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sustainability matters

On a plastic rethink mission

Soft plastic recycling • Waste to energy • Water purification • Regulations

Recycling
for a circular economy

Waste education to help communities recycle better

89% of Australians believe recycling is important

Where's the confusion?

47% believe that soft plastics can go into recycling

39% don't trust that their recycling will be properly recycled

37% are unaware that kerbside recycling is sorted in Australia

32% say it's hard to find clear recycling information

15% think that anything can be put in recycling and it will get sorted at the recycling facility

Why aren't we recycling better?

1. Recycling information is confusing and inconsistent
2. Hard to find clear instructions about how to recycle
3. Parents don't have the time to teach kids about recycling

*All insights from Cleanaway's Recycling Behaviours Report 2021
www.cleanaway.com.au/recycling-behaviours-report/

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The free online waste and recycling learning platform

cleanaway.com.au/greenius

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REGULARS

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WORDS FROM THE EDITOR

As a result of a need to preserve scarce natural resources for products such as silk and glass, the production of synthetic alternatives was prioritised during WWII.

By the 60s, plastics were beginning to take off. Prized for its lightweight qualities in some products and preserving qualities for others, plastics were considered fantastic by some, but others were already concerned about the noticeable waste and environmental issue being created. This prompted the development of recycling technology, but soon the technology could not keep pace.

Every Australian now creates around 100 kg of plastic waste each year with only around 13% of it recycled. The rest ends up in landfill or, until recently, was exported to other countries such as China and Indonesia.

Australia is now on a plastic mission with new regulations, research and development, and consumer education plans.

As of 1 July 2021, the Australian Government has banned the export of mixed waste plastics with only plastics sorted into single resin or polymer type allowed to be exported. As of 1 July 2022, this will tighten again to only allow processed plastics (eg, flakes or pellets) or processed engineered fuel to be exported.

Australian national environment ministers have also agreed to phase out eight 'problematic and unnecessary' plastic product types by 2025. These include lightweight plastic bags; plastic products misleadingly termed as 'degradable'; plastic straws; plastic utensils and stirrers; expanded polystyrene (EPS) consumer food containers (eg, cups and clamshells); EPS consumer goods packaging (loose-fill and moulded); and microbeads in personal healthcare products.

The plastic shake-up has also created opportunities for designers of new circular alternatives for plastics and developers of new recycling technologies and processes. In this issue, you'll read about soft plastic recycling technology being developed as well as new designs for mixed waste and plastic packaging recycling. We also discuss navigating the challenges in waste and recycling regulation.

Carolyn Jackson

sm@wfmedia.com.au

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Westwick-Farrow Media
A.B.N. 22 152 305 336
www.wfmedia.com.au

Head Office
Unit 7, 6-8 Byfield Street,
(Locked Bag 2226)
North Ryde BC NSW 1670,
AUSTRALIA
Ph: +61 2 9168 2500

If you have any queries regarding our privacy policy please email

privacy@wfmedia.com.au

Editor
Carolyn Jackson
sm@wfmedia.com.au

Editorial Assistant
Jane Allman

Publishing Director / MD
Geoff Hird

Art Director/Production Manager
Julie Wright

Art/Production
Colleen Sam, Veronica King

Circulation
Dianna Alberry
circulation@wfmedia.com.au

Copy Control
Mitchie Mullins
copy@wfmedia.com.au

Advertising Sales

Industrial Group Sales Manager
Nicola Fender-Fox
Ph: 0414 703 780
nfender-fox@wfmedia.com.au

Sandra Romanin
Ph: 0414 558 464
sromanin@westwick-farrow.com.au

Tim Thompson
Ph: 0421 623 958
tthompson@wfmedia.com.au

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Place matters: in sustainable building design

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> **Developing our approach to sustainability from a deep understanding of place will mean that our buildings and precinct developments have a much greater chance of being well loved by the future occupants…**

So you have assembled a great sustainable design team with the best intentions, but do they have a deep understanding of the project's place and its ecological, social and economic context?

A few years ago, I was asked to develop the sustainability strategy for a large government precinct development in outer Melbourne. My first step was to ask permission to visit the site and talk with members of the local community. I was directed instead to read the planning reports and to study the site plan. While this was helpful, the resulting sustainability strategy was largely ignorant of the identity of the place, its ecology, natural and human history and interdependent relationships with the local area.

So, why should we care about this?

Developing our approach to sustainability from a deep understanding of place will mean that our buildings and precinct developments have a much greater chance of being well loved by the future occupants, valued by the local community, approved by local government, climate responsive and resilient, part of a thriving and biodiverse ecosystem, innovative, market leading and inspirational — or more simply put, successful.

The benefits of a place-based approach to sustainability are compelling:

More energy in the room: We are a place-based people and we love to gather around the metaphorical campfire and hear stories. When we share or hear these stories of place we are energised. On a recent project I learned about Victoria's amazing short-finned eels and how they had historically migrated from the project site to the coral sea many thousands of kilometres away where they gave birth, died and then their offspring swam all the way back to that very site. This story brought the design team together and inspired much of the design of the landscaping and stormwater systems. Connect the project team to these stories of a place and see their eyes light up.

Positive contribution: No development is an island. Each is connected to other spaces and places, economies, communities, watersheds and ecosystems. When we understand this greater whole, then we have an opportunity to consider how a building or precinct can contribute to the health and vitality of these wider systems. When we can tell this story of positive contribution to the approving authority, to the community, to future tenants and occupants, they are more likely to support and value the project.

Learning from nature's intelligence: The ecological systems on the Australian landscape have evolved to renew, evolve and thrive for millennia. Think of how the design team's knowledge of sustainable design could be enriched by walking the site with an ecologist or sitting in quiet contemplation and thinking about how water, air and wildlife move across the site, or once did. Equipped with this knowledge our sustainable design can be in greater harmony with the way nature is at work in this place.

Wellspring of innovation: When you really get to know place this knowledge can be a springboard for innovative thinking. Understanding the microclimate can provide insight into the design of ventilation systems or some aspect of the history of the site could be reflected in the selection of building materials. Understanding place can be a catalyst for new thinking by the design team.

Caring for Country: I'm writing this article during NAIDOC Week and had the privilege of hearing the inspiring Claire Beattie, Executive Director at the NSW Department of Education, calling us all to "take your shoes off and ground yourself in Country". Connection and caring for Country is at the heart of Aboriginal culture and when we embrace that same understanding of our interdependence with the land, the design team will become more fully conscious of the impact of the project well beyond the end of the construction program and this will be reflected in a design that cares for Country.

Leading benchmarks: Place has become a cornerstone of highly respected building sustainability certifications such as Green Star and Living Building Challenge. Both tools encourage designs that embrace placemaking, celebrate community, contribute positively to the local area and enhance the ecology of their place.

While urban planners, architects and engineers often have to plan and assess a site and its place in detail, the same is rarely true when the sustainability lead and the project team sit down together to develop the sustainability strategy. Instead, the focus is often on checklists, regulatory requirements and plug-in technologies. But this ignores the power and influence of place to give the team new eyes in which to see the project and to integrate with the social, ecological and economic systems of which it will be a part.

So, the next time your sustainability team is kicking off a new building or precinct project, suggest that they take the time to visit, walk, contemplate, research and connect with place, its history, community, nature and future potential.

Chris Buntine is the Sustainability Group Manager at Northrop Consulting Engineers. He leads a team responsible for delivering sustainability consulting services to a wide range of clients in Melbourne. His experience includes sustainability strategy, resource efficiency, health and wellbeing, environmental modelling, stakeholder engagement and verification ratings. Chris is also a facilitator of the Melbourne Living Building Collaborative and a founding member of Engineers Declare.

Navigating the challenges in waste and recycling regulation

Recycling and Waste – compliance snapshot

Kate Swain, Partner and Sarah Hausler**, Partner at McCullough Robertson Lawyers*

With activity ramping up in Australia's waste management and recycling sector, supported by government policy and funding, businesses are striving to incorporate better waste recovery and re-use into their daily operations as we see a growth in circular economy initiatives across the economy.

However, the handling, transportation and disposal of waste requires strict compliance with the various regulatory frameworks that exist in different jurisdictions around the country. To achieve a successful transition to a greener economy, it is also essential that waste processing technologies and advanced manufacturing of waste products comply with strict environmental operating standards.

State-based action — prosecutions

Community expectations for high environmental performance of the waste and recycling industry continue to increase, resulting in increased environmental standards and compliance action by the regulators. The enforcement of environmental regulation is key in addressing and preventing unlawful waste disposal, as well as environmental pollution, land contamination and associated public health issues. There have been several waste-related prosecutions around the country, which aim to discourage activities such as stockpiling harmful waste or illegal waste dumping.

Recent examples of regulatory action taken by the New South Wales Environmental Protection Authority (EPA) in 2021 include:

- Prosecution of an individual director who illegally disposed of asbestos-contaminated soil and falsified waste disposal documents, resulting in a 12-month prison term. The company was also fined $450,000 for related offences.
- An enforceable undertaking was accepted by the EPA from a developer who agreed to pay more than $1 million to clean up land that was allegedly used to illegally store hazardous construction waste.
- A fine of $15,000 to a waste operator for incorrect storage of dangerous chemicals and flammable liquids being directly exposed to sunlight.

State-based action — levies

The movement of waste across state and national borders has been recognised as a significant environmental and policy challenge. On 1 July 2019, the Queensland Department of Environment and Science (DES) introduced a waste levy aimed at reducing the amount of waste going to landfill, encouraging waste avoidance and increasing the capacity for resource recovery. The Commonwealth Department of Environment and Energy's Compliance Plan 2019–23 includes as one of its five

priorities a focus on detecting and disrupting illegal domestic and international trade in hazardous waste.

However, following the introduction of the waste levy, there has been an increased awareness of illegal dumping and unlicensed waste management operations. DES has nominated waste regulation, management and levy compliance as one of its key focus areas for 2020–21.

Regulating 'energy from waste'

In recent years, there has been a spike in 'energy from waste' proposals, involving the thermal treatment of waste-derived materials for the recovery of energy. These emerging technologies seek to capitalise on the availability of relatively inexpensive fuel sources (ie, waste) while also generating electricity that can be used by businesses and communities. Although energy from waste is a vital piece of the waste management puzzle, it is also coming under greater scrutiny from regulators.

On 1 April 2021, the New South Wales EPA introduced a draft revised 'Energy from Waste Policy' for public comment. This policy proposes to tighten restrictions "for emissions including hydrogen fluoride, mercury, cadmium, thallium and heavy metals to meet and exceed the world's best air quality standards. It also includes the implementation of ongoing reporting requirements from energy from waste operators and real-time emissions data to be made publicly available online."

Queensland implemented a similar approach with its own Energy from Waste Policy in June 2020. The policy does not specifically aim to "incentivise or promote energy from waste", but instead to ensure that the facilities in Queensland meet the technical, environmental and regulatory standards that best suit Queensland. The policy outlines a preference for industries that produce higher value commodities such as solid or liquid fuels from waste materials, over the production of electricity and heat, to align with the Queensland Government's biofutures agenda.

These policies suggest that while the desire and support exist around innovative solutions for the processing of waste, strict compliance frameworks are required to regulate waste handling and processing facilities.

Resource recovery opportunities and developments

Governments at all levels have a responsibility to encourage the development of the resource recovery and recycling industry through appropriate regulation, incentives and utilisation of recycled products. Resource recovery exemptions are important instruments to ensure a safe 'second life' for waste and an opportunity for product design to capture waste material re-use. This is evidenced by the growing development and use by local governments of 'greencrete' — a product made available by a resource recovery exemption, allowing recovered glass sand (made from bottles and other recycled glass products) to be applied to land for pipe bedding, drainage or road making.

Similarly, the 'end of waste' framework in Queensland promotes resource recovery opportunities and aims to transform the perception of waste from being seen as waste to being valued as a resource. However, reliance on these end of waste codes is also conditional upon stringent statutory controls and standards relating to the chemical composition, testing and reporting of waste.

