 μm , making it suitable for indoor air quality monitoring system. The optional relay combined with the

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CIRCULARITYLIVE.COM.AU

Feeding our troops and helping the environment: Defence ration packs go green

Thanks to an innovative collaboration between Veolia and the Department of Defence, hundreds of kilograms of food and food packaging waste that would otherwise be destined for landfill are instead being recycled.

Defence ration packs contain food wrapped in either plastic or cardboard to ensure freshness to support troops in field training or on deployment. Like the food bought at a supermarket, if the packs do expire before use, they must be disposed of.

Veolia's chief operating officer for waste, Tony Roderick, explained that until recently, Defence had no viable alternative but to dispose of expired rations in their entirety.

"Unfortunately, recycling the ration packs via traditional recycling streams is not possible due to their mixed materials and the high labour costs associated with separating them into their composite materials," he said.

"This means expired packs were typically sent to landfill, the least preferable disposal option from both an economic and

environmental perspective. The challenge for the team at Veolia became finding a sustainable solution that helped the planet and satisfied Defence's requirements at the same time."

Responding to the challenge, Veolia worked with Defence's logistics arm to centralise the collection of expired ration packs, enabling a secure, economical and sustainable solution while also meeting Defence's environmental objectives.

A dedicated depackaging unit was used to separate the contents of the ration packs from their packaging, allowing the composite materials to be recovered. Once separated, the packaging was recycled and the organic contents used in agricultural applications or simply composted, with only a small quantity of residual waste sent to landfill.

Roderick said the results of the initial trial were very impressive.

"Over a period of less than 3 months, 604 boxes of expired ration packs were depackaged, equating to almost 7.5 tonnes of potential waste," he said.

"At the end of the trial, 92.5% of the total volume had been diverted away from landfill, including 2.2 tonnes of food organics. That's an incredible result not just for Defence and its strategic objectives but also for the environment itself."

Following the successful trial, Veolia is working with Defence to roll out the solution across almost 400 sites nationally. The process will be led by Defence's Directorate of Supply Chain Maintenance, Warehousing and Distribution as the key stakeholder.

Roderick said the initial trial's success saw Veolia receive Defence's Innovation of the Year award, highlighting what can be achieved when like-minded teams work together to solve challenges.

"This latest collaboration between Veolia and the Department of Defence shows that environmental challenges can be overcome when there's a common goal to deliver a more sustainable outcome.

"Two heads are almost always better than one," he concluded.

*Veolia Australia and New Zealand
www.veolia.com.au*

Circularity 2022



What: Circularity 2022
When: 24–25 November 2022
Where: Hilton Sydney
Web: circularitylive.com.au

istock.com/Pernal

Australia's business leaders recognise the importance of transitioning away from our current take-make-use-dispose model, but seek greater awareness of circular practices and solutions. Circularity is a new dedicated annual circular economy conference that has been specially curated to close this gap and cater to the nation's growing circular economy sector.

Brought to you by Planet Ark's Australian Circular Economy Hub (ACE Hub), Circularity will bring together industry, government and academia to share knowledge, collaborate

and drive actionable change towards a more circular future in the Asia-Pacific.

Over two days, the event will provide delegates with a comprehensive and varied agenda of conference sessions, networking events, dedicated exhibition space and awards program.

It has been designed for participants looking for thought leadership and practical applications of circular practices, while offering the chance to build long-term business partnerships and celebrate those making a difference to the industry.

Circularity is committed to raising the bar on the future of the circular economy.

The event is designed to help lay the foundations of circular principles and explore the current local and global landscape on policy, procurement and metrics. Focused discussions and collaborative workshops on business models and practices, as well as regenerative design and disrupting the linear system, will aim to inspire innovative thinking and deliver the tools needed to drive real change in transforming businesses and systems in Australia.

This in-person event is running from 24–25 November at the Hilton Sydney.

Diversified Communications Australia
www.divcom.net.au



Nature-based solution tested at wastewater plant in Vic

The Restorative Wetland Carbon Storage pilot project at Cowes, in the Bass Coast Shire of Victoria, is studying how floating wetlands can be used to manage treated effluent and emissions produced from wastewater treatment.

