SM

sustainability matters

Oct/Nov 2020 Vol.14 No.2
PP100007399

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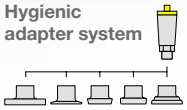

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OCT/NOV 2020

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REGULARS

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WORDS FROM THE EDITOR

While the pandemic has delivered a large drop in greenhouse gas emissions — down 2.5 Gt (4.6%) — it has also highlighted the importance of our 'sovereign capabilities', where we rely more on our own resources and materials.

The resource recovery industry was all too aware of this importance after China's National Sword policy began to be implemented in late 2017. It became clear that we needed to create a viable and sustainable local recycling industry rather than relying on China to deal with our waste.

This year, the Australian Government's Budget is spending big and includes a $1.5 billion plan to secure a sovereign capability in Australian manufacturing across six priority areas — which include recycling and clean energy.

"We make things in Australia. We do it well. We need to keep making things in Australia," Prime Minister Scott Morrison classically said.

If we consider this from a circular economy point of view, what we also need to do is to start seeing waste as a valuable (and renewable) resource when we make these 'things'.

In this issue, Professor Veena Sahajwalla, from the UNSW SMaRT Centre, discusses how the notion of sovereign capability has provided a boost to the sustainability discussion. She talks about aligning recycling and manufacturing in the new COVID-19 era to address the challenges around delivering more sustainable product outcomes.

Enjoy the read and stay safe.

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connecting industry

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Subscriptions
For unregistered readers price on application.

Printed and bound by Bluestar Print

Print Post Approved PP 100007399
ISSN No. 1834-917X

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Reconnection

*Jonas Bengtsson**

The business case for sustainable buildings

2020 may well be remembered as a year of biblical proportions. From fires and floods through to pandemic and recession, modern communities have been challenged like never before, lurching helplessly from one emergency to the next. Sitting comfortably at the top of the leaderboard as the largest contributing country to global emissions per capita, Australians were forced to confront this uncomfortable truth as 46m acres of native bushland recently burned as the world looked on.

Complicit within this, the Australian building industry alone contributes 25% of national carbon emissions — and yet this issue remain unresolved and unaddressed in the recently released National Construction Code (May, 2019).

Without appropriate legislation in place, and in the absence of decisive leadership, it is now the social responsibility of architects, designers, builders and owners to put our own house in order. We can no longer ignore the devastating impact that Australia's $360bn construction industry places on the world around us. Collectively, we must address the sustainable building crisis and shift our near-term thinking away from outdated philosophies, and direct intentions towards long-term solutions that work in harmony with the local conditions.

We can no longer ignore the devastating impact that Australia's $360bn construction industry places on the world around us.

Holistic approach

Focusing beyond the simplicity of operational emissions and embracing a holistic building approach right from the ground up is key to achieving these goals. Sustainability, by very definition, is about planning for the future; for people and for place. Only when that framework is firmly established and supported by law can the industry seamlessly transition into an environmentally and financially sustainable future.

What is the actual role of a building, if not to better connect us to the land, to enhance our mutual living space and to improve on personal interactions?

Buildings are a natural extension of the world around us. They provide home, shelter, refuge and safety. They draw communities together and are an individual expression of our cultural heritage. Research has long demonstrated that environmentally friendly 'green' buildings not only deliver the financial benefit of reduced operating costs, they have a direct impact on the health and wellbeing of employees.

Consider 2m healthy life years gained annually in the EU by improving indoor air quality, an 18% more productive workforce from the provision of natural daylight and 25% better functioning staff simply by accessing a view. Enhanced air quality, green spaces and natural sunlight all combine to improve workplace attendance and wellbeing as well as quality of productivity.

From operational to embodied

Until now, the building industry has concentrated primarily on reducing operational emissions by way of ticking the 'green' box. These factor inclusions are now almost assumed and undisputed within new builds and major retrofits. But neglected up until this point — and where now requires focus — is the embodied energy calculation for the entire project: the cradle-to-grave environmental and social impact, from demolition and reconstruction, to geographical placement, product selection and function. Working in tandem, these factors all directly contribute to the true sustainability of a build.

With the balance now shifting from operational to embodied, it forces the industry to more closely examine the materials we commonly use, and asks of us as individuals to take responsibility for it at all stages of the process. Understanding the complete environmental impact and closing the resource loop is the crucial next stage in achieving sustainability. This is an area ripe for improvement, and while it is common practice amongst sustainability professionals, it is not yet an industry-wide approach. Even with multiple rating tools in place the process is far from simple, and it is not easily achieved.

Calculating the true embodied energy costs of any build can be a subject for debate in itself — and is riddled with contradiction. Concrete is a typical example. A massive contributor to carbon dioxide emissions because of the high proportion of cement it contains, it is also effective in retaining heat. Furthermore, it is widely and cheaply available. As for end of life, it will either be discarded in landfill or downcycled into roads — invalidating the invested energy and carbon.

Steel suffers a similar fate, as the recycling process is as energy-intensive as the initial production. Even timber mostly ends up in landfill, where the decomposition process negates the CO_2 once absorbed in its natural state.

Embodied energy and carbon is where the legislation is desperately needed so that these essential considerations become the norm rather than the exception. Until we begin to embrace the circular economy, to see buildings as an extension of our natural world and take full responsibility for our creations, true sustainability — and therefore economic viability — will continue to evade us.

Corporate responsibility

For commercial businesses, environmental impact and associated risks are now a board-level consideration as shareholders demand transparency and board members are required to understand the level of responsibility they are taking on as a consequence of their roles.

Corporate annual reports are becoming increasingly more complex, and items such as climate change and societal impact are being included as standard alongside investments and operational costs. It's imperative that the full business case for sustainability includes all three elements, from sustainable resource use and optimisation of operation to consideration of the wider ecosystem and community impact. Each tangent is inextricably linked to the other and all combine for a happy bottom line — which includes a happier environment.

So how do we tackle this?

Meaningful change is only possible if the right tools and framework are in place to facilitate it. Only by simplifying the current process and supporting it with appropriate legislation can the building industry collectively begin to address these issues.

Time-saving information tools such as BPI Rating must become commonplace, removing any barrier to knowledge and allowing professionals to research and select the most appropriate materials and resources. Removing industry-speak and transitioning the language into the common vernacular is another important step towards accessibility, as recently undertaken by Green Star. We have common goals and we must commonly communicate to reach them, aligning frameworks and driving methodologies. It's the only way our legacy will take a different path.

We have the knowledge, we have the language, and now we have the tools to reconnect our buildings with the land and the people. Sustainability will always be a multi-faceted debate and whilst there is not a singular answer, significant change is entirely within our own hands: the business case writes itself.

**Jonas Bengtsson is CEO and co-Founder of Australian sustainability consultancy Edge Environment, and Founder of BPI Rating, an online database of building materials that aims to improve transparency of information, sustainability and resilience in the Australian built environment.*

Aligning recycling and manufacturing in the COVID era

Professor Veena Sahajwalla, UNSW SMaRT Centre

The UNSW SMaRT (Sustainable Materials Research and Technology) Centre is helping to align recycling and manufacturing in the new COVID-19 era to address the challenges around delivering more sustainable product outcomes.

As organisations and businesses started to experience difficulty in obtaining materials and products for their operations, the notion of 'sovereign capability' — where a nation relies more on its own resources and materials — has provided a boost to the sustainability discussion.

Across Australia, what we really need is an alignment of recycling and manufacturing and to start seeing waste as a valuable (and renewable) resource for much of the materials we use in society.

Adopting and operationalising circular economies — where materials are kept in use for as long as possible to create greater sustainability — will really only occur through such an alignment.

One recent example is the SMaRT Centre's prototyping of frames for face shields for use in medical settings, using filament made from 100% waste plastic using our Microfactorie technology.

A key lesson was how valuable filament — which is mostly only available from overseas suppliers — could become a material resource for the manufacture of parts and products, and ultimately provide an uplift in manufacturing capability in times of stressed supply chains.

The SMaRT Centre, through its microrecycling science and Microfactorie technologies, can transform waste plastics into feedstock resource for manufacturers and other 3D printing users. This model of decentralised manufacturing provides distributed benefits.

Being able to create local supply chains from waste plastic would help develop opportunities for parts and products not readily available, especially when global supply chains are disrupted.