Regulators must therefore ensure that these stringent statutory controls and standards which are applied to waste that is earmarked for re-use do not limit the potential opportunities and prevent innovative initiatives for waste resource re-use, outside of the exemption terms. Given the broad environmental benefits that can be achieved from resource recovery, greater collaboration between government and industry is needed to expand the opportunities for resource recovery in Australia.

Regulation going forward

As the environmental movement grows and momentum for waste re-use initiatives increases, future projects involving the storage, handling and disposal of waste are highly likely to trigger some form of environmental regulation.

For this reason, it is critical that the legal requirements to operate any waste facility are well understood and complied with. Companies and individuals must also be mindful of their legal obligations when adopting environmentally friendly policies or seizing upon business opportunities for recycling and re-use.

**Kate Swain is an experienced Environment and Planning lawyer who advises clients across the energy and resources, government services, infrastructure and property development sectors. She advises across all facets of environmental and planning law with a particular focus on pollution, water licensing and approvals, native title and biodiversity.*

***Sarah Hausler is a specialist planning and environment lawyer focusing on infrastructure, environment and strategic planning. Her expertise is complemented by her degrees in environmental science and urban and regional planning which complement her practical approach to the commercial and policy context in which her clients operate.*

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www.mccullough.com.au

Recycling robot to sort out soft plastics

Soft plastics lack adequate recycling methods as they can easily entangle in waste separation machinery, leading to mechanical failure and contamination of other recyclable materials such as paper. Because of this problem, current recycling methods rely on the manual sorting of soft plastics, an often repetitive and unsafe task.

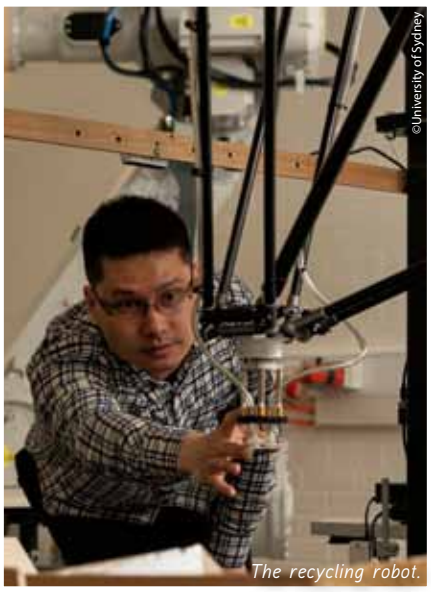
Working alongside industry partners as part of a federal government Cooperative Research Centre Project grant, researchers from the Centre for Internet of Things (IoT) and Telecommunications at the University of Sydney are developing a new method to increase recycling of soft plastics — by creating a smart, automated robotic system that uses robotics and AI to sort recyclable waste.

The researchers are working with waste management companies, IQRenew and CurbCycle, technology developers Licella, Mike Ritchie and Associates, and Resource Recovery Design to develop the system. The research team includes Professor Branka Vucetic, Professor Yonghui Li, Associate Professor Wanli Ouyang, Dr Wanchun Liu and Senior Technical Officer Dawei Tan from the School of Electrical and Information Engineering.

"The recycling robotic automation system will use artificial intelligence and computer vision to learn how to identify different forms of recycling waste, effectively learning how to 'see' and 'sort' waste, to create separate waste streams and maintain soft plastics' purity so they can be recycled," said IoT expert Professor Branka Vucetic.

The system will be integrated into IQ Renew's material recovery facility as part of CurbCycle's soft plastic recovery program, an Australian initiative that involves the household collection of recyclables that are segregated into bags prior to placing them into their kerbside recycling bin.

"Not only does our project divert household soft plastics from going to landfill; by creating a solution for the collection and sorting of waste with our industry and research partners, we're also creating a sustainable supply chain that takes rubbish from households to end markets," Associate Professor Wanli Ouyang said.



The recycling robot.

"The robot will identify 'CurbyTagged' bags and differentiate sources of plastic, separating soft plastics from the fully co-mingled recyclables," he said.

After being separated from other waste, the soft plastics will be used for various purposes, including advanced recycling into oils and other valuable chemicals using patented Catalytic Hydrothermal Reactor technology (Cat-HTR) created by Licella Holdings.

RUBBER HITS MORE THAN JUST ROADS

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Business park powers site with solar, battery, microgrid solution

The Peel Business Park microgrid solution.

Peel Business Park is a 1000-hectare industrial estate being developed in Nambeelup, WA. Due to the remoteness of the area, an existing power connection to the traditional grid did not exist — an onsite, behind-the-meter solar and battery solution was highlighted as the most cost-effective, reliable and green alternative.

The renewable energy solution includes a 1.2 MW solar farm, incorporating over 2772 bifacial 440 W panels with a NEXTracker single-axis tracking system; a FIMER skid-mounted solar and battery inverter system with medium-voltage power distribution system; and a 2.5 MWh Saft battery energy storage system.

"During the product component selection process, we were looking for a combined inverter and battery solution that would elegantly meet all the technical and project requirements," Avora Energy Managing Director Jeff Brill said. "FIMER's PV and battery solution was a fully integrated solution that could be delivered on a single skid that ensured easy installation, commissioning and servicing."

The FIMER solution was designed specifically for this project. With more than 12 months of planning across multiple teams in Australia and Europe, the customised 40″ skid incorporates a FIMER PVS980-58 central inverter; a FIMER bidirectional inverter, the PVS980-58BC, including grid-forming-ready technology; a hybrid medium-voltage transformer; and associated switchgear.

Aaron Zadeh, FIMER Australia's Utility-Scale Solar Manager, said, "We are extremely excited to have been part of this groundbreaking solution with Peel Renewable Energy, Avora Energy, Sunrise Energy Group, Jarrah Solutions and DevelopmentWA. FIMER custom designed and manufactured this solution for the project. It's a unique 'hybrid inverter station' that hosts both a solar inverter and battery converter on a single medium-voltage station. It uses FIMER's PVS980 technology and offers a range of benefits to Peel Business Park tenants.

"FIMER's technology can shape how small utility-scale microgrids can thrive in Australia moving forward," he said.

Utilising the hybrid station with both FIMER inverters enables the technology to share a portion of hardware that brings significant synergies over the system's life, including fast installation, high reliability and a rapid return on investment as well as long-term support and maintenance benefits.

FIMER Australia
www.fimer.com

Hospital food waste fuels green electricity

Epworth Richmond is participating in a three-year trial to turn food waste into fuel for green energy. As part of the trial, food offcuts are gathered from the hospital kitchen and dehydrated in a WasteMaster machine to create a powdered residue. The residue is then used as a fuel to generate green electricity at Yarra Valley Water's anaerobic facility in Wollert.

In the first 12 months of the trial — funded by the City of Yarra and Sustainability Victoria — more than 20 tonnes of food offcuts and waste were used to generate enough electricity to power 1512 homes for a day.

Chief Operations Officer of Hospitals Nicole Waldron said being more sustainable was a key strategic focus for Epworth.

"Becoming more sustainable is a priority for Epworth. We must protect the environment and ensure resources are used responsibly," Waldron said. "The WasteMaster trial means that 72% of food waste was dehydrated and turned into electricity, diverting 20 tonnes of waste from landfill."

A separate project has been launched to further reduce kitchen waste.

Epworth also has a PVC recycling program that has recycled more than eight tonnes of IV fluid bags, oxygen tubing and oxygen masks in the past year.

The PVC recycled by Epworth through Baxter Healthcare and the Vinyl Council of Victoria PVC Recycling Program is enough to produce 56 km of garden hose, 2788 children's playmats or 10 playgrounds.

Epworth Group Sustainability Manager Simon Mikedis said any metal is removed from the waste PVC before it is recycled.

"That includes 15 kg of oxygen mask clips, which were also recycled," Mikedis added. "The program diverted eight tonnes of PVC from landfill, saving more than $6000 in tipping fees, which is important as Epworth is Victoria's largest not-for-profit private hospital group."

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FLUID CONTROL SYSTEMS

From biosolids to biochar

A comparison of biochar (left) and traditional biosolids (right).

A new wastewater management strategy will recover biosolids headed for landfill and transform them into re-usable products for farmers.

The Biosolids to Biochar project is using technology developed by RMIT University — a process called pyrolysis, in which high temperatures destroy pathogens and microplastics in biosolids — to create biochar, a carbon-rich form of charcoal that farmers and the wider agriculture industry can use to improve soil health.

Currently around 30% of the world's biosolids are stockpiled or sent to landfill. The project's circular approach to wastewater management has the potential to address this issue and eliminate landfill waste across the water industry.

South East Water is helping to deliver the Biosolids to Biochar project in partnership with RMIT University, Intelligent Water Networks and Greater Western Water, with the technology currently in trial at the Melton Recycled Water Plant in Melbourne.

Steve McGhie MP, Member for Melton representing Acting Minister for Water Richard Wynne, recently toured Greater Western Water's Melton Recycled Water Plant for a first-hand demonstration of the new technology.

"This collaboration will enable the water industry to find alternative markets for biosolids, reducing waste going to landfill and allowing 100% of products to be re-used or recycled," McGhie said.

"By creating a safe product with a steady supply stream, we're also providing our farmers and the wider agriculture industry a product which is completely natural and can improve soil health and fertility. This project is incredibly exciting for both industries and I can't wait to see the outcome of the trial.

"This project is an excellent example of like-minded organisations working together with a shared commitment to sustainable solutions. By re-using and adding value to biosolids, we recover local resources, reduce landfill and create renewable energy to reduce our greenhouse gas emissions."

South East Water Managing Director Lara Olsen said that supporting these kinds of innovative emerging technologies is an important part of South East Water's commitment towards reduced emissions and a circular economy approach towards wastewater.

"The disposal of biosolids is a challenge across the water industry. South East Water is continually looking for ways we can work with others to create innovative solutions to protect our environment and to help our customers and community.

"This technology is important as it can be scaled to any size, making it a possible solution for both urban and regional water utilities," she added.

Associate Professor Kalpit Shah, Deputy Director (Academic) of the ARC Training Centre for Transformation of Australia's Biosolids Resource at RMIT University, said that developing new ways to squeeze the full value from waste resources is critical in our transition to a circular economy.

"At the heart of RMIT research [is] our strong partnerships with industry, and we hope this collaborative trial will enable us to accelerate the translation of our innovation into new home-grown technologies that advance sustainability and make a real impact in water and agriculture," Professor Shah said.

Greater Western Water Managing Director Maree Lang and Intelligent Water Networks Program Director Dean Barnett also expressed their excitement and being involved in the project.

The next stage of the trial will involve scaling up the technology, with a dedicated unit in place at a water recycling plant over a longer period of time.

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Treating wastewater
in plastics recycling applications

Recycling lines for plastics are essential to the circular economy, but they also consume resources, particularly water.

The sustainability of recycling technology should not be assessed by the quality of its end-product alone — the processes used to make the end product play an equally important role.

A manufacturer of recycling lines, Krones sees itself as bearing a particular responsibility for meeting these sustainability criteria. The group's MetaPure technology recovers materials like PET bottles and polyolefin packages, and enables the recyclate obtained to be used in equivalent applications. In their work to achieve continuous system optimisation, the development team at Krones have been proactively examining the washing module's water consumption.

"In the recycling process, the plastics are ground into flakes in wet mills and then washed," Product Manager Astrid Kadlubski explained. "This produces wastewater containing various dissolved substances, depending on the input material concerned."

In addition to common soiling, the wastewater might contain organic residues of the packages' content, or cleaning agents from the washing process and printing ink particles removed from bottles and labels.