The Labor government has invested \$250,000 towards this project as part of the Integrated Water Management grant program, which co-invests in wastewater and stormwater projects that can contribute to water security, public and environmental health, and urban amenity.

The study is being run by Westernport Water, and its findings will be shared with the broader water industry and community.

Victorian Minister for Water Harriet Shing recently inspected the pilot project and said: "This pilot project will support the water industry [to] adapt to climate change and population growth, and provide multiple environmental benefits such as improved biodiversity, habitat and water quality."

Member for Bass Jordan Crugnale said: "Nature-based solutions are important to the community and this pilot is just one example of many local innovations that will ensure the Bass

Coast is well-positioned to meet future challenges."

This project is one of 11 metropolitan and 17 regional projects receiving a funding boost under the first round of the \$14.1 million grants program.

A new liner and cover have also been installed at the San Remo Basin ensuring that Westernport Water can continue to provide consistent and reliable drinking water services for another 30 years.

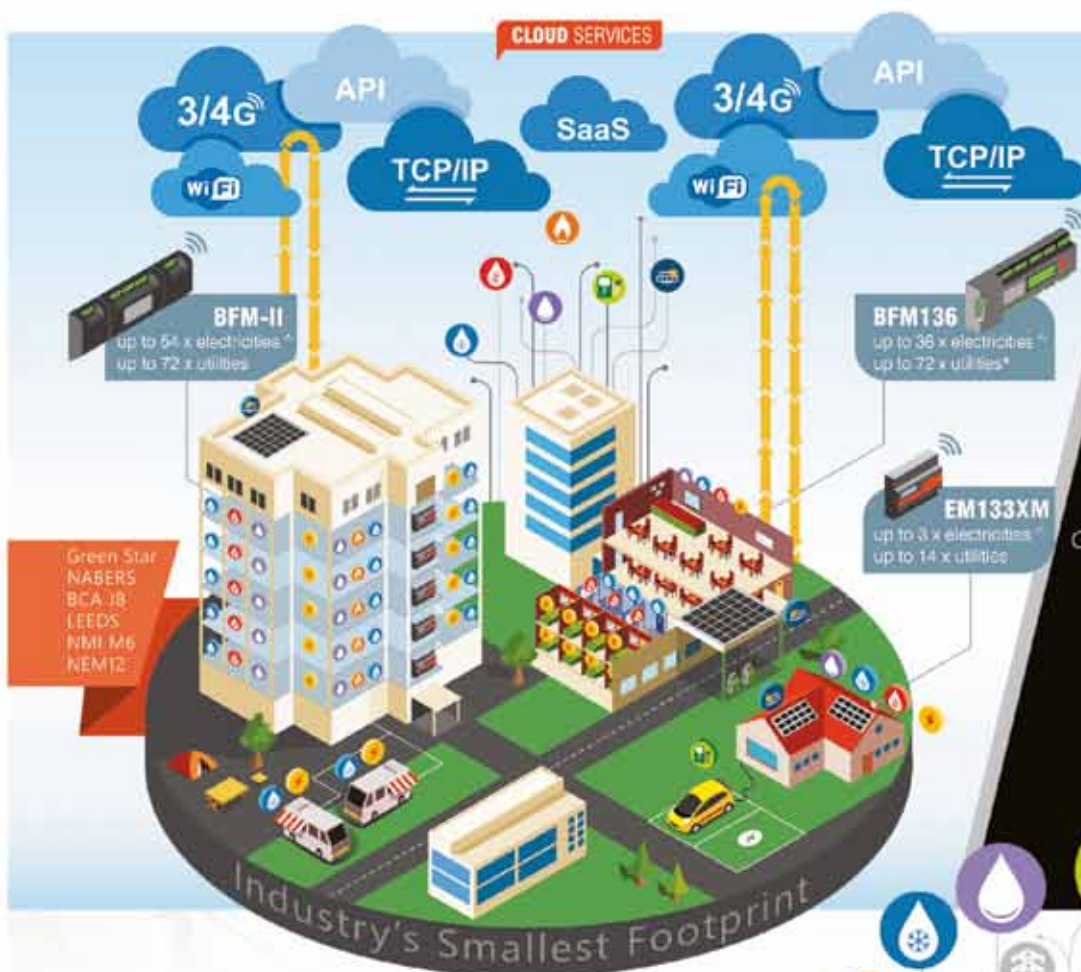
The \$2.6 million project will help prevent evaporation of the water supply from the San Remo water storage basin. The works were finished three months ahead of time and under budget without any impact to customers.