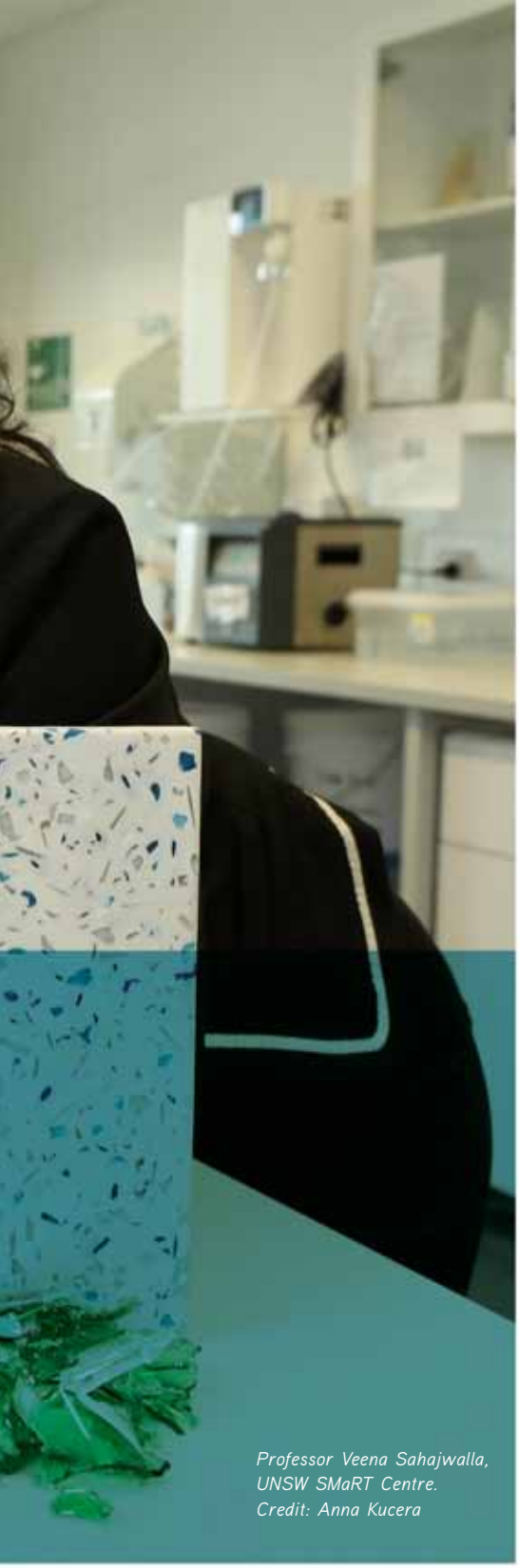
With COVID-19 disrupting global supply chains and sparking questions about sovereign manufacturing capability, now is the time to adopt new technologies and practices that can help us better manage our materials as resources, to reduce waste and create new supply chains and jobs.

This alignment of recycling and manufacturing is a key focus of the SMaRT Centre at UNSW Sydney, and we recently published two separate scientific papers that explain the science and technology behind how we are trying to forge this alignment.

The SMaRT Centre created the phrase 'microrecycling science' to describe its novel approach to researching innovative approaches and technologies to reform various waste streams into value-added materials and products, through decentralised manufacturing to help local, regional and rural locations.

Ever-increasing population, technological advancement, variable consumption trends and lack of efficiency in using materials are forcing us near a crisis point in terms of waste management.

Australia's governments have agreed to ban the exporting of glass, plastic, paper and rubber tyres from January 2021, so we



Professor Veena Sahajwalla, UNSW SMaRT Centre. Credit: Anna Kucera

"Ever-increasing population, technological advancement, variable consumption trends and lack of efficiency in using materials are forcing us near a crisis point in terms of waste management.

need to start treating these waste items as the 'renewable resources' they really are and feed them back into manufacturing and divert them from landfill, stockpiling and incinerators.

A key challenge is that existing, centralised recycling and waste treatment methods at scale often just turn things like PET bottles back into PET bottles. What we need is a recycling and manufacturing system that can innovate to reform waste for more diverse and value-added end uses.

Recyclers traditionally haven't seen themselves as manufacturers and manufacturers haven't seen themselves as recyclers, but we need them to.

So, if we accept that we need plastic, for instance, and want to keep it out of landfill and incinerators — which destroy these materials for ever — we need a system that treats it as a renewable material.

One crucial area that is now being appreciated is the SMaRT Centre's Microfactorie technologies, which are modular based and can reform waste into value-added materials for re-use and remanufacturing.

This decentralised model brings together recycling with manufacturing capability and is designed to transform problematic waste materials, such as glass, textiles and plastics into new value-added materials and products such as green ceramics for the built environment, and filament as a feedstock resource for manufacturers and 3D printers.

The SMaRT Centre is exploring options to move the capability of producing our green ceramics from within UNSW to external operational settings with some of our industry partners — this has the potential to set new benchmarks using recycled and reformed waste materials for the built environment sector in particular.

These small-scale Microfactories are designed around creating local economies of purpose — such as being able to recycle locally sourced waste glass and textiles — which helps create a circular economy where regional market participants make up the supply chain, including the end-market participants.

Many of these innovations have progressed as a result of funding from a range of sources including the Australian Research Council (ARC).

We now have an incredible opportunity to solve numerous existential problems at once: we can collectively address waste and recycling issues and lower our carbon footprint, while also enhancing our manufacturing capability, thus creating new supply chains to enhance our sovereign capability.

COVID-19 has unearthed the weaknesses in our current way forward to meet sovereign challenges but we can start a whole new 'green materials' movement, where we use waste as renewable resources for manufacturing to supercharge our economies that are going into some of their biggest recessions.

This could lay the foundations for the next economic recovery or growth period. We are adding a fourth R to the three Rs of Reduce, Reuse and Recycle, with Reform, by transforming waste into value-added materials. This is a key principal for our new ARC Microrecycling Hub into Battery and Consumer Wastes.

Onshore and more sophisticated processing of recycling as part of manufacturing can change the game for Australia and all countries around the world.

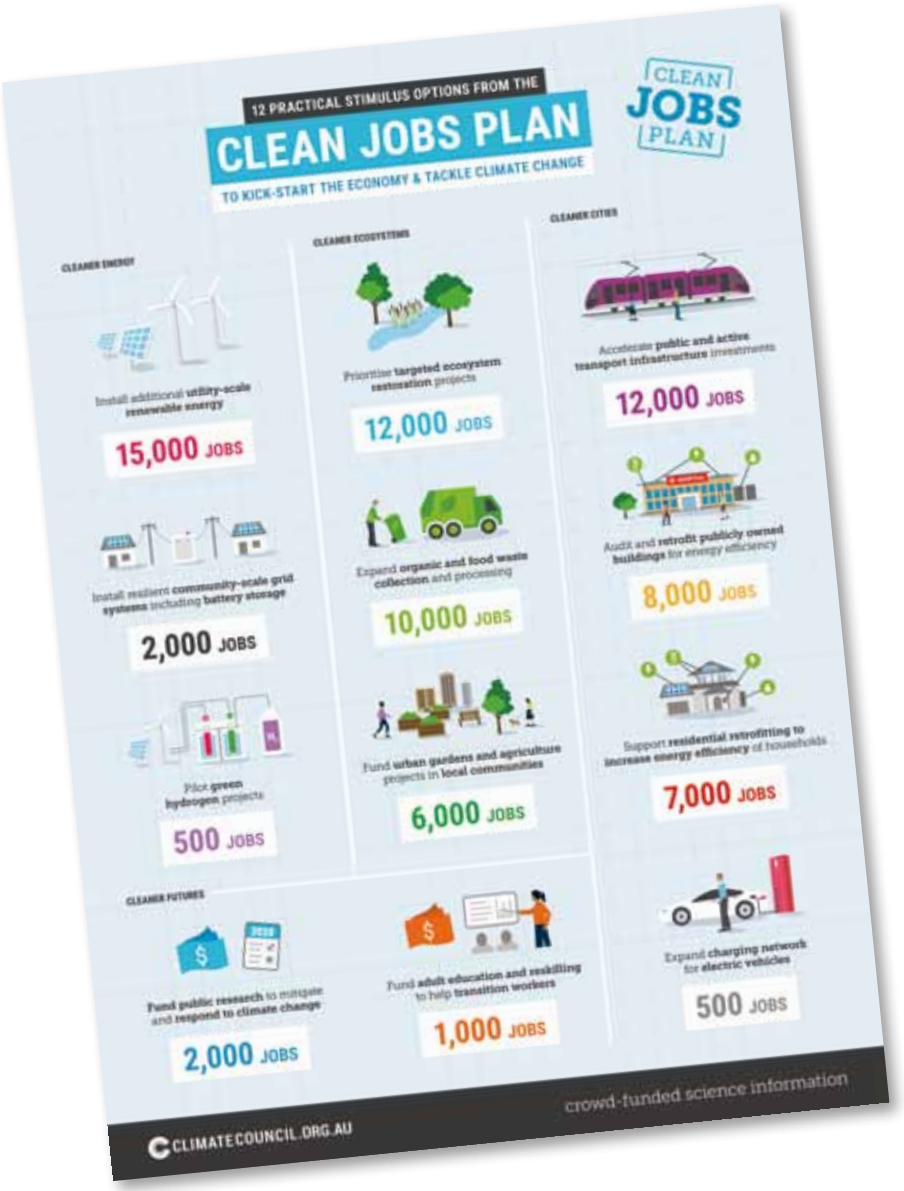
The goal is to completely eliminate the word waste from our vernacular because waste will become the renewable resource we know that it is.