"In many recycling lines, the water is recirculated and treated in a bypass," Kadlubski said. "With the result that the process water's dirt load keeps on rising and ultimately impairs the end product's quality." To counter this, Krones has developed an intelligent solution for the complete treatment of the washing and mill water. The solution entails several advantages for recycling-line operation: "Firstly, this reduces both fresh water consumption and wastewater incidence. Secondly, the recycling process is kept at a consistently high level of quality," Kadlubski explained. "And last but not least, such treatment makes sure that the wastewater discharged into the municipal system complies with the relevant specifications. Needless to say, this also applies for the ultrastringent regulations in Germany."

Krones' MetaPure technology recovers materials in a way that enables the recyclate obtained to be used in equivalent applications.

Krones (Thailand) Co Ltd
www.krones.co.th

INDUSTRIAL MID-RANGE LASER DISPLACEMENT SENSOR

The optoNCDT ILR2250 laser distance sensor from Micro-Epsilon is an industrial-standard laser distance sensor that operates on the phase-comparison principle. The sensor offers a measurement range of up to 100 m, which can be extended to 150 m by attaching an additional reflector film on the object to be measured.

The laser sensor is a bridge between the traditional long-range laser and the highly precise laser triangulation sensors. It can measure with 0.1 mm of measuring resolution, yet offer an extended range for long-distance measurement. It also comes with an auto-integrated mode that offers high signal stability even when used to measure on challenging surfaces such as dark, structured or weakly reflecting surfaces.

The laser distance sensor has a mounting plate with four threaded pins to make sensor alignment and mounting easier. The sensor features a robust design in an IP65-certified die-cast aluminium housing, which protects against dirt and splashes of water. The product offers stable measurement and easy integration into OEM applications.

The optoNCDT ILR2250 laser distance sensor can be used in factory and plant automation due to its compact size and lightweight structure. It is utilised in drone applications for distance measurement from the air. Other typical applications of the laser distance sensor include position measurement on gantry cranes, filling level measurement in silos, acquisition of coil diameters and diameter measurement of rings during rolling.

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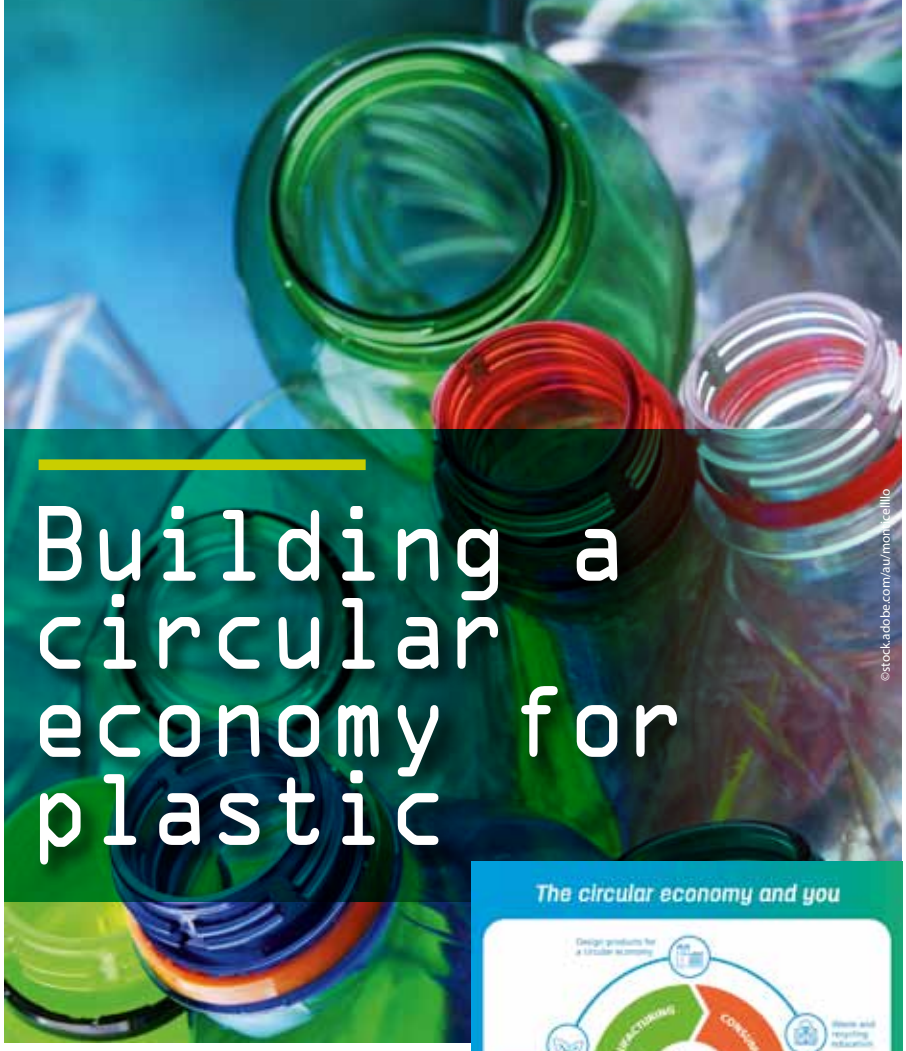

Building a circular economy for plastic

Imagine buying a drink from a shop, putting the empty bottle into your recycling bin, and the next time you buy a drink, the bottle you purchase is manufactured with plastic recycled from the first.

It is possible in a circular economy, where waste is minimised and resources are re-used and recycled.

Closing the 'loop' for plastic starts with building the four pillars of a circular economy by:

- reducing contamination and improving recovery;
- improving sorting technology at material recovery facilities (MRFs);
- increasing domestic markets for recovered plastic; and
- stimulating local demand for recycled products.

Reducing contamination and improving recovery

Contamination occurs when non-recyclable material mixes with recycling — reducing the value of recycled material, raising safety issues at processing facilities and creating additional costs.

In Australia, consumer plastic is collected from household kerbside and commercial recycling bins, which can have high levels of contamination, and container deposit schemes, which are an example of 'source separation' where plastic is segregated from other materials at the point of disposal, which improves the quality of the material for recycling.

To improve the quality of kerbside recyclables, rules and bin lid colours need to be standardised and recycling behaviour could be improved through education, with research showing Australians want a more sustainable future, but they are confused about recycling.

Cleanaway's Recycling Behaviours Report found only 25% of Australians are separating waste correctly and up to 35% of recyclable materials are going to landfill due to sorting errors.

The report was released to launch Cleanaway's online education resource, Greenius, which makes recycling simpler for residents, councils, schools and businesses.

Improving technology

The sorting capability of MRFs varies around the country, depending on when the facility was built and local requirements. Plastic sorting technology is different to standard MRF technology in how it recognises individual polymers and separates items. To capitalise on clean plastic from container deposit schemes and improved kerbside returns, it is critical to have technology at MRFs that separates plastic into individual polymers, including HDPE, PP, PET and LDPE.

At Cleanaway's Plastic Recovery Facility in Laverton in Melbourne, plastic is being sorted into individual polymers for recycling and export.

Increasing domestic markets

Export bans are heightening the need for markets for recovered plastic in Australia.

From 1 July 2021, only plastic that has been sorted into single resin or polymer types, or processed into engineered fuel, can be exported, and from 1 July 2022, only plastic that has been reprocessed for further use, such as flakes or pellets, can be sent overseas.

One way to build domestic markets for recovered plastic is to invest in pelletising technology, which creates the feedstock for manufacturing products from recycled materials.

The $45 million facility being built in Albury by Circular Plastics Australia (CPA), a joint venture of Cleanaway, Pact Group and Asahi Beverages, will transform about one billion PET bottles each year into pellets for new bottles.

Stimulating local demand

Knowing consumers will make sustainable choices will encourage more investment in sorting and processing technology.

A high percentage of respondents to the Recycling Behaviours Report were actively making sustainable choices, and 41% sought out these products most or every time.

"We're seeing strong investment from both the waste management sector and consumer goods sector to increase recycled content onshore but, without strong consumer demand, it will be hard to justify more ambitious projects," said Cleanaway's Head of Corporate Affairs, Mark Biddulph.

"If we all play our part, we will have a real chance of building a sustainable circular economy for plastic onshore here in Australia."

Cleanaway

www.cleanaway.com.au

Solar solution for shopping centre

RACV Solar has entered into an engineering, procurement and construction arrangement with CEP.Energy to deliver a solar and battery installation in New South Wales.

CEP.Energy has partnered with the privately run shopping centre — Narellan Town Centre in Southwest Sydney — to establish an embedded network and install, own and operate a significant solar array together with battery storage.

With a 2.62 MW solar installation and 10 MWh battery storage system, this is RACV's largest installation to date.

Under a 30-year agreement, the system is planned to reduce electricity costs for landlords and tenants. It will also offer market services to support the grid.

The CEO of RACV Solar, Andy McCarthy, said the sheer scale of the project and the positive benefits it will provide was a significant milestone for RACV. "This very large project in New South Wales is the perfect opportunity to continue RACV's focus on providing solar and battery systems for both commercial and residential customers across Australia, contributing to our ongoing and increasingly significant investment in cleaner energy. We are thrilled to be working with CEP.Energy to deliver this NSW project, and will look to partner with many others in NSW over the next few years," McCarthy said.

"The Narellan Town Centre is in a critical growth corridor of Sydney and we are so pleased the project can provide positive benefits for landlords and tenants, as well more broadly through contribution to the grid," McCarthy continued. "We are excited about the start of the relationship with CEP.Energy and the many opportunities it presents."

The CEO of CEP.Energy, Peter Wright, said: "We are thrilled to be working with RACV Solar, a tier 1 contractor and a celebrated

and trusted Australian brand. We look forward to continuing our partnership for the many more solar and storage projects we will deliver across Australia over the next 12–18 months as we build a large-scale renewable energy footprint."

RACV Solar
solar.racv.com.au

Qld Catholic education goes renewable

More than 100 Catholic schools across Brisbane and South East Queensland will be powered by 100% renewable energy with zero net carbon certification thanks to a Power Purchase Agreement (PPA) between Brisbane Catholic Education (BCE) and ENGIE Australia & New Zealand.

The PPA will supply electricity from ENGIE's renewable energy portfolio across Australia, aggregating around 26,000 MWh/y of the key loads of Catholic Archdiocese of Brisbane buildings, which includes 115 schools and key Archdiocese and Centacare Catholic Family Services sites.

The key requirement for BCE was to secure a long-term electricity supply agreement that provides immediate cost savings as well as a clear environmental benefit — something the ENGIE PPA was able to deliver.

Beyond Brisbane, St Augustine's College in Greater Springfield will be one of the Catholic schools benefiting from the new agreement. The PPA will accelerate the school's integration into ENGIE and Springfield City Group's 'Zero Net Energy Roadmap', which will see the entire Greater Springfield area powered by 100% renewables by 2038.

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"It is fantastic for ENGIE to be able to support Brisbane Catholic Education to go 100% renewable," ENGIE ANZ Executive General Manager of Energy Management Andrew Hyland said. "We are working with a diverse range of businesses to accelerate their carbon-neutral transition; schools and public buildings are at the centre of our communities and play an important role in leading our net zero energy transition.

"This deal shows how education authorities, not just large businesses, can benefit from renewable PPAs on price and stability while also going 100% renewable."

Deputy-Executive Director Dr Doug Ashleigh said the partnership was an important step towards realising energy sustainability goals for schools and living BCE's commitment to Laudato Si — the Vatican's document outlining how we need to care and protect the environment.

"We educate our students about the importance of environmental sustainability, so it is great to show that we are modelling this by moving to renewable energy sources to power our schools," Dr Ashleigh said. "We consider it a win for the environment and a win for school budgets as it will help reduce power costs."

The Director of Property and Building for the Archdiocese of Brisbane, Patrick Lane-Mullins, said this had been an extremely worthwhile procurement exercise.

"It will result in the majority of the larger energy-consuming assets being not only under the single service provider, but also being 100% renewable," he said. "This is a great step forward in reducing our carbon footprint."