The San Remo Basin can store up to 30 million litres or about five days of supply and is an important part of the water supply system, providing safe and reliable storage for Phillip Island and surrounding areas.

"Renewal of critical assets like the San Remo Basin is essential to the ongoing supply of water services that meet, or exceed customer expectations — meaning reliability for families, businesses and the local community," Crugnale said.



istock.com/Tenedos



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Making the most of agricultural waste

An Australian manufacturer called Extracta is set to use agricultural waste such as sugarcane husks, grape marc (that is, their skins and seeds) and orange peel (leftover after juicing) for making ingredients for nutraceutical, food and cosmetic industries.

Extracta's materials will also be used for complementary medicines through sister company MediKane, which purchases sugarcane fibre, grape by-products and pectin from orange peel to produce plant-based alternative therapy products.

Importantly, repurposing all of these products will keep them out of landfill.

Rod Lewis, Extracta's CEO said: "Called Extracta because the company is extracting value from agricultural surplus, we're pioneers in this sector. This saves agricultural producers money because they won't have to send waste to landfill and benefits the environment by diverting agricultural waste from landfill. Plus, we're re-establishing the manufacturing of several ingredients like pectin in Australia.

"There are other companies who use agricultural waste like grape marc, but unlike most others, we will be utilising 100% of waste rather than just one element."

Australia produces over seven million tonnes of food waste each year, which calculates to about \$20 billion in waste annually.

Extracta sees that as an opportunity though, hoping also to use waste from mangoes, avocados, stone fruits, watermelons,



soy and berries to manufacture further ingredients, ideally with the option of exporting them.

"We have already secured \$2.5 million with two government grants through the Fight Food Waste Cooperative Research Centre. One of these will allow us to set up a production facility in Queensland in partnership with Queensland University of Technology (QUT) and the other to develop high-value

medical products in conjunction with Macquarie University," Lewis said.

The first company's plant in Brisbane will be processing sugarcane fibre, and another in Orange will be working with grape marc. These production facilities will be relocatable to move with the seasons so that they're not tied purely to specific produce waste.

"We are also working closely with key players in the wine industry including Tamburlaine Wines in Orange. The partnership with Tamburlaine will result in a joint production facility in Orange to process wine marc for pectin, tartaric acid and tannins."

Extracta is currently working with agricultural investors in Australia and reaching out to those in America too as it seeks capital for marketing and sales ahead of its local launch before the year's end. It intends to follow this by entering the US market in 2023.

Extracta

<https://extracta.com.au>



Preparing the next gen of environmental specialists

the ideal launch into the sustainability field and fulfils my need to see tangible community benefits come to life through the urban renewal aspects of the project,” Poppy said.

Students can tailor their learning with the option to study two of three specialty areas: business management, natural resource management and spatial science. Suitable for people from a range of backgrounds and experience, the degree caters for both suitably qualified graduates from related fields and mid-career professionals wishing to gain postgraduate qualifications in the field. There are study pathways from 80 units to 160 units depending on your level of experience. Students can study at a time that suits with the program offered 100% online with multiple intakes per year.

For recent graduate Mitchell, he highlighted multiple key benefits of the degree.

“[They] include meeting industry professionals and lecturers, learning how to apply my theoretical knowledge to solve real-world problems, gaining access to a world-class library to study and meeting a range of people with different backgrounds and professions that helped shape my own professional journey,” Mitchell said.

The structure of the degree also helped Mitchell excel with online study.

“It allowed me to work full-time and study full-time and achieve great marks throughout my degree due to the flexibility of the program and the fact I could study anywhere.”

Current student Tambalyn echoes Mitchell’s sentiments about online study.

“For someone who works full-time and often remotely, it was perfect,” Tambalyn said.

“Much of the course material has been relevant to my current career and has helped my overall career progression.”

There is also a shorter Graduate Certificate in Environmental Management and Sustainability, a 40-unit 100% online program that provides core knowledge and is designed to provide credit into the Master’s program, completing two degrees in less time.

2023 applications are now open.