ARC Laureate Professor Veena Sahajwalla is an internationally recognised materials scientist, engineer and inventor revolutionising recycling science. She is renowned for pioneering the high temperature transformation of waste in the production of a new generation of 'green materials'. In 2018 Veena launched the world's first e-waste Microfactorie and in 2019 she launched her plastics Microfactorie, a recycling technology breakthrough. As the founding Director of the Centre for Sustainable Materials Research and Technology (SMaRT) at the University of New South Wales, Sydney, she is producing a new generation of green materials and products made entirely, or primarily, from waste. Veena just concluded heading as Director the ARC Industrial Transformation Research Hub for 'green manufacturing', a leading national research centre that works in collaboration with industry to ensure new recycling science is translated into real-world environmental and economic benefits, and is now head of a new ARC Microrecycling Hub into Battery and Consumer Wastes.

Clean jobs can help repair the economy – and the climate

The Climate Council has identified that 'clean jobs' will help get Australians back to work and are the key to long-term emissions reductions.

With thousands of Australians out of work due to COVID-19, governments have a crucial role to play in making targeted investments and implementing policies that can put Australians back to work. The aim is to devise win-win solutions that create jobs and tackle long-term problems at the same time.



The Climate Council's Clean Jobs Plan was devised to investigate how creating thousands of jobs can help Australia rebuild the economy and tackle climate change.

The plan identifies 12 major policy opportunities to immediately kickstart economic growth. Collectively, these opportunities represent 76,000 jobs. Job creation would start immediately and over a three-year period. These opportunities are deliberately targeted to regions and occupations hit hardest by job losses, and have the potential to grow the entire economy in the long term.

"Today we've seen preliminary government data for the year to June 2020 that indicates emissions have dropped because of the coronavirus," Climate Council Head of Research Dr Martin Rice said.

"Lowering our emissions is critical to keeping Australians safe, but it must be done in a way that is sustainable.

"Unfortunately this drop is temporary and built upon the suffering of Australians and the economy. To reduce our emissions in the long term, we need credible climate policy and clean jobs," Dr Rice said.

Climate Council Senior Researcher Tim Baxter said the latest government data indicated a record rollout of renewable energy that has reduced emissions in the electricity sector.

"However, emissions linked to Australia's growing liquefied natural gas (LNG) exports have cancelled out that positive progress," Baxter said.

"Gas is a fossil fuel, driving climate change, and right now Australia is the largest exporter of LNG in the world.

"What is deeply concerning is that the methane emissions from Australia's gas industry are not being fully accounted for," he said.

"Recent re-evaluations of the climate impact of methane have found that it is even more damaging to the stability of the climate than previously thought."

Examples of clean jobs include:

- installing utility-scale renewable energy, including solar and wind farms, transmission infrastructure and utility-scale batteries
- targeted ecosystem restoration
- public and active transport construction
- projects relating to organic waste, energy efficiency in buildings, urban green spaces, community-scale storage and more.

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AI RECYCLING SORTING TECHNOLOGY

Redwave Mate from Austrian company Redwave is an artificial intelligence system designed to monitor and optimise recycling plants.

The system measures quality and records and analyses information during production, with collected data used to ensure optimal plant and sorting operation. Artificial intelligence is designed to increase plant availability and sorting efficiency, as well as maximise yield and purity.

Communication between the sorting machines takes place in real time and monitoring across platforms makes the flow of information manageable.

Based on Redwave 2i technology presented in 2018, the system links different types of sensors, with predictive parameterisation and further steps towards artificial intelligence.

The system is designed to optimise plant and sorting operation; improve and optimise sorting rate and final output quality; increase plant availability and sorting efficiency; monitor material flows across platforms; compare individual machine data and recommending parameterisation; produce immediately available data; be available on all commonly available mobile devices; export and process data.

REDWAVE
www.redwave.com

ENERGY MANAGEMENT DEVICES

ABB's System pro M compact InSite connected devices provide a scalable cloud-integrated solution to optimise and manage energy consumption.

Designed for commercial and industrial buildings, the range can be installed as a standalone solution or integrated into any IT infrastructure, to help users achieve a high standard of energy efficiency compliance and save up to 20% on energy bills.

The preassembled kits are designed to make sub and final electrical distribution smarter with minimal effort. Once installed, system diagnostics and real-time notifications track electrical system performance. Actions can also be programmed on the web user interface, which automatically reacts to the system conditions without the need for manual intervention.

The solution delivers high data security standards and regular firmware updates. Central to the range is the SCU100 control unit, which allows users to better manage energy in subdistribution panel boards. The unit can gather data from up to 16 energy and power meters, as well current sensors for branch measurement.

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The Mammuthus or MTS series of high-performance enterprise Ethernet switches from Hirschmann IT offers an intelligent and secure IT/OT converged solution for a range of networks across many industries to help maximise performance.

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Sustainable hydrogen insights

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Could wastewater play a key role in accelerating Australia's hydrogen industry?

Global technical professional services firm Jacobs has partnered with Yarra Valley Water to investigate the potential of an Australian hydrogen industry supported by co-located hydrogen production at wastewater treatment plants. With findings presented in the thought-leadership paper 'Toward a Zero Carbon Future', the study examines commercial barriers to sustainable hydrogen and looks to finding innovative solutions to take the country down the path of decarbonisation.

Hydrogen has potential to play an important role in Australia's drive towards a decarbonised, sustainable future, but cost remains a major barrier to adoption.

Building on suggestions made in 2019's original thought leadership paper, the latest paper uses Yarra Valley Water's Aurora wastewater treatment plant as a case study to explore the relationship between outputs from electrolysis — hydrogen and pure oxygen.

Specifically, the analysis explores whether using oxygen in wastewater treatment processes could create enough savings for the wastewater treatment plant to effectively subsidise the cost of hydrogen and increase its commercial viability.

Based on the case study results, the paper recommends considering a transition to oxygen-based treatments alongside an assessment of whether an on-site hydrogen facility would be commercially viable. Feasibility studies on the technical and commercial viability of co-locating hydrogen facilities at a range of wastewater treatment plants will be an important next step.

"Together with Yarra Valley Water, our paper starts a conversation about a possible future role for water utilities in Australia's hydrogen industry that supports both decarbonisation and the commercial readiness of this emerging industry," Jacobs Senior Vice President of Global Operations Patrick Hill said.

The findings from the case study indicate that implementing treatment technology that allows for the efficient use of pure oxygen at the Aurora wastewater treatment plant could deliver net capital and operating cost savings to Yarra Valley Water compared with other treatment options tested. At the same time, the guaranteed demand for oxygen at Aurora was instrumental in enabling the co-located hydrogen facility to be commercially viable while selling hydrogen within a competitive price range of AU$2–6/kg.

Importantly, this result was achieved for 'sustainable hydrogen' — produced using recycled water and renewable energy — highlighting the opportunity for decarbonisation without compromising the nation's drinking water resources.

"Embracing renewable energy is a significant focus for our business," Yarra Valley Water Managing Director Pat McCafferty said.

"It's been fantastic to partner with Jacobs to explore how the water sector could play a bigger role in developing an effective and commercially viable hydrogen industry in Australia."

Although specific to the unique circumstances of the Aurora wastewater treatment plant, the conservative nature of the analysis suggests the findings are promising and point towards a pivotal role for water utilities in accelerating the development of Australia's hydrogen industry.

The implications for the water industry and the Australian Government's hydrogen strategy present an exciting opportunity to enable more rapid decarbonisation of the world's most emissions-intensive industries.

Jacobs
www.jacobs.com

Victoria tackles pandemic-driven clinical waste surge

Coronavirus outbreaks in some of Victoria's aged-care facilities have led to a hundredfold increase in clinical waste production. In response, the Victorian Aged Care Response Centre has rapidly coordinated a cross-government effort to manage the situation.

The Response Centre has acted quickly to find a solution, working with private industry, the Victorian Government and regulators to secure storage containers, rubbish collection, incinerators and safe disposal and processing of the waste.

Victorian Aged Care Response Centre Executive Officer Joe Buffone said the waste increase at affected facilities was due to personal protective equipment requirements for staff and increased measures to strengthen infection control.

"As well as dealing with the devastating impact of having coronavirus in their facility, these centres are faced with ever-increasing amounts of waste," he said.