ENGIE
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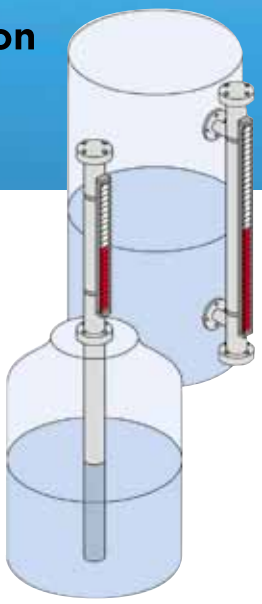

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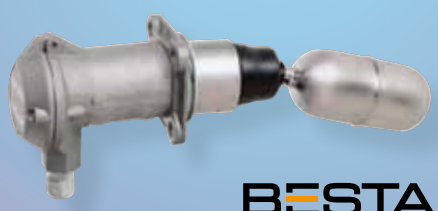

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Predicting power generation from wind and solar

Machine-learning technology is being used to accurately predict energy generation from wind and solar for integration with the national grid, as part of a collaboration between Monash University's Grid Innovation Hub, Worley and Palisade Energy.

The Australian Renewable Energy Agency (ARENA)-funded project aims to provide wind and solar power generators with more accurate and reliable five-minute-ahead self-forecasting tools.

By improving the accuracy of five-minute-ahead forecasts required by the National Electricity Market, the forecasting solutions developed by the Worley and Monash team can enable a more secure and reliable grid. This is made possible through better forecasts to reduce the frequency of poor dispatch, thereby supporting a higher share of renewables in the market without compromising on overall grid stability.

The development of the machine learning forecasting methodology was led by Dr Christoph Bergmeir from the Department of Data Science and AI at the Faculty of Information Technology (IT) at Monash University, in collaboration with Monash Business School's Department of Econometrics and Business statistics, and was initiated by the Monash Energy Institute's Grid Innovation Hub.

"Predicting short-term renewable energy generation is not an easy task. Renewable energy cannot be produced on demand, as it is bound to natural resources such as the wind and sun. Therefore, in order to achieve a stable network and enough power generation, we need a reliable short-term prediction method," Dr Bergmeir said.

"By introducing machine learning methodologies to this short-term forecasting process, we're able to apply algorithms that are trained on historical time series data, resulting in the accurate forecasting of wind and solar energy."

The key benefits of the project include increased renewable energy penetration in the grid due to improved dispatchability of renewable generation, and reduction in frequency control ancillary services (FCAS) payments by generators resulting from the failure to meet forecast targets.

"Our forecasting solution provides immediate value to our existing renewables customers as they target lower FCAS charges. And with PowerPredict officially launched, renewable generators in Australia and internationally can benefit from our power forecasting technology," said Denis Marshment, Global Vice President of Data Science Customer Solutions at Worley.

The research and development of these models is expected to add to the overall body of knowledge around the application of machine learning and other AI technologies to wind and solar forecasting.

"Natural variations in weather make it difficult for renewable generators to accurately forecast their short-term power generation levels, and this impacts grid stability. In 2020 alone, inaccurate power predictions cost Australian generators $210 million, so using machine learning algorithms to see five minutes into the future is incredibly valuable. Our forecasting algorithms achieved a 45% improvement in our customers' power output predictions," Marshment said.

The technology has the potential to lower energy prices across the board, and potentially open up avenues for hydro and other forms of clean energy.

"If renewable generators can lower their causer pays factors, they can produce electricity cheaper, and eventually that saving could be passed on to the customers. It would also make renewables more competitive, which is also a desirable outcome," Dr Bergmeir said.

Associate Professor Ariel Liebman, Director of the Monash Energy Institute, added, "This is an exciting and timely application of one of the Monash Energy Institute's and Grid Innovation Hub's star computer science and AI teams. This project shows how industry, represented by our visionary partners Worley, and academia can create real impact together both commercially and in contributing to the global effort to stop climate change."

SPONSORED CONTENT

EXPERIENCED CO-REGULATORS LEFT TO FILL THE E-WASTE VOID

Ecycle Solutions welcomes the responsibility of ensuring e-waste recycling targets are met despite changes to the NTCRS.

This financial year will see many changes to the National Television and Computer Recycling Scheme (NTCRS) due to the departure of two long-standing Co-Regulators and the introduction of the Recycling and Waste Reduction Act 2020 (Cth).

MRI PSO and Electronic Product Stewardship Australasia (EPSA) both ceased their Co-Regulatory arrangements at the end of the past financial year, leaving Ecycle Solutions and Australian and New Zealand Recycling Platform Limited (ANZRP) to fill the void as the most experienced Co-Regulators of the NTCRS.

"The NTCRS gives businesses, councils and the general public a solution to their recycling needs without any associated costs," explained Chris Tangey, General Manager of Ecycle Solutions.

"As a result of the COVID-19 pandemic generating extra e-waste, the requirement for businesses, councils and the general public to responsibly recycle their end-of-life televisions and computers has never been greater," said Tangey.

Ecycle Solutions recycled over 17,000 tonnes of e-waste in 2020/21 and are expecting to recycle over 35,000 tonnes this coming financial year.

Despite two new Co-Regulators joining the scheme starting 1 July 2021, the responsibility on experienced Co-Regulator, Ecycle Solutions, has grown to ensure the overall recycling targets of the NTCRS can be met.

"It is very difficult for a company to join the NTCRS as a new Co-Regulator and make an impact in their first year," said Tangey.

Tangey explained that Ecycle Solutions are prepared for the increased amount of e-waste volume across the country; a credit to their specialist recyclers.

"We work with a number of small to medium specialist e-waste recyclers across Australia that are AS/NZS 5377 accredited.

"Each of our recyclers have the capacity to infill the void caused by the departure of two Co-Regulators and their partnered ewaste recyclers."

Despite the increased volume Ecycle Solutions expect to recycle this financial year, they continue to welcome any NTCRS compliant e-waste from businesses searching for an effective recycling solution.

The success of Ecycle Solutions can also be attributed to the partnership with their parent company, QLS Logistics — a national warehousing and logistics specialist company.

By leveraging off their key strengths and competitive advantages, Ecycle Solutions can provide a long-term diversified, commercially viable and sustainable recycling business.

"Our reverse logistics arrangement sees QLS Logistics' trucks leave the depot bound for retail stores with brand new electronic goods, and return with end-of-life e-waste in need of recycling," explained Tangey.

Ecycle Solutions also recycles expanded polystyrene (EPS) and will be participating as a collection specialist in the Battery Stewardship which is forecast to commence in early 2022.

"We are excited to be undertaking some new projects in this coming financial year, including the participation in the Battery Stewardship from its commencement," said Tangey.

Australia is well below the international standard for recycling handheld batteries with only 4% of all batteries being recycled.

The Battery Stewardship Scheme will operate similarly to the NTCRS, providing a solution for businesses, councils and the general public to responsibly recycle all battery types, excluding lead acid. It will be a free collection service.

"Ecycle Solutions welcomes any businesses interested in participating in the scheme," said Tangey.

"We are currently securing partnerships with potential collection sites, particularly in Regional Australia."

Ecycle Solutions are proud to be partnering with businesses, councils and the general public to reduce waste going to landfill and improve the environmental outcomes across Australia.

Ecycle Solutions
www.ecyclesolutions.net.au

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Recycling ecology park opens $100m mixed waste plant

Sustainable recycling and waste management solutions provider BINGO Industries has opened what is claimed to be the world's largest and most advanced dry mixed waste recycling facility at its Eastern Creek Recycling Ecology Park in Western Sydney.

The new $100 million state-of-the-art recycling facility is fitted with some of the world's most advanced resource recovery and manufacturing technology and, when fully operational, will be capable of diverting approximately 90% of materials from landfill.

Construction of the facility has been supported by a $5 million grant from the NSW Environmental Trust as part of the NSW Government's Waste Less, Recycle More initiative funded from the waste levy.

"Recycling and waste management are both key environmental issues and key economic opportunities," Federal Environment Minister Sussan Ley said. "I applaud BINGO for being at the leading edge of the supply curve as the market for recycled materials will continue to grow.

"We want people, companies and industries to have a genuine reason to recycle, to have confidence in the process and in the new products that will be created.

"The Morrison government is committed to the process and BINGO have made it clear today that they are committed," Minister Ley said.

NSW EPA CEO Tracy Mackey added that, "The EPA encourages the waste sector to find innovative solutions that can help preserve resources and prevent waste from going to landfill.

"This facility supports the move towards a circular economy and with the $5m funding received from the NSW Government I look forward to seeing the innovative outcomes of this project near the end of 2021," she said.

BINGO Managing Director and CEO Daniel Tartak said delivery of this project was significant for not only BINGO but also for the growth and development of Australia's circular economy.

"As companies like BINGO, encouraged by supportive government policy, begin to invest in these world-class assets, we are starting to see a shift away from our traditional model of 'take, make and dispose' towards a circular model where resources are preserved and reused," Tartak said.

"Our vision is for a waste-free Australia. Completion of this project will be a significant milestone in the development of our world-class Recycling Ecology Park, which is a central part of achieving this vision," he said.

The 9000 m^2 plant is expected to process up to 7000 tonnes of materials a day or 300 tonnes per hour. The new plant is capable of processing building and demolition and commercial and industrial waste.

The advanced screening, sorting and processing technology installed in the new plant will produce a high-quality end product, most of which will be turned into BINGO's ECO Product range of recycled building and landscaping products such as aggregate, roadbase, sand, soil, mulches, paper, cardboard, plastics and metals.

"BINGO's recycling segment and revenue from our recycled products continue to grow each year. We have a big vision for our Eastern Creek Ecology Park with development plans underway for additional facilities at the site to deliver solutions for other waste streams such as tyres, plastics and glass," Tartak said.

"We are really proud of what we have achieved here, this has been our biggest development to date and it is an exciting time to be operating in the recycling industry," he said.

Construction of this project has created some 400 construction jobs and will generate up to 100 jobs once operational.

Expected to be fully operational in July this year, the plant has been fitted with the latest in safety, environment and fire-management technology and rainwater catchment tanks. The recycling centre will also be fitted with rooftop solar later this year, as part of BINGO's RE100 commitment to achieve 100% renewable electricity across all its sites by 2025.

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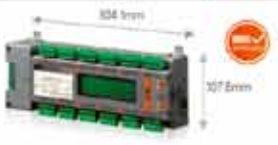

MODEL	EM133XM	BFM136	BFM-II
INSTALLATION TYPE	SMALL	MEDIUM	LARGE
*ELECTRICITIES Tenants	Up to 3	Up to 36	Up to 54
UTILITIES Water, Gas	Up to 14	*Up to 72 With BFM utility module	Up to 72

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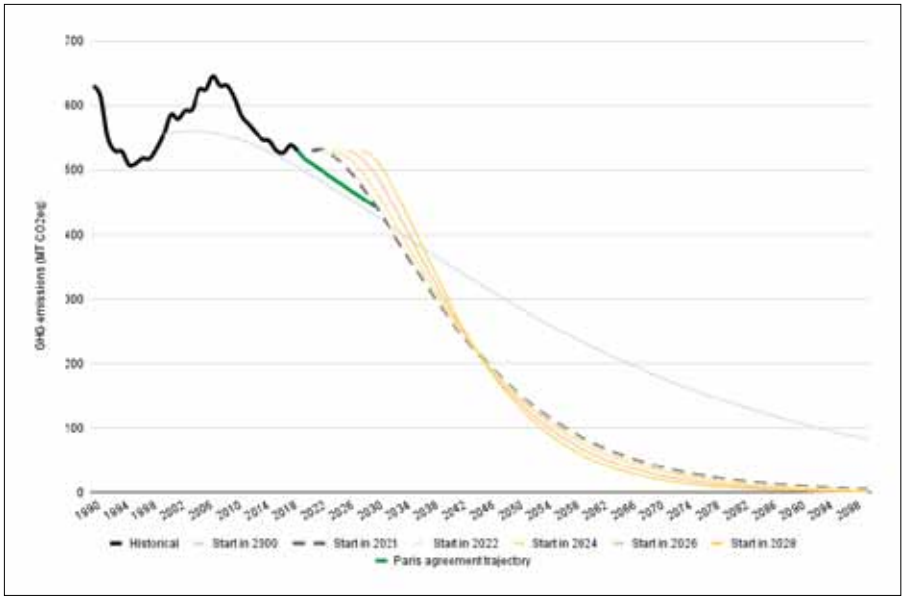
Veolia's ambition of Ecological Transformation supports government's decarbonisation targets

Recent modelling* undertaken by leading environmental solutions provider Veolia has revealed that a drastic reduction in greenhouse gases is needed in Australia to achieve the federal government's emission reduction targets of 26 to 28% by 2030.