Visit the University of Newcastle’s website for more information.

University of Newcastle

newcastle.edu.au/enviro-sustainability

Sustainability is a key driver of economic policy, and while the word is often used casually in conversation, it involves numerous stakeholders all interacting and influencing each other and policy. There is a need for specialists across business, government and the community in the field of environmental management to help navigate these relationships and protect our fragile environment, with strong job growth forecasted over the next decade.

At the University of Newcastle, the Master of Environmental Management and Sustainability aims to develop these specialists. The program is one of few nationally that incorporates sustainability theory and practice in environmental management tuition.

“The program has a very good reputation with alumni and current students, scoring highly on student satisfaction of teaching,” said program convenor Geoff MacFarlane.

“It is also accredited by the United Nations in teaching sustainable development goals in the curriculum.”

The core and directed courses are certified by both the United Nations Institute for Training and Research (UNITAR) and Newcastle’s International Training Centre for Authorities and Leaders (CIFAL), the only CIFAL centre in Australia and the Asia-Pacific region. These courses ensure graduates have been taught best practice skills that can be immediately applied to their career.

“The career destinations of graduates are diverse, with many entering government roles at the local, state and federal level in sustainability and environmental management,” MacFarlane said.

For alumna Poppy, a desire to pivot her career led her to the Master’s degree where she was able to jump straight into her dream job — securing a role as Environment and Sustainability Manager at Transport for NSW on the Sydney Light Rail project halfway through her studies.

“My role combines environmental management — something I have lots of experience in — with sustainability. This role is



IICA to hold its final

NSW Technology Expo for 2022 in Newcastle

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The Institute of Instrumentation, Control, and Automation (IICA) will hold its final Technology Expo for 2022 for NSW on 25 October. The expo will exhibit Australia's widest range of innovations, technologies and equipment in the advanced manufacturing industry.

The event will take place at The Arena at the NEX.

In becoming one of Australia's most significant regional cities, Newcastle is the industrial heartland with strong engineering roots.

"Newcastle and the Hunter is such an amazing part of Australia. Newcastle has many of the facilities and opportunities of a large city, but with a more relaxed lifestyle. It is also a city with strong engineering roots," said Andrew Mosdell of Wallbridge Gilbert Aztec in an article in the Newcastle Herald.

The Hunter region is Australia's largest regional economy at over \$50 billion in value. This ranks above Tasmania, the Northern Territory and the Australian Capital Territory in terms of economic output.

With over six Regional Growth Funds, totalling \$2.5 billion, there is no better space for businesses to invest, activate and expand their business operations. The regional funds' objectives are to unlock economic potential by building, upgrading, and supporting the infrastructure needs, connectivity, power, transport, and telecommunications links as well as water and sewerage services. This is great support for small- to large-scale energy, manufacturing

and other companies in terms of investment and development.

In addition, using new technology to improve transport efficiency and innovation in Newcastle, the NSW Government's Smart Innovation Centre invites local innovators and industry leaders to collaborate and trial automated vehicles in the region, forming a solid space with opportunities for the automotive and green industry.

In May 2022, the NUW Alliance welcomed NSW Premier Dominic Perrottet's commitment of \$370 million to establish an Advanced Manufacturing Research Facility at the coming Western Sydney Airport. The facility will bring universities and industry together to generate new technologies and globally competitive manufacturing innovations.

This will not only pave the way to advanced manufacturing in NSW, but it will also boost the industrial sector across Australia.

WA engineering consultants BG&E Resources (BGER) has opened an office in Newcastle. According to BGER managing director Craig Bloxham, "With a GDP of more than \$18 billion, the largest age cohort being 20- to 24-year-olds and the continued migration of residents from metropolitan hubs, Newcastle is a city on the move to becoming even more globally competitive."

Despite the current interest of the Hunter region, in Newcastle wine and coal are soon to lose their primary economic contributor title as the renewable energy industry begins to take over. Many engineers testify that Newcastle has taken an unexpected

and 'very fast' turn. The government has ambitious visions for clean jobs to replace those in the coal industry and the first sign of evolution has taken place.

Newcastle was able to facilitate the world's first hydrogen battery system built by LAVO. LAVO builds a hydrogen battery system that works by drawing electricity from a rooftop solar array, using an electrolyser to split water into hydrogen and oxygen, storing the hydrogen in a solid state in silver hydride tanks, before dispatching this as electricity via a fuel cell when needed to generate electricity.