"Many of these centres usually generate enough medical waste to fill one 240-litre wheelie bin per week. Those with active cases of coronavirus are now filling as many as 12 240-litre bins per day, or 84 bins per week."

Buffone said government agencies had worked to streamline the permit process for collecting and safely disposing of the waste. The federal government is funding additional waste collection services and waste management coordination.

He explained that the measures being taken were designed to provide extra capacity and streamline permits while maintaining Victoria's high standards for clinical waste disposal.

"Clinical waste is a prescribed industrial waste under EPA Regulations and must be transported by a permitted vehicle and disposed of at licensed premises," he said.

"EPA guidelines have been distributed to every aged-care facility in Victoria, clearly defining what is clinical waste and how to safely dispose of it.

"Waste collection companies have significantly increased the number of trucks to cope with the demand and have been key partners in developing the solution."

How water stewardship benefits businesses by reducing water risks

At a time when many businesses find themselves operating in water-stressed environments facing long-term reductions in water supply, or in an increasingly stringent compliance setting, it's important to understand how the local water system works and to identify the specific risks and values in your water catchment.

AWS Standard Criteria	Potential business benefits
Gather information to define the site's physical scope	While most businesses have physical site information, adding local catchment information is useful as it highlights the site's reliance and impacts on the catchment, knowledge gaps and assumptions that could be a risk.
Understand relevant stakeholders, their water-related challenges and the site's ability to influence beyond its boundaries	This can be one of the most useful exercises under the AWS framework. Stakeholder mapping can identify previously unrecognised collaborations with otherwise unconnected groups or individuals.
Gather water-related data for the site, including a water balance and any nearby significant water environments such as marine conservation areas or wetlands	Improving the understanding of the true cost of water and water-related services adds value to any organisation. Recognising important water environments close to the site can be a catalyst for collaboration to improve the sustainability of water in the catchment.
Gather data on the site's indirect water use	The value this provides is significant as it will identify where in the supply chain and production process water is consumed or impacted and where risk or opportunity might reside.
Gather water-related data for the catchment including water balance, water quality and infrastructure	This information helps to identify important issues within the catchment, highlighting strengths and weakness.
Identify shared future water challenges in the catchment	Many challenges will be shared with stakeholders; for example, maintaining adequate water supplies for industry and the community or preventing pollution of a natural waterway highly valued for recreation or ecological biodiversity.
Assess and prioritise the site's water risks and opportunities	Identifying options to manage risks and realise opportunities provides significant value.
Understand and define best practice in sustainable water management	Best practice and benchmarking can help identify a roadmap of continuous improvement at site and broader catchment levels.

Water is essential for the development and maintenance of successful economies and for preserving human health. Ensuring the ongoing availability of water as an essential resource means that water must be used responsibly and sustainably. Water is a renewable resource, circulating on the planet for many millions of years, but it becomes lost from the water cycle if it is polluted or extracted more quickly than it is replenished. Increasing pressure from population growth, economic activity, demand for food, rising living standards and climate change are affecting both the available quantity and quality of fresh water. Significant impacts of water scarcity are already evident around the world, affecting both the natural environment and vulnerable communities and industries.

The water catchment (or river basin) is a key component of the local water system, where water supply is obtained and wastewater discharged; however, the hydraulics of each catchment area vary considerably. Climate, population density, the level of agricultural or industrial development, and the types of governance and regulations will all significantly influence the issues and risks a business faces at specific locations. 'Catchment A' may experience water shortages due to prolonged drought or over extraction, whereas 'Catchment B' may suffer from frequent flash flooding, pollution and poor water infrastructure. Interbasin transfers and multiple water sources can add to the complexity.

Putting the principles of good water stewardship into action can help ensure water use for human and economic purposes is sustainable and doesn't deplete freshwater resources or cause harm to the natural environment.

Using water stewardship as a foundation principle is different to other water management approaches because it takes the catchment context into account, making it applicable to any size business in any location, using any type of water source, including utility supplied.

To assist in applying this approach to industry, international organisation Alliance

for Water Stewardship has developed an ISO equivalent standard focused on sustainable water management. One of the lowest cost, highest value exercises for organisations dependent upon water resources is to use the first step of the standard to improve understanding of the water risks present in the local catchment and to identify potential opportunities for improving the security and sustainability of their water supply.

The eight criteria components in this first step necessitate the gathering of data on water use to understand impacts on the catchment and to identify the shared water catchment values and challenges. Such an analysis provides a good indication of how sustainable an operation currently is and what actions could be taken to reduce risks or take advantage of opportunities to improve water security, reduce costs, increase efficiency or improve water governance. The following example outlines some of the potential benefits of such an approach:

Using a water stewardship approach can help identify a pathway to longer term business sustainability. This means improving security of supply, identifying solutions to continuously improve, staying ahead of the compliance curve, or in the direst of circumstances identifying relocation options to ensure long-term business viability. Cress Consulting can help you undertake this assessment, putting you in a more powerful position to determine the next step in securing the future water supply for your operation or business.

Cress Consulting is a provider of sustainability services and an experienced water stewardship credentialed specialist offering consulting, training and auditing services.

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The future of transportation post-COVID-19

Jason Grandin, Regional Data Analytics and Consulting Lead at Arcadis

Transport isn't a sector that tends to stand still, but during the COVID-19 outbreak it has been undergoing change at a more rapid pace than ever before. So is this change temporary, or does it hint at a deeper, more long-term shift?

Due to the requirements of social distancing and its person-dense nature, there's a clear hesitation for people to use public transport. People are instead looking at other modes of transport. Active transit is seeing a massive rise — even to the casual observer, bike stores and cycleways have never been busier. It's interesting seeing that shift, and I'm intrigued to see whether it's a long-term one or not.

But beyond people taking the opportunity to be active, we're also seeing a shift in the way we work. Organisations have been forced to adopt remote working practices, and many have been able to do that very effectively.

It begs the question: what does the workplace of the future look like? Why would any CFO or company be looking to spend big on office space when they can have people working just as effectively from their homes? We're going to see less centralised workplaces, which means there simply aren't going to be as many people utilising public transport infrastructure post-COVID-19.

Changing the 'modal hierarchy'

In my opinion, COVID-19 has simply brought forward the inevitable.

A lot of cities see the benefit in active transit. They have each defined their modal hierarchy, which essentially ranks transport options from most desirable to least desirable. Most cities want people walking as much as possible. If they can't walk, a city would prefer them to cycle. Where cycling is impossible, take the train. Train to bus, bus to taxi, taxi to car. This hierarchy makes the roads less busy, the air cleaner and the citizens healthier.

To push this hierarchy, cities must build necessary infrastructure such as cycle paths. The crisis is accelerating a change in behaviours, which in turn is accelerating the infrastructure development timeline. But it's not all down to COVID-19: I also think people are more health-conscious now than they have been, which is playing its part.

The critical role of data

With our world changing at such a rapid pace, staying abreast of new trends and the direction we're headed in is crucial to delivering transportation solutions that are fit for purpose.

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This is where data comes into play.

We now have more data available than ever before, which gives cities an opportunity to accelerate their strategies by collecting the right information, managing it effectively and drawing smart insights to make data-backed decisions. Data is any decision-maker's most valuable asset, and it must be managed as such.

Through Bluetooth and IoT, for example, we're now able to collect an incredible amount of transport data. If we know how people move, we can work out where infrastructure should be built to instigate behavioural change, and eventually optimise people's journeys.

To better understand how data and technology are shaping transport, let's take a look at a real-world example:

Trading cars for bikes in LA

Los Angeles is an incredibly car-centric city. No walking, no riding; the only way people travel is by car, making it so congested it's not funny. LA has ambitions to become more cycling-centric, which begins by simply giving people the option to ride.

We're looking at where all the cycling infrastructure is, collecting data on where current cycleways are, where more could potentially be and the sort of people that typically ride bikes. The last point is the most interesting: What demographics and socio-economic class denote an LA cyclist? Where do these people live and where do they need to get to? Who exactly are we building this infrastructure for?

We then overlay the human data on the infrastructure data and fill in the gaps. If there's a whole bunch of students in this suburb with no way to ride to their university in that suburb, the theory is that if we build the infrastructure — cycleways or whatever it may be — people will ride because they can.

I feel our work is going to have a big and positive impact on LA, and it's excited to be able to offer a solution to such a big problem.

How Arcadis is shaping the future of transport

Designing and engineering major infrastructure projects is Arcadis's bread and butter. We've made major investments in data analytics and have developed deep digital transformation expertise. This is all to say that Arcadis looks at things differently and is able to deliver modern infrastructure projects and services that drive better strategic outcomes for those who own and operate the transport.

How do you see your city's transport developing into the future? Do you feel as though active transport will eventually overtake public? Do you imagine a time where you won't need a car?