Modelling by Veolia, showing the trajectory we need to take in order to be in step with the Paris Agreement.

Following the recent announcement of its purpose to achieve Ecological Transformation, Veolia has declared it will use its water, waste and energy solutions to deliver on Australia's decarbonisation goals, prevent climate change and restore a sustainable future.

Ecological Transformation sets the agenda for rebalancing the way humans interact with the planet. It considers the way we source, make, use and dispose in unison, to ensure a sustainable approach at every stage. By doing this people can continue to thrive, while protecting natural resources and preventing detrimental impacts on the environment at the same time.

Modelling undertaken by Veolia shows the steep trajectory Australia must take if we want to prevent climate change and keep pace with Paris Agreement targets, which aim to limit global warming to below 2°C. As part of Australia's commitment to the global environment crisis, the government has set ambitious low-carbon targets to reduce Australia's greenhouse gas emissions by 26 to 28% by 2030. Achieving this requires immediate action from all industries.

Richard Kirkman, CEO and Managing Director for Veolia Australia and New Zealand, said:

"Australia is at the edge of an opportunity to prevent climate change, take up the economic benefits of going green and build sustainable jobs for the future. If we don't act, devastating floods, bushfires and loss of biodiversity will only get worse.

"Never have environmental concerns been so visible, or their consequences for our societies so real. With a focus on Ecological Transformation, our water, waste and energy solutions are designed to halt biodiversity collapse, and avoid resource depletion."

Building on its strategic plan Impact 2023, Veolia is committing to accelerating and expanding the deployment of existing solutions, to act on the environmental concerns of today's society. This goal reinforces its Resourcing the World mission and is in line with the Group's purpose.

*Modelling adapted from trends used by Robbie Andrew (Center for International Climate Research) for the Global mitigations curves.

To learn more about Veolia's water, waste and energy solutions, visit: Veolia.com/ANZ.

Veolia Australia and New Zealand

www.veolia.com.au

A flexible polymer membrane incorporating nanoparticles of PAF selectively absorbs nearly 100% of metals such mercury, copper or iron during desalination, more efficiently producing clean, safe water.

One-step water purification & desalination

New, high-performance adsorptive membranes enable one-step desalination and purification of complex water sources with the added bonus of being able to target and recover potentially valuable ions, researchers report in the journal *Science*.

As the global water demand grows, efficient methods for cleaning complex, non-traditional water sources, such as wastewater or seawater, are becoming more important. However, current water purification technologies are one-dimensional and can only be used for desalination or the removal of toxic trace contaminants. Thus, water treatment plants require complex multistage systems that are costly and relatively inefficient. What's more, some contaminants, like precious metals and nutrients, could be valuable if recovered during water processing, but due to current technologies' inability to target and separate specific ions or molecules, these materials are often discharged into waste streams or reintroduced into the environment.

Adam Uliana and colleagues from University of California, Berkeley have now presented a general approach for the fabrication of robust, tunable adsorptive membranes that enable one-step desalination and purification of complex water solutions and also allow for the removal of specific target solutes. The membranes feature porous aromatic framework (PAF) nanoparticles embedded within ion exchange polymers.

According to Uliana et al., salts are removed using a series of cation and anion exchange membranes. At the same time, PAF particles can be tuned to capture specific ions, allowing for simultaneous desalination and decontamination of complex water sources. "The efficiency of this one-step process contrasts starkly with conventional intensive water treatment methodologies, which require multiple steps to achieve similar results," the authors wrote.

Desalination — the removal of salt — is only one step in the process of producing drinkable water, or water for agriculture or industry, from ocean or waste water. Either before or after the removal of salt, the water often has to be treated to remove boron, which is toxic to plants, and heavy metals like arsenic and mercury, which are toxic to humans. Often, the process leaves behind a toxic brine that can be difficult to dispose of.

The new technique, which can easily be added to current membrane-based electrodialysis desalination processes, removes nearly 100% of these toxic metals, producing a pure brine along with pure water and isolating the valuable metals for later use or disposal.

The researchers hope to be able to tune the nanoparticles to remove other types of toxic chemicals, including a common groundwater contaminant: PFAS, or polyfluoroalkyl substances, which are found in plastics. The new process, which they call ion-capture electrodialysis, also could potentially remove radioactive isotopes from nuclear power plant effluent.

WORKPLACE RECYCLING SYSTEM

The Method Recycling System is designed to help organisations recycle more and waste less.

Flexible recycling stations can be created using Method's 60 or 20 L recycling bins made from 50–80% recycled materials. Bold colour coding and labels aligned with the Australian recycling industry can be placed consistently across the workspace to help make recycling an unconscious habit.

Custom streams can be created to collect hard-to-recycle items such as batteries or e-waste. To further improve recycling rates and reduce contamination, signage can be added above or on the front of the bins.

Method Recycling Australia Pty Ltd
www.methodrecycling.com

MECHATRONIC DRIVE SYSTEM

The MOVIGEAR mechatronic drive system from SEW-EURODRIVE combines motor, gear unit and corresponding drive electronics in one system to facilitate efficiency and functionality.

The system is designed for flexible use across various communication infrastructures, such as decentralised applications in the field. With its compact design and integration of components with permanent-field synchronous motor, gear unit and integrated electronics, MOVIGEAR is tailored for efficient use in the general materials-handling sector.

MOVIGEAR is available in two sizes and three electrical performance classes for a total of four communication variants.

Interplay between the IE4 efficiency class motor, efficient gear unit and integrated electronics allows energy savings of up to 50% for clients' systems, with matched components and energy optimisation of the overall system facilitating efficiency.

SEW-Eurodrive Pty Ltd
www.sew-eurodrive.com.au

REVERSIBLE DRUM VAC

EXAIR's Reversible Drum Vac is designed for the safe recovery of fluids like coolant, hydraulic oils, sludge and chips, wastewater, tramp oil and liquid spills. The Reversible Drum Vac's powerful vacuum can fill a 205 L drum in just 90 s and, with the turn of a knob, the same stainless steel pump can quickly empty the drum. The flow rate in and out of the drum can be controlled with the knob, making it useful for dispensing liquids.

Electrically operated all-purpose vacuums aren't designed for use in industrial environments and as a result, motors wear out quickly and impellers clog. Powered by compressed air, the Reversible Drum Vac has no moving parts, no electric motor to wear out and has no impellers to clog, assuring maintenance-free operation. The product is designed for continuous and heavy-duty applications where electric vacuums fail and can also be used for lighter-duty applications.

CE compliant, the Reversible Drum Vac has built-in pressure/vacuum relief and attaches quickly to any closed-head 205 L drum. An automatic safety shut-off valve prevents spills or overfilling.

Compressed Air Australia Pty Ltd
www.caasafety.com.au

MACHINE ANALYTICS SOFTWARE

The Emerson PACEdge industrial edge platform is designed to help manufacturers with digital transformation projects by enabling users to quickly create and scale up performance-improving applications. The platform simplifies application development by bringing together open-source tools into a secure platform for using machine data and analytics.

Using modern IIoT protocols such as OPC UA, MQTT and REST, the platform provides access to data from industrial control systems and field devices, as well as IT systems and cloud services, for plant or enterprise data aggregation. With drag-and-drop programming and embedded web interfaces and visualisation, users can use this information to quickly create applications and dashboards to analyse and view operational data, such as overall equipment effectiveness, compressed air usage, energy consumption, acceleration and vibration, and other sensor data.

Advanced applications can combine these outputs with external data sources (ie, weather, public utility rates) and machine learning algorithms. Operators in the field have immediate access to diagnostic and production information, allowing them to make decisions quickly.

The PACEdge release coincides with the launch of Emerson's PACSystems RXi2-BP edge computer, a small form-factor industrial PC that enables high-performance analytics to be run close to the machine.

Emerson Automation Solutions
www.emerson.com/au/automation

ISOLATED THREE-PHASE SMART POWER METER

The PM-3133i Isolated 3-phase Smart Power Meter from ICP DAS gives access to real-time electric usage for three-phase power measurement.

With an accuracy of <0.5% (PF=1) the PM-3133i series can be applied to the low-voltage primary side and/or medium-/high-voltage secondary side, enabling users to obtain energy consumption readings from the monitored equipment in real time under operation. The power meter is equipped with wired clip-on CT (various types, support input current up to 400 A). It operates over a wide input voltage range of 10–600 VAC, which allows worldwide compatibility. Built-in AC isolator protection means total isolation between the AC measurement side and the control side.

Product features include: true RMS power measurements; energy analysis for 3P4W, 3P3W, 1P3W, 1P2W; current measurements up to 400 A with different CT ratio; isolated voltage measurements up to 600 V with clip-on CT for easy installation; supports Modbus RTU protocol; multiple data format.

It is recommended that the CT and reference voltage of the meter be installed on the primary side of the 'AC Filter' with an EMI ferrite core to minimise the interference effects of the inverter.

ICP Electronics Australia Pty Ltd
www.icp-australia.com.au

Sustainable solution to soil decontamination

Paul Morey — Manager of Projects

An industrial zone in the outer south-east Melbourne suburb of Dandenong is home to a permanently located integrated waste treatment and resource recovery facility. The 11,000-square-metre facility, which opened and started accepting soil in 2015, has a focus on sustainability — rather than simply sending contaminated soil to landfill, Renex Group has created an opportunity to recover and re-use the resource.

Convinced that there had to be a more long-term, sustainable solution to clearing contaminated land, the team at Renex unearthed novel technology proven over more than a decade in Germany. The technology employs a process that includes indirect drying of soil, pyrolysis, oxidisation and a sophisticated dry and wet gas cleaning plant. The resulting remediated soil is inert and non-leaching, thus no longer posing a risk to the environment and able to be safely re-used.

Melbourne's Westgate Tunnel project is a high-profile instance, but simply one of countless examples of contamination by per- and poly-fluoroalkyl substances (PFAS), a problem impacting communities worldwide. Recent reports suggest that 3 million tonnes of rock and soil from the project are set to be dumped in a landfill facility at Bulla, west of Melbourne. However, in recent years there has been a significant shift by most states in terms of preferring recycling and re-use of materials as well as land remediation rather than dumping into landfill.

One such practical re-use for the remediated soils was the subject of a study conducted for *Sustainability Journal* to demonstrate the usefulness of remediated soils in concrete applications. The study "successfully demonstrate[d] that commercially heat-treated remediated soils can serve as supplementary cementitious materials or to replace fine aggregates in concrete applications". Re-use in road construction is another practical application, blending the remediated soil with asphalt.

Engineering for the Dandenong facility was handled by Melbourne's Lycopodium Process Industries, who adapted the technology to Australian Standards and regulatory requirements. The project faced challenges such as ensuring the process was energy efficient and had minimal and compliant emissions to meet strict EPA requirements.

The completed facility has the capacity to receive up to 100,000 tonnes of soil and other prescribed industrial waste each year. Soil contaminated with hydrocarbons, pesticides or herbicides, for example, gets excavated and classified onsite, then transported to Dandenong in EPA-licensed vehicles.

The Renex team then re-test the soil to verify the contaminants before mechanically pre-treating and blending the soils to achieve a suitable feedstream to the plant.