Newcastle takes pride in its ability and strategic facilities, a great opportunity for businesses looking to relocate, innovate, develop, and achieve more with proactive regional government support.

The IICA Tech Expo 2022 will allow industry leaders and technology experts to explore not only advanced manufacturing technologies but also a strategic opportunity for investment, all under one roof at the IICA Technology Expo at NEX.

IICA Technology Expos are a one-stop-shop, featuring many companies showcasing their products or services related to the Instrumentation, Control and Automation Industry.

Visitors can pre-register now through <https://bookings.iica.org.au/bookings/events/event.asp?bookingid=1351> and enter for the chance to win an Amazon Echo Dot 4th Gen Smart Speaker.

IICA (Institute of Instrumentation Control & Automation)
www.iica.org.au

Waste-to-energy system to launch in Brisbane

Finn Biogas is set to launch the Firefly MMAD_05, a miniaturised modular anaerobic digestion system that can take organic waste and turn it into power and heat.

Last year, the company received a \$1 million grant towards its development as part of the federal government's Business Research and Innovation Initiative (BRII).

The platform uses a combined heat and power (CHP) generator to produce power from waste and has an integrated SCADA system control panel to allow for the automation of the process. Different modules can be used for generating biogas or compost.

"Through innovative technology, we are optimistic that together we can make waste work and embrace a brighter future and circular economy through restorative and regenerative energy," said the company's founder and managing director, Jason Hawley.

"Organic waste management is already highly developed at an industrial scale; however, it is difficult to manage at an urban scale, as waste generally comes in small volumes and is segregated across the city.

"The design of our MMAD system is tripled layered and provides both social and environmental benefits, including the diversion of waste from landfill, a reduction in greenhouse gases and the production of nutrient-rich fertiliser which would have otherwise gone to waste."

Food waste is often mixed with general waste, which can potentially cause risks to health and needless greenhouse gas emissions. The MMAD system is intended to divert this food waste from the landfill and process it into energy and fertiliser, the latter of which can be used for green spaces. It benefits from local councils providing and collecting food organics garden organics (FOGO) bins, which can be directly processed by the technology.

"As our system turns waste into energy and nutrient-rich fertiliser, councils will be able to have their own MMAD system — thereby creating their own energy to use within the community."

A collection of the MMAD systems working together across five precincts would be able to prevent about 1000 tonnes of waste from entering landfill and almost 2700 tonnes of CO₂ emissions from being released.

"Scaled across Australia, we could divert up to 21,000 tonnes of waste from landfill and mitigate approximately 55,000 tonnes of CO₂ equivalent emissions — in just one year."

The system is being developed as part of the 'turning office trash into energy treasure' challenge led by the Australian Renewable Energy Agency (ARENA) and is expected to be launched within the next six months.

Finn Biogas Pty Ltd
finnbiogas.com

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The problem of 'greenwashing' and how we can work to normalise real change

Jason Cooper, CEO of Envirosuite*, talks about how to enable companies to accurately spruik their ESG credentials.

In 2003, a meeting of the United Nations Environment Programme Finance Initiative created the concept of 'ESG', or 'environmental, social and corporate governance'. For a long time it remained something of a buzz phrase, understood by few and cared about by even fewer, but in recent years ESG has morphed into a global phenomenon with ESG assets tipped to surpass US\$41 trillion in 2022 and US\$50 trillion by 2025 — one-third of the projected total assets under management globally.

The rise in profile for ESG in the investor world has undoubtedly coincided with a rise in momentum behind social causes worldwide as growth in natural disasters has fuelled the climate movement, and of course, corporations and funds have been quick to jump on the ESG bandwagon. But perception and reality of a company's credentials can vary widely, and after years of media reports and widespread concern around 'greenwashing', the ASX recently announced a crackdown on ethical funds, joining ASIC to fight against those using

the market disclosure system to fake green credentials.

That's exactly what greenwashing is. What we see is certain companies pretending or promoting that they are doing the right things by ESG, but not really putting the right fundamentals in place. It's important to note that there are myriad reasons why this practice has grown globally, not least of which is the fact that ESG doesn't have a global standard. It can be interpreted in a variety of ways, and the result is a variable outcome for companies, investors and, of course, the environment.