Arcadis Pty Ltd

www.arcadis.com

Waste matters in the City of Casey

The City of Casey in Victoria has adopted a technological solution to improve waste collection efficiencies, lower costs and reduce litter across its key public spaces.

The city signed a commercial contract with sustainability technology company Matter to equip bins in public spaces with smart waste sensors. Data collected — including bin volumes, collection times and days, fill levels, estimated CO_2 and bin visits — will initially be used to improve waste collection rosters and routes, and reduce costs.

City of Casey Sustainability and Waste Manager Michael Jansen said the council had used remote sensing technology to achieve efficiencies in environmental monitoring on closed landfills for some time now.

"Casey is excited about partnering with the team at Matter. Their technology will further support our innovative practices and enhance our litter bin service within the community," Jansen said.

"Good-quality data will provide … greater insights into what is happening in the community. This will allow us to plan more efficient collection schedules, respond more effectively and be proactive to ensure delivery of a high-quality and cost-effective service."

Along with councils and businesses across Australia, Matter is on a bold mission to supply all residential homes with their technology and user apps by 2025, enabling councils to offer the incentive schemes required to drive consumer waste reduction within the home.

Matter Managing Director Martin McGinty said the company was thrilled to be selected to roll out the technology across the municipality, signifying a crucial first step in using waste sensing to address the waste crisis.

"The City of Casey is already leading the way in community waste management and we are thrilled to be able to support them to further innovate in this space," McGinty said.

"Our existing projects have shown that not only are there significant efficiencies available with our technology when used in public spaces, but it has clear benefits in terms of reduced traffic, public safety and litter reduction.

"In one case, our data found that up to 80% of bin attendances were unnecessary. This data is only the start of what waste sensing is capable of when you have access to the right technology and user apps," he said.

Matter
www.matter.city

The nitty-gritty on Bondi WWTP's tough pumps

When Sydney Water's Bondi Wastewater Treatment Plant needed repairs to two Gorman-Rupp Grit Pumps, authorised Australian distributor Hydro Innovations was called upon.

The plant has four channel-type grit inlets, each with a Gorman-Rupp 6″ Super T Series pump sitting on a moving bridge above these channels, which 'vacuums' up the grit that sinks to the bottom of the channels.

The Bondi plant has been using Gorman-Rupp pumps in this application for more than 30 years. During this time, the pump manufacturer has developed harder materials to cope with abrasive applications like pumping grit and sand. Sydney Water was one of the first organisations to recognise the benefits of these harder components, which result in less downtime and longer intervals between repairs.

Being self-priming, the pumps can be located above the water in a safe and easily accessible position, allowing quick and easy monitoring and repair. Cranes are generally not required to access pumps and inspection covers allow operators to gain access to pump internals without removing the unit from the pipe system.

A patented internal clearance adjustment system also allows one operator to safely adjust clearances in minutes with just two spanners, keeping pumps at peak efficiency for the life of the installation.

With pumps available in sizes from 50 mm (suction and discharge) to 520 mm, flows from just a few litres per second (L/s) to 200 L/s and a variety of materials of construction, the pumps can be tailored to individual applications.

Hydro Innovations
www.hydroinnovations.com.au

Quiet solution for odour suppression at water treatment plant

While Goulburn Mulwaree Council was constructing a new, state-of-the-art water treatment plant, four temporary settling ponds were required. One of these ponds contained materials that were in the early stages of processing. As a result, the pond was producing an invasive odour that was disturbing nearby residents.

Tecpro Australia was contacted for urgent advice and assistance. The Tecpro team suggested the V12s Dust Controller and made some slight modifications to suit the application. Tecpro also suggested a dosing unit to add odour-neutralising chemicals to the dust controller's fine water mist.

One of the reasons for recommending the V12s Dust Controller is its quiet operation. Operating at 60 dBA at a radius of 20 metres, the equipment's sound emission level is equivalent to a normal conversation. As a result, the council was able to offer an effective odour-suppression solution without creating a noise problem — a real challenge in the quiet rural area.

With Tecpro's solution, the council was quickly able to control all odours from the temporary treatment plant without disturbing the tranquillity of the neighbouring properties.

The V12s are set at an operational speed to control spray and water volume to reduce water consumption and keep odour-neutralising chemicals to a minimum, allowing Goulburn Mulwaree Council to operate the odour-neutralising process efficiently and effectively.

V12s Dust Controllers suppress dust on urban demolition and construction sites where dust and noise emissions need to be strictly managed. They are equally suitable for large, industrial sites to prevent the release of foul smells including biogas — often found around treatment or recycling plants and composting sites. In fact, they are so effective, a special V12So odour suppression version was recently launched to satisfy the demand for large-scale odour control and disinfection.

Tecpro Australia

www.tecpro.com.au

Crumb rubber: a legacy investigation

Main Roads WA is working with the Australian Road Research Board (ARRB) and Tyre Stewardship Australia to validate the use of recycling asphalt pavement that contains crumb rubber.

As asphalt is 100% recyclable, contractors are increasingly opting to mill out roads, save the materials and re-use them in new asphalt mixes, which is a material well known as reclaimed asphalt pavement (RAP).

However, one of the major unanswered questions in the industry is: can these mixes containing recycled products then be recycled as RAP when the pavements reach their end of life?

When Zia Rice, Senior Professional Leader at ARRB, sat down to investigate literature on this topic, she found there wasn't much evidence to answer this question so a study project commenced.

"When we make asphalt mixes that contain RAP, if we are at percentages greater than 20% we need to characterise the RAP viscosity so we can tailor the new mix to a target viscosity. So, we did a laboratory investigation to see how the RAP characterisation was affected by the

presence of crumb rubber alongside the practicality testing," Rice explained.

There were not any issues during this stage when claiming, processing, mixing and repaving the RAP. However, when a larger tonnage of the crumb rubber was examined, the team found some issues with build-up during processing that could reduce efficiencies.

"Despite the slight build-up during processing of larger tonnages, we could see this is something that could be easily rectified by industry if they understand that when they are going through high volumes of this mix, they might need to tailor their plans," Rice said.

The laboratory investigation also returned interesting results.

"We found it difficult to characterise the viscosity of a crumb rubber RAP binder due to the presence of the rubber particles. Through our current methods it's hard to get a representative answer so further investigation is needed there," Rice said.

"This could facilitate a new design process for level two and three RAP mixes with high percentages; perhaps we will look at an alternative performance indicator rather than target viscosity."

TSA CEO Lina Goodman was thrilled with the project: "This collaborative project is a great example of how important innovation is in the circular economy. Australia generates the equivalent of 56 million used car tyres every year. Around 30% of those end up in landfill or are stockpiled," Goodman said. "That is why TSA has committed almost $6 million to date to support specific projects and studies, such as this RAP project, aimed at finding innovative and sustainable ways of turning a waste stream into a valuable commodity."

Tyre Stewardship Australia Limited
www.tyrestewardship.org.au

Research enhances aluminium recycling technology

Aluminium recycling has received a boost through new research into the effects of crystallisation.

Researcher Dr Biao Cai from the University of Birmingham's School of Metallurgy and Materials used sophisticated high-speed X-ray imaging to record the formation of microcrystals as alloys cool and solidify under a magnetic field.

A mathematical model was developed by his collaborator, Dr Andrew Kao from the University of Greenwich, to predict whether microcrystals would form and what shape they would have.

The model predicted that that helical 'screw-like' crystals would form under the influence of strong magnetic stirring, and the high-speed X-ray confirmed that this occurred.

Although these elegant crystals are just micrometres wide (10 times smaller than a human hair), they have implications for industrial-scale processes.

"These microscopic crystals ultimately determine the physical properties of the alloy. To be able to adjust their shape, structure and direction of growth will enable us to perfect processes for both manufacturing and recycling of metals and alloys," said Dr Cai.

Dr Cai has already invented a technique to improve aluminium recycling by removing iron. Iron is a detrimental element that can make aluminium brittle and limit its use in premium applications such as aircraft.

Existing methods for removing iron during recycling are either expensive or inefficient, but this simple, inexpensive technique uses magnets and a temperature gradient to remove iron contamination.

The invention has been patented by University of Birmingham Enterprise and supported by the Midlands Innovation Commercialisation of Research Accelerator, which awarded Dr Cai a grant to build a large-scale prototype.

Rocket Composter takes off in Australia

A community farm in Fish Creek, Victoria will divert 200–300 kg of food and green waste from landfill every day using the Rocket Composter from UK waste-to-energy solutions provider Tidy Planet.

Facilitated by Australian distributor Eco Guardians, the global partnership will see the A900 In-Vessel Composter (IVC) shipped over 17,000 km, where it will be installed on the Rail Trail near Buckley Park Community Farm.