A drying step follows, in which all the water and moisture in the soil is removed. The soil is then indirectly heated using hot oxidisation gases, and the organics are removed. Those organics are then taken through to an oxidisation chamber and used as fuel for the system's heating process. The soil is effectively pyrolysed (in the absence of oxygen) during this step, which removes any trace contamination remaining and renders the soil inert and contaminant-free. The heat for the process is provided by utilising the energy in the flue gases from the oxidisation of the contaminants and organics in the soil, resulting in less use of non-renewable fuels such as natural gas or diesel compared to portable in situ treatment plants.

The final stage is to clean the gas that emanates from the oxidisation stage, a multistage complex process that filters particles and scrubs out any oxidisation contaminants in the exhaust gases to ensure strict compliance with regulatory licensing requirements for discharge.

The completed facility is helping give landowners sustainable options to re-use soil and avoid landfill.

Lycopodium Process Industries Pty Ltd
www.lycopodium.com/LPI

New process makes sea water drinkable in minutes

A team from the Korea Institute of Civil Engineering and Building Technology (KICT) has developed a membrane distillation process to turn sea water into drinking water, using a stable-performance electrospun nanofibre membrane.

Membrane wetting is the most challenging issue in membrane distillation. If a membrane exhibits wetting during membrane distillation operation, it must be replaced. If a membrane gets fully wetted, the membrane leads to inefficient membrane distillation performance, leading to low-quality permeate.

Led by Dr Yunchul Woo, the KICT research team developed coaxial electrospun nanofibre membranes fabricated by an alternative nanotechnology called electrospinning. The technology can prevent wetting issues and improve the long-term stability of the membrane distillation process. Improved hydrophobicity is achieved by the formation of a three-dimensional hierarchical structure, which is created by the membranes' nanofibres for higher surface roughness.

Dr Woo's team used poly(vinylidene fluoride-co-hexafluoropropylene) as the core, and silica aerogel mixed with a low concentration of the polymer as the sheath, to produce a coaxial composite membrane and obtain a superhydrophobic membrane surface. The membrane performed a 99.99% salt rejection for one month. The results are published in the *Journal of Membrane Science*.

The membrane operated well, without wetting or fouling issues, due to its low sliding angle and thermal conductivity properties. Temperature polarisation is one of the significant drawbacks in membrane distillation. It can decrease water vapour flux performance during membrane distillation operation due to conductive heat losses. The new membrane is suitable for long-term membrane distillation applications as it possesses several important characteristics, such as a low sliding angle and low thermal conductivity for avoiding temperature polarisation, and reduced wetting and fouling problems while maintaining supersaturated high water vapour flux performance.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The research team noted that it is more important to have a stable process than a high water vapour flux performance in a commercially available membrane distillation process. Dr Woo commented that the coaxial electrospun nanofibre membrane has strong potential for the treatment of seawater solutions without suffering from wetting issues, and may be appropriate for pilot-scale and real-scale membrane distillation applications.

Corn by-product used to clean water

US researchers have found a way of recycling the by-product of corn and turning it into a material that helps clean water.

About half the harvest — stalks, leaves, husks and cobs — remains as waste after the kernels have been stripped from the cobs. These leftovers, known as corn stover, have few commercial or industrial uses aside from burning.

A study by the University of California — Riverside (UC Riverside) describes an energy-efficient way to put corn stover back into the economy by transforming it into activated carbon for use in water treatment.

Activated carbon, also called activated charcoal, is charred biological material that has been treated to create millions of microscopic pores that increase how much the material can absorb. It has many industrial uses, the most common of which is for filtering pollutants out of drinking water.

Kandis Leslie Abdul-Aziz, an assistant professor of chemical and environmental engineering at UC Riverside's Marlan and Rosemary Bourns College of Engineering, runs a lab devoted to putting pernicious waste products such as plastic and plant waste known as biomass back into the economy by upcycling them into valuable commodities.


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"I believe that as engineers, we should take the lead in creating approaches that convert waste into high-value materials, fuels and chemicals, which will create new value streams and eliminate the environmental harm that comes from today's take-make-dispose model," Abdul-Aziz said.

Abdul-Aziz, along with doctoral students Mark Gale and Tu Nguyen, and former UC Riverside student Marissa Moreno at Riverside City College, compared methods for producing activated carbon from charred corn stover and found that processing the biomass with hot compressed water, a process known as hydrothermal carbonisation, produced activated carbon that absorbed 98% of the water pollutant vanillin.

Hydrothermal carbonisation created a bio-char with a higher surface area and larger pores when compared to slow pyrolysis — a process where corn stover is charred at increasing temperatures over a long period. When the researchers filtered water into which vanillin had been added through the activated carbon, its combination of larger surface area and bigger pores enabled the carbon to absorb more vanillin.

"Finding applications for idle resources such as corn stover is imperative to combat climate change. This research adds value to the biomass industry, which can further reduce our reliance on fossil fuels," Gale said.

HIGH-PRESSURE COUPLING

AVK's WANG PN35 high-pressure couplings join high-pressure pipelines in repair situations and new installations.

The Australian-made, stainless steel couplings are specifically designed for local conditions, manufactured and tested in-house to the highest available standards.

The design encompasses a belled sleeve to meet the demands of pipe deflection and support the high PN35 pressure rating. The couplings are manufactured from 316-grade stainless steel and supplied with nitrile rubber gaskets approved for potable water use. All couplings have 316 stainless steel bolts and nuts coated for anti-galling. The couplings connect a dedicated pipe outside diameter (OD) with a maximum variance of ±3 mm.

The range includes 259–507 mm pipe OD, with plans to extend beyond these sizes.

AVK Australia Pty Ltd
www.avkvalves.com.au

HEAVY-DUTY ASYNCHRONOUS MOTORS

Bonfiglioli's BX Heavy Duty Series of asynchronous motors is designed to meet the requirements of demanding industrial applications. Both the IEC and Compact motor are available in IE3 efficiency classes according to the international standard IEC 60034-30.

The motors are equipped with features such as a cast iron frame, C3 corrosion protection, regreasable bearings and shock pulse measurement predisposition as standard on all sizes.

Heavy Duty BX can be personalised and adapted to users' needs due to a wide range of available options. The motors can be equipped with options including: protection class up to IP56; tropicalised, corrosion-resistant paint; and anti-condensation heaters. Motors in the BN/M and BX/MX series are also available in the brake motor version, with a selection of AC or DC brakes. To maximise e-motor flexibility, all motors can be controlled with inverters.

The BX series withstands environments up to IP65 and can resist extreme temperatures (with bimetallic or PTC components). Incremental and absolute encoders are optional.

Bonfiglioli Transmission Pty Ltd
www.bonfiglioli.com.au

Resource and energy recovery investment to deliver triple impact

A Clean Energy Finance Corporation (CEFC) report examining the role of resource and energy recovery in Australia's transition to a low-emissions economy has identified a potential investment pipeline of up to $7.8 billion to 2025 across the waste, bioenergy, recycling and resource recovery sectors.

The report 'Energising resource recovery: the Australian opportunity' — developed in collaboration with global engineering and consultancy firm Arup — predicts that investment over five years would deliver a triple impact in terms of economic, employment and emissions benefits. The investment could generate thousands of jobs across rural and regional Australia and drive down emissions from landfill by as much as 60% on current forecasts.

According to the report, the resource and energy recovery sectors could contribute significantly to Australia's economic, employment and emissions goals with additional social benefits.

Report highlights

- New and expanded infrastructure requirements for waste, recycling and bioenergy projects in Australia have the potential to generate between $4 billion and $7.8 billion in new investment in the period to 2025.
- Emissions from landfill could be reduced by as much 60% by substantially reducing, reusing and recycling materials before they enter the waste stream, in line with the waste hierarchy.
- The employment benefits include the potential for the creation of up to 9000


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construction jobs, 2600 indirect jobs and as many as 1400 direct and ongoing jobs, including in regional and rural areas.

"Australia's recycling and resource recovery sector is undergoing considerable transformation, driven by global market pressures, evolving consumer preferences and an increasing focus on reducing our carbon footprint," CEFC CEO Ian Learmonth said.

"As an experienced investor in the bioenergy, recycling and energy-from-waste sectors, we see immediate and important investment opportunities in recycling and resource recovery, drawing on proven technologies with the potential to deliver long-term economic and environmental benefits.

"We also recognise the critical importance of supporting the circular economy, to back the development of new industries and jobs while cutting greenhouse gas emissions and making more efficient use of finite natural resources."

The report examined the investment and employment benefits that can be gained from strengthening the recycling, organics, bioenergy and thermal-energy-from-waste sectors.

The areas with the strongest investment potential were in large-scale energy-from-waste facilities, which have the potential to reduce significant volumes of waste going to landfill while at the same time recovering energy. Other significant opportunities were in refuse-derived fuel facilities and processing municipal solid waste generated by households.

Arup Australasian Resource and Waste Leader Joyanne Manning said, "The waste and bioenergy sector has shifted radically over the last five years, and this review is vital to provide evidence and confidence for future potential investment opportunities. Arup is delighted to have partnered with the CEFC to undertake this review and prepare this market report."

CEFC Waste and Bioenergy Lead Mac Irvine added, "This analysis clearly demonstrates both the diversity and complexity of the bioenergy and waste sectors, across a broad range of feedstocks, technologies and end uses.

"While this complexity poses challenges for potential investors and project proponents, international experience should give investors confidence that we can capture these opportunities in the Australian context, in both metropolitan and regional areas.

"Critical success factors include appropriate feedstock supplies, careful site selection, and a clear commitment to community engagement and the social licence to operate.

"Ensuring robust investment in mature and proven technologies, complemented by a commercial approach to infrastructure delivery and operation to underpin long-term performance, are also vital," Irvine said.

Investment opportunities

The CEFC report assessed a diverse range of resource and energy recovery investment opportunities over the period to 2025:

- Bioenergy technologies using 100% organic feedstocks can produce renewable energy in various forms, including heat, electricity, gas and transport fuels. These technologies and feedstocks can provide an incredibly flexible energy source with the potential for baseload or dispatchable generation as well as energy storage.
- Food and organic liquid wastes are suited to biogas production through anaerobic digestion.
- Bio-hubs, which bring together multiple players such as food and beverage producers, intensive horticulture and wastewater treatment, have the potential to secure organic feedstock and energy offtake at a viable scale and pricing.
- While waste materials which have been mixed or contaminated may have no viable recycling option, these residual waste materials could be a suitable energy resource for industrial heating, displacing fossil fuel consumption and diverting waste from landfill.
- Emerging constraints on landfill capacity around Australia's metropolitan centres and increasing landfill levies are beginning to create clear commercial drivers for thermal energy recovery infrastructure, as the sector seeks alternatives for managing mixed residual waste.
- The phase-out of non-recyclable packaging materials and single-use plastics by 2025 under the National Waste Policy Action Plan will help simplify the plastic waste stream, while also requiring investment in upgrades to sorting infrastructure to separate clean polymer streams for high-quality recycling.
- There is a growing market opportunity for tyre-derived products in Australia in road, rail and non-structural civil projects, including bitumen-crumb rubber asphalt, bitumen-modified spray seals and soft-fall matting.
- Policy implementation could drive investment and employment opportunities. The report noted the positive impact of policies around the application and increasing of landfill levies, waste export bans and requirements for increased source separation.
- Elements of the National Waste Policy Action Plan would also have a positive impact on industry development, including the twin 2030 targets of lifting resource recovery rates to 80% and cutting landfill volumes of organic waste by 50%.

Pact and Cleanaway to build $38 million plastic recycling plant

A new $38 million plastic recycling facility, announced by Pact Group and Cleanaway, will process more than 20,000 tonnes — or the equivalent of over 500,000 plastic milk bottles and food tubs — collected from household recycling bins into food-grade resins and will be located at Cleanaway's recycling facility at Laverton.

The post-consumer polyethylene recycling plant will convert locally collected kerbside materials into high-quality, food-grade rHDPE and rPP resin. This will facilitate the inclusion of locally processed recycled resin into food, dairy and other packaging.