Tesla, the 'clean energy electric car' company, recently released its 2022 Impact Report, in which the company dismissed the way ESG assessments measure sustainability and the relationship between businesses and the environment. Elon Musk used the report to commit to measuring "real world impact" instead, and called for the baseline approach of ESG to be updated beyond measuring whether an environmental issue impacts the profitability of a company.

A short time later, Tesla was kicked out of the S&P 500 ESG Index. At the same

time, ExxonMobil is rated top 10 best in the world for environment, social and governance by the S&P 500. Musk has since called ESG a scam, saying it's been weaponised by phoney social justice warriors.

But let's take a step back and look at why people want ESG credentials to begin with. If you look at the results of the Australian Federal Election, the success of the Teal Independents running in traditionally safe Liberal seats on a platform of climate action, it's pretty clear to see that people want to see change. Punters want to be contributing to a proactive stance on climate change and making a positive impact on the environment. As a result, an increasing number of funds want to be investing into companies that are seen to be doing the right thing.

In Australia we've seen quite a few companies come up and flout their ESG credentials without too much substance behind it. Up until now, there's been very few that are really driving the change, but there's definitely a shift happening. A younger generation wants to see change, and they are voting with their feet. So funds will have to start to provide a level of transparency



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and consistency around the companies they are investing in and what they are doing. We have seen recently ASX-listed mining company IGO release an entire ESG deck, including presentation materials for an upcoming ESG Roadshow. This could be seen as a watershed moment, particularly if they deliver on their promises.

The question remains around how we move towards a place where we have globally recognised ESG standards. At Envirosuite, our view is that before we get to that point, companies need to have a monitoring baseline so that investors and funds can understand and collect data around their operations, and be willing to share that in somewhat of a transparent way. We have certain customers around the world that proactively want to monitor their environmental impact, and make that available to the rest of their industry, as well as to their local communities and to government, and they are growing in number.

We believe in the importance of environmental intelligence to form this baseline. So, for example, our software platform will collect various environmental parameters like noise and vibration, air quality, water quality, dust impacts, etc. We will bring that into our platform and provide real-time monitoring for our customers, and that will then generate reports that our customers can then directly put into their ESG compliance statements. Furthermore, we're actually helping a lot of customers around the world from airports, mining industrial facilities and waste facilities to actually provide compliance to regulatory bodies to make sure that they are not exceeding any of those parameters.

Adoption of baseline standards needs to grow, and the more people that come into this segment, the faster the industry will accelerate. Importantly, too, it's not just

about the monitoring. It's actually now what you do with that data to drive change. It's about getting insights from that data, and driving change, whether that's a government body or private industry, to really drive an improvement in those ESG ratings.

If you are serious about ESG, it's hard to argue with Elon Musk's belief that real-world impact is the most important part. This core idea seems to have been lost as many companies have used ESG as a money-making exercise, but we feel it's inevitable that eventually there will be global standards. The first step to getting there is to ensure that companies are collecting more and more data, and become more and more transparent. Envirosuite is not only well positioned to help with that, but we also believe that purpose is key to turning ESG into something with a more tangible impact for people and the planet.



**Jason Cooper has held senior and executive level management roles in industry-leading companies in the US, UK and Australia. He has worked in a wide*

range of industries such as market place, consulting, software development, utilities, energy-efficient buildings, health, data centres, mining, oil & gas, energy performance contracts, public private partnerships, agriculture and transportation. Jason joined Envirosuite in July 2020 as chief operating officer, and was appointed as chief executive officer in March 2021. Earlier in 2022 he joined the board as Managing Director of the company. During his tenure he has led the commercialisation of EVS Water, reset and positioned the product suite for scaling across EVS Water, EVS Aviation and EVS Omnis, and delivered strong growth and retention in key markets and products.

Envirosuite Operations Pty Ltd
www.envirosuite.com



Waste Expo Australia

26-27 October 2022

MCEC, Melbourne

www.wasteexpoaustralia.com.au



Transitioning from waste to resource

The Australian Government has set an ambitious target to get to 80% recovery rates by 2030. Getting to this milestone will require the cooperation of stakeholders from across the waste and recycling sector and will require a shift in how businesses and consumers view and use materials and waste, transitioning from a disposable economy to a circular one. Moving toward this sustainable, more environmentally focused economy requires buy-in from industry, government and the community at large.