Food and green wastes will be collected from surrounding residences before being fed into the Rocket — alongside a dry source of woodchip — to produce a nutrient-rich compost for use in the onsite gardens.

"This is a completely new project for the farm and, as we're a community initiative, it was crucial that the environmental solution we invested in would allow for a completely closed-loop model," farm volunteer Marg Watson said.

"We've been operating for over three years now, and our ethos has always been that a community should be able to grow enough food to feed all those who live in it. With the help of the Rocket, we'll be able to produce high-quality compost for use on our cultivation plots.

"We've been strongly supported by the wider community in bringing this project to fruition, and we're looking forward to what the future holds."

As for green waste, soft environmental weeds from public and private land will be collected by local community groups and dried onsite, to be used as the main source of carbon content.

Tidy Planet Sales Manager Huw Crampton said, "This represents our first ever composting project in Australia and we're really excited about taking our technology to the other side of the world.

"The food waste management debate has been hotting up in Oz for a while — ever since the government launched the National Food Waste Strategy in 2017 — and composting can provide an effective way to reduce landfill and carbon emissions at the same time."

Eco Guardians Pty Ltd
www.ecoguardians.com.au


Multimedia filtration

KOIOS DATALYTIX — NEXT GENERATION WATER MANAGEMENT FROM TRILITY

The next generation in digital water management, supercharging your operations in days, not years.

TRILITY brings cutting-edge operations technology to the water industry, enabling businesses to move in step with customers' expectations. The power lies in generating value from process and assets, not complexity. Bringing data and operational capabilities to life seamlessly with our next generation KOIOS DatalytiX technology.

Our applications have been developed through years of best practice in process engineering, operations technology, water quality and asset management — providing tangible outcomes based on experience.

KOIOS DatalytiX integrates and contextualizes data from existing:

- SCADA
- Water quality systems
- Historians
- IT platforms
- Cloud applications
- External databases;

accurately and efficiently, without the need for complex technology projects.

KOIOS DatalytiX is built by operators for operators.

We believe in bringing data to life.

KOIOS DatalytiX core architecture enables best practice operations and asset management in real-time. We augment and enable operators with single pane of glass viewpoints and predictive analytics — linking operators, leaders and senior managers to the plant floor in unison. KOIOS DatalytiX provides businesses with the total vision required of their entire operations in the rapidly transforming digital economy.

KOIOS DatalytiX includes predictive artificial intelligence (AI) to understand process performance and how it can be improved through simple changes to current practices. Our team understands your challenges and can help you reduce complex data management overhead through KOIOS DatalytiX Expert-as-a-Service in a single unified tool.

The benefits in partnering with KOIOS DatalytiX include:

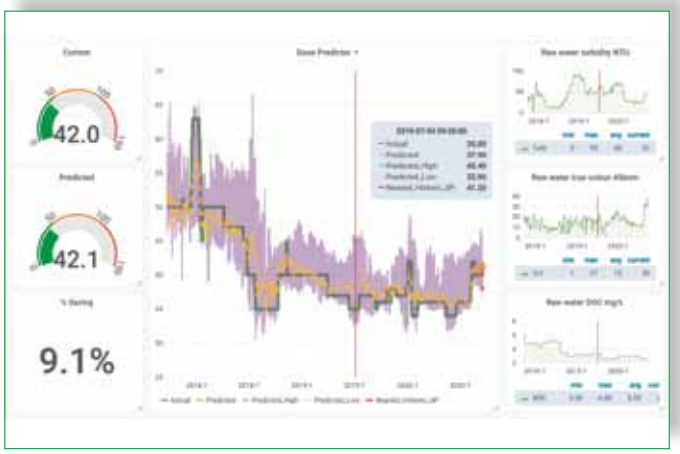
- 5% – 20% reduction in energy for pumping optimisation
- 5% – 10% reduction in chemical coagulant dosing
- Step change capabilities for remote operations management and optimisation
- Increased compliance savings through proactive risk and process management
- Spares always there — through predictive technology, we can optimise site inventory ensuring spare parts are where they are needed
- Plug and Play into the platform through our connector and applications to get off the shelf value in days to weeks with no development required.

Riverland backwash filter

As operators we understand every customer faces unique challenges in their local environment — KOIOS DatalytiX tailors its suite of applications to suit your operations.

Using cutting-edge data management technology, we provide simplicity and return on investment with rapid on-boarding and customer support. Our team of experts provide a suite of pre-configured applications for water, wastewater, network and membrane operations on premises or in the cloud.

KOIOS DatalytiX ensures proactive risk management, with built-in predictive engines to assess performance and operational risks. We assess potential upcoming risks based on real-time and offline parameters, with codified best practices from a long operational lineage available in our digital libraries to empower and support customers.



KOIOS DatalytiX *Real-time integrated dose prediction*

KOIOS DatalytiX *Real-time integrated demand and event prediction*

With KOIOS DatalytiX we're watching 24x7, predicting and assessing, making sure assets are operating efficiently and engaging teams to ensure safe and effective operations.

KOIOS DatalytiX provides a single point to analyse, manage and optimise water operations, with minimal configuration and training required. We provide technical water expertise 24/7 offering operational experience codified into your connected asset. KOIOS DatalytiX replaces the tedious, error-prone process of mining data from multiple, disparate platforms.

KOIOS DatalytiX range of applications can offer value now, supercharging your digital capability in days not years. Our team of experts is ready and available to talk to you about your challenges and opportunities. Contact us today to discuss how KOIOS DatalytiX can bring your data to life.

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www.koiosdatalytix.com

Data-driven path to water security

Water is the critical component of life, underwriting food security and economic productivity. As the United Nations warns, water scarcity affects every continent with more than one in five people impacted by water shortages. Therefore, water utilities have a responsibility to champion innovation to deliver sustainable water services and safeguard water security.

Simon Zander, Water and Wastewater Segment Manager, Schneider Electric

With the recent pandemic added to the equation, water networks are under even higher pressure with increased and variable demand profiles.

To generate the insights needed to drive a sustainable shift, data is being used to uncover potential savings and efficiencies. Being 'data driven' means an organisation is using trusted, quality data to inform decisions. This is not a new concept — it's a concept that has been around for decades.

At a recent industry panel with Karen Davey-Thorpe, DAMA, and Jacek Krutak, Department of Transport for the Queensland Government, we discussed some of these challenges and the potential solutions. One of the core themes was data driven, which is a popular phase now because marketers are using it to sell a range of tools. The truth is that while many tools are more readily available, organisations continue to fail to be data driven because tools on their own can never enable this. The path to becoming data driven is much more complex than that.

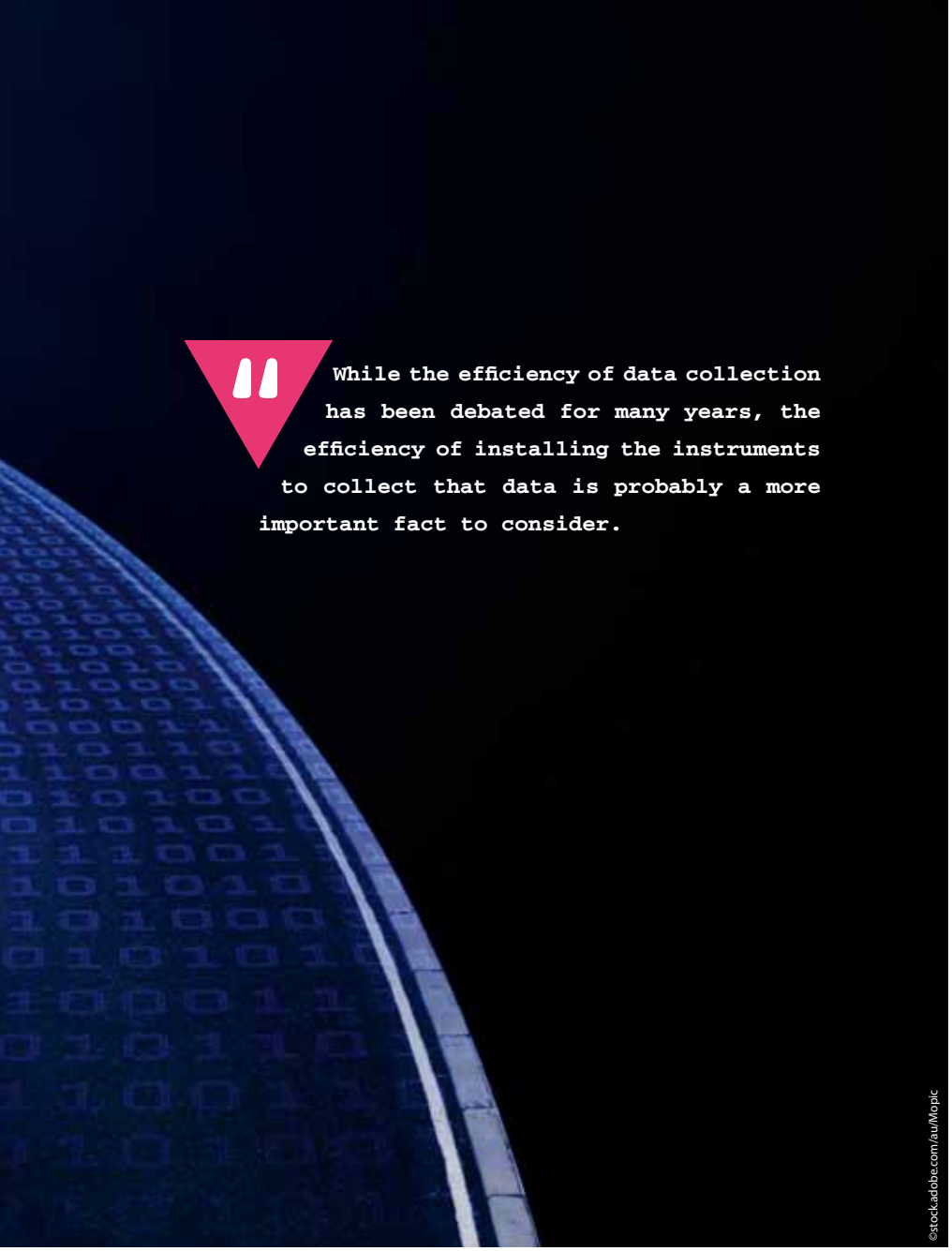
Remote and continuous monitoring of operations can enable digital solutions to provide data-driven preventive adjustments as part of the proactive management of systems.