This joint venture between Pact and Cleanaway complements the existing PET joint venture between Pact, Cleanaway and Asahi, with construction of another PET recycling facility in Albury underway and ahead of schedule for commissioning later this year.

"The new recycling facility highlights the progress we are making in expanding our reuse and recycling capability, a core component of our growth strategy," said Pact's Managing Director and CEO, Sanjay Dayal.

The Laverton facility will help to increase Australia's local processing capacity for recycled plastics, which are subject to a series of rolling export bans from later this year. Australia has lacked local onshore processing capacity to manage reprocessing of waste collected through kerbside collections, most of which was being sent offshore prior to export bans.

Construction of the plant will start towards the end of the year and it is expected to be fully operational by December 2022.

Cleanaway
www.cleanaway.com.au

Canberra energised with community-owned solar farm

Investing in solar used to be limited to those who owned property with a sunny roof and could afford to place solar panels on it. Now a community-owned solar farm in Canberra opens up investing in solar to all Canberrans and anyone who wants to be part of the shift to a renewable energy economy.

More than 400 Canberrans have raised over $2.4 million to finance the construction of the SolarShare Community Farm, located on a 3 ha site in Majura Valley on the outskirts of Canberra. The 1 MW solar farm consists of 5000 solar modules, which will contribute over 2.3 GWh of energy into the grid each year.

ACT Minister for Energy and Emissions Reduction Shane Rattenbury was there as the farm was switched on in March.

"The SolarShare Community Farm has given the local community the power to invest in renewable energy, providing power to around 250 local homes through this great initiative," he said.

"For people who can't install solar at their own premises, this is a great way to be involved in the clean energy revolution.

"Now that we have a proven model, I look forward to seeing more community-owned solar farms here in the ACT and across Australia."

SolarShare's Principal Executive Officer, Lawrence McIntosh, was proud to be energising the solar farm and helping the city transition to a sustainable future.

"Studies overseas have shown when an energy generation plant is locally owned, nine times as much local economic activity is created compared with plants owned by large developers not locally based. This is because the local investors in the project will generally cycle their earnings back into local goods and services," McIntosh said.

"It's been a pleasure to be a part of creating the SolarShare Majura project and I feel tremendous gratitude for all the support we've receive from the community, from our volunteers, from local service providers, our construction and finance partners Epho and CWP, and of course the ACT Government."

The project is a part of the ACT Government's large-scale renewable energy program.

SolarShare
www.solarshare.com.au

MARSIC EMISSION MEASURING DEVICE ENSURES GREATER TRANSPARENCY ON THE WORLD'S OCEANS

The wave of success in digitization: A new measurement device from SICK enables ships to maintain reliable exhaust gas cleaning. But that's not all: The data that it provides opens up pioneering new application possibilities. Also thanks to a digital twin in the cloud.

Important new regulations took effect on 1 January 2020: The International Maritime Organization (IMO), a UNO subsidiary dedicated to the safety and environmental compliance of ships, reduced the sulfur limit value in fuel in international waters. Because most ships are powered with heavy fuel — and therefore emit large quantities of sulfur dioxide — this change requires urgent action for many shipping companies: About 60,000 ships worldwide must either switch to considerably more expensive low-sulfur fuel or retrofit exhaust gas cleaning equipment. This so-called scrubber washes sulfur oxides from the exhaust gas and is installed with an emission measurement system.

SICK offered a solution at the right time: "We specifically developed our MARSIC measurement device for maritime emission measurement," explains Hinrich Brumm, Strategic Industry Manager Combustion Engines and Maritime, who has been at SICK AG for five years. "It proves compliance with the IMO regulation, and therefore the efficiency of these exhaust gas cleaning systems — and is an indispensable component of the scrubber." The device (roughly 130 x 40 cm and weighing about 120 kg) can measure up to nine gas components — SO_2, CO_2, CO, NO, NO_2, NH_3, CH_4, H_2O and O_2 — and is also designed for other on-board process measurements.

Even in heavy seas — the Digital Twin in the cloud

The measurement device provides continuous data, and can thus form the basis for new applications because internet connection is now also possible on the high seas — so the data is constantly available via cloud solutions and can be accessed at all times. SICK is using this capability for its current work developing a variety of new maritime applications.

One such application is a cloud-based digital twin of the physical MARSIC device — a 'virtualized asset' in Industry 4.0 jargon. Any sensor can be represented, and the device's real-time data visualized on the SICK AssetHub, a cloud-based web service for SICK customers. It is therefore possible to see what the device is measuring at sea, so the shipping company can monitor the emissions. If there is a problem, for example a clogged filter, not only is the crew notified, but also the shipping company — and appropriate measures can be implemented.

It is also possible to link the MARSIC emission data with other data. In future, therefore, digital services will be able to combine these values with the ship's position data and issue warnings when the ship enters a SECA zone, enabling the crew to take action in good time.

In the safe haven of digitization

A digital service based on a ship's emissions measured using MARSIC could also, for example, be very helpful in future for collaboration with ports. The complex emissions requirements vary enormously from port to port. Some ports now even have incentive models with reduced port fees if the ship emits lower pollutant levels. Manual completion of the numerous forms required by ports makes enormous demands of the crew with plenty of leeway for mistakes. A digital service that transmitted the emission values to the port authorities via the cloud would improve the process and provide added value in the form of reduced workloads and the security of having complied with all regulations.

But that's not all: SICK is already working on developing new digital services for all aspects of decarbonization or 'green shipping': "The maritime industry is undergoing radical change and, in view of the climate change debate, must stop using heavy fuel and move towards alternative propulsion concepts," explains Hinrich Brumm. "SICK, with about 40,000 different sensors, also has the competence to develop suitable solutions here, too, and offer them in good time — from individual products to complex complete solutions including cloud-based services."

Above all, these digital applications are a pioneering new development for shipping. While the reliable monitoring of ships' emissions was impossible in the past, it can now be achieved thanks to MARSIC and cloud-based services.

SICK Pty Ltd
www.sick.com.au

THIS IS SICK
Sensor Intelligence

Solar vs wind: the race to power up sustainable energy

Damien Crawford, Infrastructure Director East (Australia, New Zealand & Asia), Robert Bird Group

Renewables are on the agenda for organisations, consumers and governments alike. A few years ago, convincing stakeholders of the virtues of renewables was an uphill battle, but now they're seen as imperative.

And while the collective conscious has embraced the concept of renewables, questions remain. What's the best source of renewable energy? Is it the low-cost-power-generating wind farm or the quick-build solar farm? What might a renewable future look like, and how will it happen?

Solar has emerged as a primary choice over the last few years. This comes down to the difference in gestation periods between solar and wind power farms. If you could get a wind farm up, from concept — to a development application (DA) — to construction, within seven years, you'd have done well. Generally speaking, wind farms require a solid decade, from concept to delivery. And we often find with wind power that a project may come to market two or three times over its life cycle. It can be shelved, and then it'll come back. And then when it comes back, due to changes in technology and need, there may be a need to redesign and build larger turbines.

Harnessing the wind's power is nothing new.

People used wind energy to propel boats along the Nile River as early as 5000 BC. By 200 BC, simple wind-powered water pumps were used in China, and windmills with woven-reed blades were grinding grain in Persia and the Middle East.

Of course, engineering and design have moved on somewhat since 200 BC, and another major contributor to the rapid increase in installed capacity comes down to the technological advances in our sector. These advancements have resulted in more extensive and more efficient wind turbines that can use intelligent technology.

So, is the answer still blowing in the wind?

Wind-generated energy is currently one of Australia's primary sources of renewable energy, generating enough electricity to meet almost 8% of the nation's total electricity demand.

The cumulative installed capacity of wind energy in Australia has been steadily growing and has more than tripled since 2010. This is partly due to it being one of the lowest-cost sources of new electricity supply in Australia. With the cost of utility-scale wind energy expected to continue to fall, new wind farms are anticipated to deliver electricity below $50/ MWh by 2030.

Or is it time to let the sun shine on solar?

Solar, on the other hand, is relatively quick to implement and reasonably low-impact. If done well, we can get from concept to start of construction in a little over a year.

The nature of the solar farm is fluid. The asset fulfils its purpose until it's no longer required, meaning clients aren't spending much capital on producing these types of investments. As engineers, it's about designing solar farms that are fit for purpose but that are cost-effective.

Harnessing Australia's solar potential is a no-brainer. Australians are leading the world when it comes to solar penetration through rooftop PV systems on homes. Reducing our electricity bills is the number one reason people are turning to this renewable energy.

This trend is continuing to spill into the private sector, meaning now is the perfect time to start creating solar farms, both large and small, to help further power the country.

Price certainty will always come up trumps.

So why have we seen such an influx in renewables over the past few years? The most straightforward and probably least popular answer from an industry perspective is around price certainty.

Of course, the corporate social responsibility element means all businesses want to be green, as well as the public's perception and a shift in understanding.

But from my perspective and the renewable energy developer's perspective, cost is king.

Until now, the challenge for energy, and carbon-intensive energy sources, has been price certainty. There's variability in that. And that's one thing the industry doesn't like — cost variability.

Connectivity and transmission is the key to a renewable future.

One of the most significant challenges to face solar and wind generation is our ageing transmission network. It was created for coal-fired generators, emanating at the power station and transmitting to the high-demand areas.

Fast-forward to 2021, and we've got solar, and wind farms positioned in myriad locations across Australia — many not located near the coal-fired power stations and associated transmission lines. In many places the network, in essence, needs to be flipped, and together with battery storage, it's our most significant challenge to overcome — how do we improve transmission networks across Australia?

This is where some issues around the stability of networks will arise. Put simply, we're trying to feed too much power in at the wrong end.

And this takes us back to the all-important price point. For renewables to work effectively in the longer term, there needs to be a committed expenditure on transmission. And the critical issue Australia faces is quite simply this... who pays for it?

Robert Bird Group
www.robertbird.com

Solar winnings used to innovate manufacturing recycling plant

Renewable energy may have been a loser in the federal Budget, but businesses in the manufacturing sector are investing in solar to save on power bills and using the savings to innovate and increase production. These solar winners are demonstrating how to improve the bottom line, increase profit margins and become more sustainable at the same time.

Thomas Bell, Sales Director of solar solutions provider Energus, commented that manufacturers are rapidly embracing solar and the company has helped over 200 businesses, schools and community organisations across NSW convert to solar and save big on their energy bills.

Two of these businesses are Motion Asia Pacific based in Chullora and Cooks Confectionery in Albion Park near Shellharbour, both of which have been able to use the savings to innovate and invest in their operations.

Cooks Confectionery is one of Australia's leading confectionery companies, which supplies premium quality chocolate, toffee and nut products to wholesalers, supermarkets, convenience stores, service stations and other retail outlets Australia-wide.

In July 2020, Cooks Confectionery engaged Energus to install a 70 kW solar energy system on the roof of its 1000 m² property, which led to a huge reduction in energy costs, enabling the company to double its shifts.

"We effectively doubled production without increasing our energy costs," said Cooks' Managing Director, Daniel Lezcano.

Bell said, "We were very pleased to see that the huge reduction in energy costs enabled the company to double its shifts. Even with the introduction of the second shift and operations spanning from 6 am to 10 pm, the company's energy bill stayed the same, thereby saving them $10K/quarter."

Given that the production of chocolate is high in energy use with the need to refine it for 10–12 hours, to have motors on for the same amount of time and to have heaters working for 24 hours, Lezcano said it was a no-brainer to look at installing solar to reduce Cooks' energy bill.

Motion Asia Pacific is an industrial engineering distribution group with 1600 employees across 14 core businesses and 180 branches which has saved in excess of $25,000 pa on its energy bill after installing solar at its headquarters. This is enabling it to look towards a greener future and reduce costs at the same time.