Michelle Mandl-Keating from TOMRA Cleanaway said, "I believe that the community and business has a considerable role to play in further activating the circular economy.

"Extended Producer Responsibility (EPR) initiatives, like Container Deposit Schemes, mobilise the community to participate in waste and resource recovery through legislating a 'polluter pays' approach to resource management. Community participation and support of outcomes is vital to achieving the outcome, which is ultimately delivering a circular economy and moving away from waste," she continued.

At this crucial time for the industry, Waste Expo Australia will see one of the largest gatherings of waste and resource recovery professionals gather in Melbourne

to discuss strategies to reduce waste overall as well as reducing the amount of waste heading to landfill.

Thought leaders at Waste Expo Australia will present on the shift away from linear economic models to a circular economy, where product stewardship and the move away from raw material use is a priority, with speakers from Sustainability Victoria, Recycle Vic, TOMRA Cleanaway, GHD and more.

TOMRA Cleanaway will present its world class Container Deposit Scheme, Return and Earn.

Mandl-Keating continued, "Direct refund of the container deposit has played a key role in triggering the paradigm shift in the community regarding the value of waste. EPR programs are highly future focused and geared towards achieving a positive legacy with community behaviours that keep valuable finite resources and energy in a continuous loop.

"TOMRA Cleanaway is driven to achieve greater recovery of materials to enable the circular economy. Throughout our contract delivery in NSW, we have been able to deliver certainty of quality commodity volumes to recyclers that have in turn been able to invest in domestic processing activities.

"Our materials are delivered, in most instances, to domestic processors and manufacturers, and from the time of col-

lection of an eligible beverage container to recycling and reprocessing it can take as little as 6 weeks for a recycled container to be back in market for purchase," she concluded.

According to Robby Clark, Portfolio Director for the Energy & Waste Portfolio at RX Global Waste Expo, this is a critical time for the waste industry. "We are proud to deliver the most comprehensive Waste Expo agenda. With a stellar line-up of speakers from all across recycling and waste management, all coming together to share their successes, lessons learnt and what the future holds, Waste Expo gives attendees the opportunity to hear from some of the biggest names in the industry at the conference and do business with leading suppliers for free on the expo floor," he concluded.

To view the full Waste Expo Australia Conference Agenda, please visit: <https://www.wasteexpoaustralia.com.au/en-gb/conference-agenda.html>.

Waste Expo Australia is co-located with All-Energy Australia, forming the largest gathering for waste and recycling management, clean and renewable energy, and energy storage professionals in the country. Free registration is available at <https://www.wasteexpoaustralia.com.au/>

RX Global

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Climate Change Bill 2022

The Australian Federal Government's Climate Change Bill 2022 was passed by the Senate in September 2022 and will now become legislation.

The bill outlines Australia's greenhouse gas emissions reduction targets of a 43% reduction from 2005 levels by 2030 and net zero by 2050.

It requires the minister to prepare and table an annual climate change statement and the Climate Change Authority to give the minister advice in relation to the annual statement and future greenhouse gas emissions reduction targets.

There will be periodic reviews of the target, which will increase every five years to stay in line with the Paris Agreement which aims to limit global temperatures to 2°C and strive for 1.5°C above pre-industrial levels.



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What to look out for at All-Energy

The All-Energy Australia expo, dedicated to clean and renewable energy, is taking place from 26 to 27 October.

There will be over 200 speakers at the event, presenting on 10 stages. The 14 themes that will be covered by the presentations include Grid Scale Energy, Digitisation, Community and Local Energy, Hydrogen, Electric Vehicles, Decarbonisation, First Nations Energy, Long Duration Storage, Bioenergy, Future Grid, Offshore Wind Energy, Power Purchase Agreements, Energy Management and Distributed Energy Resources.

Some of the expert speakers giving presentations at All-Energy Australia include Penelope Howarth, Climate Change


Branch at the Department of Foreign Affairs and Trade; Grace Young, Chief Innovation Officer at Wattwatchers; Greg Hannan, Head of Network Strategy and Non-Network Solutions for CitiPower, Powercor and United Energy; and Helen Rowe, Transport Program Manager for the Climateworks Centre.