So it is not the technology holding us back, the real factors preventing businesses from being data driven are predominantly organisational.

In order to have data that is both secure and suitable for supporting optimised performance and informed decision-making, an organisation needs to ensure it recognises the need to have the right skills and capability to support the lifecycle of good data management located throughout their business (vertically and horizontally). That is, it needs to build data management quality and security practices into the organisation so it's the 'norm' or 'the way it's done around here'.

Many global companies plan their data management and systems to take into account the cost of these over time. These companies budget for people, processes (training) and platforms over the whole lifecycle of their needs. For many companies, this is in perpetuity; however they use the life of the software system as the planning horizon. On the other hand some organisations fail to plan adequately. If only the capital costs of the platforms have been budgeted and the management of the systems (people and processes) are not taken into account, companies are less successful in achieving their efficiency goals.

We know our water utilities need to be more efficient. Many still have very manual processes and a basic level of data manage-



> **While the efficiency of data collection has been debated for many years, the efficiency of installing the instruments to collect that data is probably a more important fact to consider.**

ment and security practices and capabilities. There is a significant opportunity for the industry as a whole to leapfrog other industries. Utilities with an outwards focus will do this by learning from the experience of others within and outside the industry across areas such as data definition and design, tool selection and cybersecurity.

However, they also run the risk of repeating the mistakes of the past. By trying to purchase tools that retrofit into the existing process they run the risk of using technology to remain trapped in the past. Secondly, many companies that embrace data-led approaches overstep in the collection of data. It is often viewed as more is better so companies over-collect from customers, leading to a breakdown in trust.

While the efficiency of data collection has been debated for many years, the efficiency of installing the instruments to collect that data is probably a more important fact to consider. For example, the Water Corporation of Western Australia is the largest water authority in the world by area served. They have invested heavily in remote monitoring systems due to their broad area of operation.

So when a new asset is brought online, the actual act of installing the monitoring equipment can be expensive, due to travel times needed for highly qualified resources. In this case, monitoring more signals than usual can be used to reduce the need for costly site visits. The first wave of monitoring in the water industry was purely for operational needs; however, the next wave of monitoring will be for asset management benefits as well. Schneider Electric can offer many different connected products, that is, typical electrical products that can be connected to the internet, which can provide an indication of the assets' health.

By connecting these products to apps and analytics that are hosted in a cloud computing system, asset performance information can be gathered. Many water utilities are geographically spread out, such as the Water Corporation of Western Australia, or are in highly congested areas, such as Sydney, where travelling across the city can take hours. Having access to this asset performance data saves unproductive human visits to the assets. The assets can be managed centrally, so that human visits are programmed when absolutely required.

It's disappointing to see organisations repeating the mistakes of others. They always think they can do it fast or cheaper, but history shows that's not true.

You can't really 'digitally transform' if you don't know what your desired end state in terms of customer outcomes is. Designing an organisation around that outcome which is data driven will allow you to exploit the value of the various digital technologies.

Lastly, cybersecurity is a board-level concern and risk to manage, so it needs to be considered as a critical part of not only transformational activities, but also BAU. Unfortunately, cybersecurity is often undervalued or overlooked as a key foundational block.

Scalable, smart solutions can meet customer needs using modular systems to select the functions they need to tackle the problems they are facing, whilst being scalable to meet the changing needs over time.

By using the data available, we can build water infrastructure that is more sustainable and efficient than ever before. This is a challenge that all the companies that support the water industry globally are tackling together.

Note: This article is based on a panel discussion by myself, Karen Davey-Thorpe and Jacek Krutak.

Schneider Electric

www.schneider-electric.com

Lendlease saves water with smart metering

Lendlease has implemented a smart water metering program in its retirement villages, saving the equivalent of over 17 Olympic-sized pools of water since 2017.

According to the United Nations Environment Programme, buildings are responsible for 12% of the world's freshwater use.

Determined to improve water conservation and cost savings, Lendlease started a smart water metering program with WaterGroup.

WaterGroup's smart watering solution was rolled out across the retirement living portfolio, saving over $180,000 in water use.

As of April 2020, 41 out of 72 of Lendlease's retirement villages had a smart water metering solution comprised of a smart water logger and a desktop portal to view the water data collected.

To ensure Lendlease Retirement village managers were set up to succeed, WaterGroup provided a six-month AWARE (active water analysis, risk and efficiency) management service. The AWARE service included an experienced team who proactively monitored and analysed data, helping village managers make the most of their smart metering systems.

In WaterGroup's 2019 AWARE report to Lendlease, a reported $124,000 water savings was achieved.

Since 2017 the entire portfolio has saved 3.26% in water use — equivalent to 17 Olympic-sized pools — reducing residents' outgoings by over $180,000 in water bills across the portfolio.

Data automation: water logger and Dee Why Gardens

Dee Why Gardens Village installed a water logger in 2019 and is one of many smart metering success stories across the Lendlease retirement village portfolio.

In March 2020 WaterGroup's smart logger alerted the village management team of two significant leaks that were occurring in pipes deep in the ground that would have otherwise been very challenging to identify.

Thanks to the water logger alert and the village management team's swift response, the location of the leak was found and repaired. This leak was estimated to have cost the village over $2500 a month. The insight and quick response avoided serious cost and potential safety and damage issues, had this underground leak gone on for a prolonged period.

Tim James, Village Manager of Dee Why, received the leak alerts. He asked staff to look out for damp residues around the grounds and buildings — however, nothing was immediately obvious.

"I noticed the leak alerts continuing and water use increasing. Without being able to observe the issue, I knew we needed to call in the experts for an assessment," he said.

Lendlease engaged WaterGroup's leak detection team, and within four hours WaterGroup had tracked the exact location of the leak, using its high-tech acoustic leak detection equipment.

WaterGroup discovered a cracked pipe under seemingly dry concrete slabs on one of the Village outdoor paths. James shared this information with their local plumber, who was easily able to dig underground, find the leak and successfully repair the pipe. What could have been a serious, costly and long-term issue was identified, found and rectified within five weeks.

The importance of saving water

Across its Retirement Living villages Lendlease believes that saving water is both the right thing to do, as well as the smart thing to do in terms of reducing cost and supporting a lower cost of living for its most valued stakeholder — its residents.

It continues to pursue water savings through investigating rainwater harvesting and re-use, retrofitting water efficient fittings and fixtures, water-sensitive design, real-time water monitoring and the latest technologies available for leak detection.

WaterGroup Pty Ltd
www.watergroup.com.au

AUSTRALASIAN
Waste & Recycling Expo

ONLINE EVENT
25-26 NOV 2020

Interact and engage with the waste, recycling and resource recovery sector this November with the AWRE online event.

No matter where you are in the world, connect and re-establish ties with the industry through a two-day digital experience, full of thought leadership presentations, keynote sessions and product launches.

Committed to bringing the waste and recycling industry a platform to grow and do business safely, the AWRE 2020 online event will offer the opportunity for you to connect while staying apart as we all navigate a changing world.