Motion Asia Pacific has over 350,000 stocked product lines, which equates to a presence in almost all industrial and trade sectors, from agriculture and automotive to mining and transport. The company produces products to keep their customers' plant, machinery and equipment operating safely, efficiently and sustainably.

Its solar installation produces approximately 2.2 MWh of energy each week, which is enough to vacuum 54,885 m² of carpet or seven rugby league fields.

"The decision to switch to solar is part of a long-term goal to reduce Motion Asia Pacific's environmental footprint, which follows on from our transition to LED lighting in 2019," said Motion Asia Pacific's Business Improvement Manager, Gavin Baxter.

"When we considered the rate of return on the investment was less than 2 years, it was an obvious next step for the company."

Motion Asia Pacific said the efforts to reduce the company's carbon footprint have been positively received by staff. Baxter observed that part of the team were particularly appreciative of the changes from the outset, while other team members became enthused when they saw how $26,800 pa savings on energy costs can be achieved in congruence with the company's larger corporate social responsibility goals.

Energus

energus.com.au

Energy program to soak up surplus solar

Endeavour Energy and smart metering company Intellihub have officially launched the Off Peak Plus energy program, which is set to change the way off-peak electricity systems operate.

Partnering with 10 energy retailers, the two companies have installed smart meters at 2500 homes across Albion Park in NSW. The installed meters are used to control hot water systems, allowing them to be switched on during the day when surplus power is being generated from household solar systems.

The program is designed to improve network performance, help save customers money and speed the transition to a low-carbon future.

"Endeavour Energy initiated this program to solve the problem of replacing and upsizing a 50-year-old off-peak control system in its nearby substation," said Endeavour Energy CEO Guy Chalkley.

"By using advanced smart meters, instead of investing in expensive old technology at

the substation, Endeavour Energy can save real dollars and cents for our customers by finding ways to help them capture more affordable solar energy.

"We'll also be able to access energy and power quality data through the smart meter to help us better respond to issues and outages, particularly during storms, giving customers even safer and more reliable energy," Chalkley said.

NSW Energy Minister Matt Kean said with almost a quarter of all homes now using solar, Off Peak Plus would give customers more control over their electricity use and enable excess solar power generated locally to be used by neighbours to heat their hot water systems.

"This state-of-the-art program has found a way to manage peak energy demand, helping to futureproof the grid with even more home solar systems," Kean said.

"The smart meters will also detect safety issues with a customer's installation and help detect network issues and outages, particularly during storms and incidents."

The program is managed by Intellihub, a metering provider specialising in products that enhance grid visibility and data insight.

"It's an innovative project, not just because of the technology, but how it's being used to benefit customers, the environment and industry all at once," Intellihub CEO Adrian Clark said.

"Endeavour Energy is showing the industry how to work together and share the benefits of technology and collaboration."

Intellihub

www.intellihub.com.au

AWRE 2021 cancelled following lockdown extensions

The Australian Waste & Recycling Expo (AWRE) 2021 — scheduled for 25–26 August — has been cancelled due to the unfolding COVID-19 situation across the nation.

Representing the national waste and recycling community, AWRE brings together exhibitors and visitors from states across Australia. The extension of the lockdowns in New South Wales, Victoria and most recently South Australia has impacted interstate travel, prohibiting industry members from connecting at a nationwide event.

AWRE showcases the full circle of innovative products and sustainable solutions from across Australia, with the opportunity to connect with influential professionals. The cancellation of the event comes as a disappointment to the event organisers, who were committed to delivering a much-anticipated face-to-face event this year.

"The team ha[s] been working hard to plan and deliver AWRE 2021 with new initiatives — it is extremely disheartening to not run AWRE this year. With much reviewing and replanning in the background over the past few weeks, the ambiguity of the coming months has led to the outcome, and we will focus all efforts into delivering a stronger AWRE 2022 instead," AWRE Commercial Director Bill Hare said.

The AWRE team expressed that it is humbled by the support received from exhibitors, partners, sponsors, speakers and suppliers, and looks forward to delivering a standout face-to-face event and reuniting the industry on 24–25 August 2022 at ICC Sydney.

Cleantech's role
in economic growth opportunity and net zero emission

As climate-related disasters — from floods to fires — increase and the threat of pandemic life continues, the need for cleantech awareness, and uptake, across Australia and the world increases too.

The role of cleantech in the economic growth and recovery post-COVID and in the face of climate change will be the focus of the third National Cleantech Conference & Exhibition (NCTCE) in 2021, with the theme, Cleantech: from disruption to transition.

As Australia's only multi-sector cleantech event, the two-day event scheduled for November, in Brisbane, provides a national platform for collaboration, learning, networking and doing business between innovators, investors, producers and commercial end users of clean technology.

The 2021 speaker program features cleantech industry innovators and thought leaders from Europe, America and around Australia.

Program highlights include a panel discussion featuring a representative from each Australian state and territory and facilitated by John O'Brien (Decarbonisation Partner at Deloitte) discussing the state of cleantech in Australia.

As one of Australia's preeminent leaders in the emergence of cleantech, John O'Brien says while many people understand cleantech to only be renewable energy, all levels of government and large corporate entities are understanding it to be so much more.

"For example, the role finance companies will be asked to play — and are already playing — in reducing emissions is ramping up exponentially. If you are to invest a dollar or loan a dollar, the question exists around what the emissions associated with that dollar might be," O'Brien said.

"And while the pressure is on oil, gas and mining to embrace cleantech solutions and make the transition to them, consumers are also looking for carbon-neutral options on their products every day — from booking flights to buying beer," he said.

"This is where the opportunity for cleantech entrepreneurs is so great. It is becoming universally understood that the cost of doing nothing about climate change is simply too great for economies the world over — and cleantech solutions can be found across all sectors from water, energy, waste, transport, agriculture, manufacturing and the built environment.

"The economic and financial factors around cleantech solutions are now driving the uptake as much as environmental factors, which is pleasing to see, but it's a steady process.

"Cleantech offers solutions to the big climate challenges and consumers are now demanding these solutions — there's simply no better time to act than now."

It's a sentiment shared by the CEO of Australian organisation Beyond Zero Emissions, Heidi Lee, who will facilitate a panel discussion on how coal-producing regions can transition to green economies, using the Ruhr Valley in German as a case study.

"One of the biggest opportunities in Australia right now is to capture the rapidly growing market for zero-emissions products," she said.

"Most Australians don't realise the many positive economic and social benefits the transition to zero emissions will bring for us — individually there'll be household cost savings and as a society we have some of the best renewable resources in the world, so we'll be a top-tier choice for global businesses to operate.

"But this opportunity isn't well understood, particularly in regions where the local economy is currently dependent on fossil fuels. Through showcasing zero-emissions solutions in these places, we're able to promote the benefits and opportunities that exist, shift the public narrative and make sure that Australia acts now to seize this opportunity."

The focus of the 2021 National Cleantech Conference & Exhibition (NCTCE) aligns strongly with the objectives of the Technology Investment Roadmap released by the Australian Government in 2020, which prioritises low-emissions technologies with potential to deliver the strongest economic and emissions reduction outcomes for Australia.

Dedicated breakout streams in the program will also showcase cleantech implementation case studies, new innovations and technology, business growth and investment opportunities.

The adjacent exhibition will also be showcasing the latest solutions and service offerings in the sector. The two-day hybrid event will be held both in person and live streamed from the Brisbane Convention & Exhibition Centre to support global attendance and COVIDSafe options.

NATIONAL CLEANTECH CONFERENCE & EXHIBITION (NCTCE) 2021

When: 1–2 November 2021
Where: Brisbane Convention & Exhibition Centre, Brisbane
Tickets: http://nctce.com.au/registration.
To become an exhibitor, visit https://nctce.com.au/exhibition/become-an-exhibitor.

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www.nectarcc.com.au

Clean energy event returns to Melbourne this October

With an extensive pipeline of renewable energy and hydrogen projects and strong demand for rooftop solar and battery storage, the growth of renewable energy in Australia is showing no sign of slowing down. For this reason, All-Energy Australia is gearing up for a face-to-face event this October in Melbourne to continue supporting the industry's growth and accelerating the transition to a renewable energy future.

This free-to-attend exhibition and conference, organised in partnership with the Clean Energy Council, is where renewable energy professionals can get exclusive access to the latest technologies and trends, and discuss the opportunities and challenges in the sector. As one of the industry's largest all-encompassing clean energy events, the expo floor will feature over 150 leading companies including Growatt, Enphase Energy, Clenergy, SMA, Krannich, Fronius, Canadian Solar, Array Technologies, Huawei, Sunman and Red Earth Energy Storage.

"The 2021 event takes place at a crucial time in our country where Australia's clean energy transition is more important than ever. All-Energy Australia provides a platform for the industry to connect visitors with leading suppliers on our exhibition floor and drive conversations about the future of renewables at our multi-stream conference," Robby Clark, Portfolio Director at All-Energy Australia, said.

With the conference agenda to be announced in September, this year's program will have more than 170 expert speakers discussing the latest in solar energy, energy storage, hydrogen energy, electric vehicles, bioenergy, distributed energy resources and more. All-Energy Australia will also host the Clean Energy Council's Solar Masterclass, a one-stop shop for installers to get their fix of expert advice on the big design and installation issues facing the rooftop solar industry.

The health and safety of exhibitors, visitors and staff is All-Energy Australia's number one priority.

The organisers of the event are actively monitoring the COVID-19 situation as it evolves and working with the venue and relevant authorities to ensure the event will have the highest health and safety protocols in place.

ALL-ENERGY AUSTRALIA
When: 27–28 October 2021
Where: Melbourne Convention and Exhibition Centre
Free registration is available at www.all-energy.com.au/

83rd WIOA Victorian Water Industry Operations Conference and Exhibition

The Water Industry Operators Association of Australia (WIOA) is pleased to bring the Annual Water Operations Conference and Exhibition to Bendigo from 24–25 November 2021.

The conference and exhibition provides a forum for people undertaking operational roles in the water, wastewater and recycled water industries to update knowledge and skills through interaction with other water industry employees. The large exhibition allows attendees to view and discuss the latest advances in technical equipment and systems with suppliers.

Features include:

- More than 20 speakers over two days on a range of topics relating to the water industry
- Products and services from many of the world's leading companies
- Ixom 2021 Best Tasting Tap Water in Victoria
- Victorian Main Tapping competition

Learn from the experience of others through the operational, technical and research presentations

View and discuss the latest advances in technical equipment, products and services

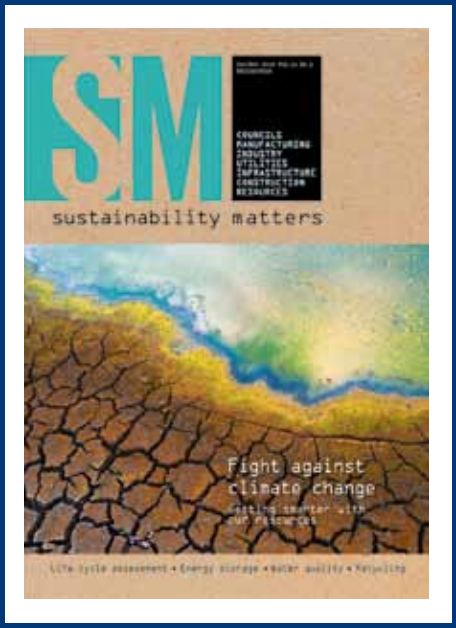
Update knowledge and skills through interaction with fellow water industry employees

If you're an operator, manager, engineer, consultant or professional or someone who is working in the water industry or just has an interest in water, then this is a must-attend event. The exhibition is free for anyone to attend and keep informed about the latest industry developments — it provides a good platform to meet and liaise with leading figures in the water industry.

What: 83rd WIOA Victorian Water Industry Operations Conference and Exhibition
When: 24–25 November 2021
Where: Bendigo Exhibition Centre, Prince of Wales Showgrounds, Bendigo
Web: wioaconferences.org.au/vic-2021/

FREE

to industry and business professionals



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