All-Energy Australia runs from 26 to 27 October at the Melbourne Convention and Exhibition Centre. It will feature presentations from industry experts and there will be over 250 suppliers showcasing their products and technologies relating to renewable energy and energy storage.

All-Energy Australia
www.all-energy.com.au



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Australia & New Zealand's infrastructure industry is well positioned to reach net zero

Sumit Oberoi, Industry Strategist, Autodesk Construction Solutions

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Australia and New Zealand's infrastructure industry is well positioned to meet 2030 benchmarks and the net zero carbon by 2050 goal to address climate change risks identified by the Intergovernmental Panel on Climate Change (IPCC).

Almost every jurisdiction requires infrastructure supply chains to deliver carbon reductions measured using the Infrastructure Sustainability Council Rating Scheme (IS Rating Scheme). This is the Australian and New Zealand rating framework designed to assess the sustainability of the planning, design, construction and operation phases of infrastructure programs, projects, networks and assets.

The IS Rating Scheme evaluates governance, economic, environmental and social performance and has now become standard practice in most states and territories for any major transport project to plan and deliver carbon reductions, across a broad range of asset classes and sizes. Throughout Australia we have also started to see a range of targeted policy programs to incentivise innovation and uptake in low-emissions building materials, renewable energy and the circular economy.

Our industry is strongly placed to help enable this transition over the next decade because of its role in shaping societies and economies and through its unique position to influence emissions reductions, leverage investment and respond to policy incen-

tives from government, proponents and asset owners.

However, collective action is needed to deliver the low-carbon, climate-resilient infrastructure that meets community, government and investor requirements.

The infrastructure industry's contribution to emissions

Across Australia, it is estimated that infrastructure contributes around 70% of national emissions; with around 15% (or approximately 87 million tonnes of CO₂ per year) directly contributed through the delivery and operations of that infrastructure.

The infrastructure industry has already demonstrated the influence it can have on the reduction of emissions, with most recently delivered infrastructure projects being able to deliver a combined 11% reduction of CO₂ equivalent from materials across the asset lifecycle, and 68% reduction from energy use.

However, over the three years from 2021 to 2024 it is expected that around \$166 billion will be spent by governments in Australia on infrastructure.

Joint industry report highlights positive findings

In December 2021, in a first-time collaboration, Autodesk, the Australian Constructors Association, Consult Australia and the Infrastructure Sustainability Council released a joint report to support industry in accelerating a net zero future through the design and construction of the infrastructure pipeline.

The report, A net-zero future delivered through our infrastructure pipeline, signals that a whole-of-business, systems-based approach across asset lifecycles is required to accelerate the journey to net zero. This includes pulling key levers such as procurement, materials, methodologies, technology and people capability.

There are many tools identified in the report which also map key enabling levers against asset lifecycle phases, as well as a net zero delivery model to prompt and guide decision-making — from rethinking and redefining problems and solutions through to reducing carbon-intensive materials and ensuring regenerative approaches are integrated in asset design and construction.

The report also presents real-world case studies to inspire project teams to use, adapt, scale and accelerate further innovation. Technology is also identified as a key enabler of decarbonisation.

How technology supports the infrastructure industry

Technology supports the infrastructure industry with the tools they need to unlock insights, make better decisions and achieve superior outcomes.

Software helps automate complex processes and transform data into actionable insights that empower innovators to improve the impact of everything they design, make, own and operate. Cloud solutions and connected data environments fuel innovation — across technology, processes, supply chains and industries. This opportunity is only accelerating.

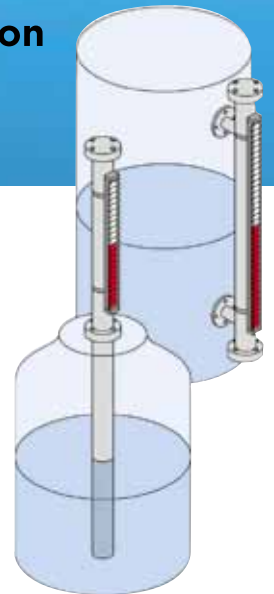


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