FIND OUT MORE

AWRE.COM.AU

OIL-FREE COMPRESSION BLOWERS

Kaeser Compressors has expanded its range of EBS series rotary screw blowers with the launch of the EBS 410 models, specially designed for water industry applications. With a flow rate of 10–40 m³/min and pressure differentials from 0.3 to 1.1 bar, as well as a selection of motors ranging from 22 to 75 kW, the EBS 410 series rotary screw blower models provide energy efficiency, space-saving design and automation.

The standard 'STC' version is now equipped with an energy-saving IE4 super premium efficiency motor that reduces energy consumption. The 'SFC – Sigma Frequency Control' version is equipped with a frequency converter and a synchronous reluctance motor — a slip-free design that combines the advantages of high-efficiency permanent-magnet motors with those of robust asynchronous motors. Variable speed control enables the flow rate to be adjusted as required, achieving a control range of 1:4, which allows dynamic operation and efficiency.

The new models come in two sizes — up to 37 kW and 75 kW, and can be installed side by side, for space saving and ease of maintenance. The series is delivered ready for connection, including controller and frequency converter, or star-delta starter. All units are also CE and EMC certified.

Kaeser Compressors Australia
au.kaeser.com

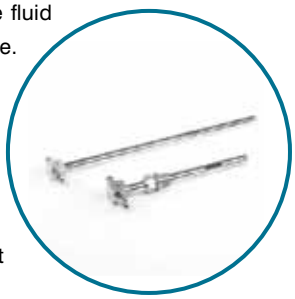
PITOT TUBE

The McMenon Averaging Pitot Tube (MAPT) is a multiport self-averaging flow meter with a design based on the classical pitot tube concept of fluid flow measurement, designed for installation in a large variety of industries worldwide. The MAPT produces an averaged differential pressure (DP) signal proportional to the square of the flow rate.

The outer impact tube has a number of pressure-sensing holes facing upstream which are positioned at equal annular points in accordance with a log-linear distribution.

The 'total pressures' developed at each upstream hole by sum of the impact of the flowing medium and the static pressure are firstly averaged within the outer impact tube and then to a second order (and more accurately) averaged within the internal averaging tube. This pressure is represented at the head as the high pressure component of the DP output. The low pressure component is generated from a single sensing hole located on the downstream side of the outer impact tube, measuring static pressure.

For bidirectional flow measurement, the MAPT can be supplied with the same number of downstream ports as upstream. The MAPT is an improvement on the round sensor design due to the unique profiled flats, which are positioned around the downstream hole in order to define the separation point at which the flow lines separate as the fluid passes around the outer impact tube. This feature creates a stable pressure area at the downstream pressure sensing hole thereby maintaining a more constant flow coefficient at high velocities enabling a very wide range of flow measurement (turndown).



AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

BI-DIRECTIONAL ELECTRIC VEHICLE CHARGER

The Highbury DC Bi-Directional charger is claimed to be the world's slimmest bi-directional DC charger and will enable electric vehicle owners to sell excess power to the grid directly from their vehicle's battery.

Intended for garages or car ports, the 7 kW DC charger's slim design ensures it can fit into tight spaces and be mounted easily to walls. Dimensions (without cables) of the product are 123 x 350 x 820 mm (D x W x H).

Designed for CHAdeMO or CCS-compliant vehicles, the bi-directional capability allows the product to funnel excess power from the batteries of vehicle-to-grid (V2G)-enabled electric vehicles, such as the Nissan Leaf, back to the grid, helping owners shave money of their electricity bills.

The Highbury DC Bi-directional Charger is available from Rectifier Technologies.

Rectifier Technologies Pacific
www.rtp.com.au

Bright Thinkers Power Station goes live in Sydney's West

The 1.7 megawatt Bright Thinkers Power Station (BTPS) at Goodman's Oakdale Industrial Estate in Horsley Park

Image courtesy of Epho Commercial Solar Energy.

An urban solar station on the rooftop of DHL Supply Chain's (DHL's) new warehouse in Sydney's West has the ability to direct solar energy either partially or fully to the consumer onsite, or directly trade the energy on the National Electricity Market (NEM).

Developed by Epho Commercial Solar and partially funded by the Australian Renewable Energy Association (ARENA), 'Bright Thinkers Power Station' (BTPS) technology will power the 1.7 MW solar PV system — installed on the roof of the 31,457 m^2 Horsley Park warehouse.

"We installed the Epho system for guaranteed green energy," DHL Supply Chain Australia & New Zealand CEO Saul Resnick said.

"This warehouse, purpose-built for the healthcare industry, has complex energy requirements and this system allows for flexibility. We are committed to our Group's GoGreen goal to achieve net-zero logistics-related emissions by 2050. Solutions like this one contribute to that goal and provide the best green outcomes for our customers and the community."

Epho partnered with Siemens to develop the control system, featuring switching technology that segregates electricity through two separate channels. The dynamic switching is enabled by an algorithm based on solar PV output, the electricity wholesale market and tenant demand.

Epho Managing Director Dr Oliver Hartley explained, "Epho developed the BTPS concept to allow large rooftop solar systems to be connected both behind the meter as well as independent, market-registered power stations.

"Epho's innovation allows the entire roof area to be utilised and that the roof can be turned into a market-participating urban power station.

"It was absolutely wonderful to experience how a vague idea scribbled onto a whiteboard over two years ago turned into one of the most exciting new developments in the distributed energy resources sector."

Australia has enormous potential for solar power systems on industrial roofs. Urban power stations near metropolitan areas are set to play a big part in building a low-emission Australian economy.

Epho Head of Business Development Matt Scaddan highlighted, "The question always was how we can unlock this potential and, potentially, Epho's BTPS technology could be the key, because the technology facilitates a low-risk win/win/win situation between the customer, the landlord and the solar asset developer."

Epho Pty Ltd
www.epho.com.au

Green energy solution for Greenham

Simons Green Energy conducted a feasibility study to assess the suitability of HW Greenham & Sons installing a mixed-fuel cogeneration system at their meat processing site in Tongala, Victoria. The system needed to offer significant environmental benefits and make sound financial sense.

Subsequently awarded the project, Simons provided the client with an end-to-end solution from initial design to project completion.

Simons partnered with Siemens to provide the two cogeneration units that are installed on site, operating 24 hours a day, five days a week. The cogeneration and biogas system is fully automated with remote monitoring by a custom-designed PLC and SCADA control system, which monitors site conditions including both cogeneration units, pumps, pressures and temperatures of all relevant systems, including biogas CAL pressures and flare.

Two SGE-42HM 1000 kW Siemens cogeneration units deliver power and heat to the abattoir, with a combined maximum electrical output of 2000 kW and 1900 kW of heat. SGE covered three of the existing anaerobic lagoons to capture the methane that was naturally being generated in the ponds. The treated

biogas and natural gas power the engines, creating electricity and heat.

The two electrically led generators service the base electrical load for the site, varying their output in order to match the grid requirements of the facility. The waste heat produced by the engine is used to heat water from 85 to 95˚C, which is then used to preheat washdown and process water via a series of plate heat exchangers. This preheated water reduces the thermal load on the hot water heaters.

Blending fuels ensures the generation of power and heat supply and allows the facility to operate at a higher output than on biogas alone, with a lower cost per watt than a straight biogas system. Diluting the biogas with natural gas effectively reduces the sulfur level of the operation.

The system is predicted to reduce emissions, electricity and heat generation, and waste management by approximately 14,000 tonnes per year of CO_2e, with the system set to pay itself back in approximately 3.5 years.

Simons Green Energy
www.simonsgreenenergy.com.au

Monash develops resource recovery process for spent plastics

A team of researchers at Monash University is working on a process to turn end-of-life plastics and tyres into useful resources.

End-of-life plastics and tyres present a global problem, with at least 14 different types of fossil fuel-derived plastics, as well as bioplastics, in use worldwide. Although hard waste plastics can be recycled several times to make a product of some sort, they cannot be recycled into a solid product indefinitely. Soft plastics, which have accumulated globally over several decades, also pose a significant problem.

The processing rig generates oil continuously.

Image courtesy of Monash University.

To address this challenge, chemical engineering researchers at Monash University looked to develop a polymer-agnostic treatment process to convert solid wastes to liquid fuels and gases, recovering monomers to convert them back into polymers or plastics following circular economy principles or generating hydrogen from the waste streams.

Led by Professor Sankar Bhattacharya, Drs Mahmud Kibria, Pramod Sripada and Imtenan Sayeed, and PhD student Umer Chaudhry have improved a catalytic process that can be tweaked to achieve one or the other of these objectives.

The team recently tested some of the oils generated from mixed plastic waste in a diesel engine. By blending the oils with commercial diesel at 40%, the engine experienced smooth start-up and stable engine performance.

AWRE 2020 reimagined

25 - 26 November

Committed to providing an essential platform for the waste, recycling and resource recovery sector to grow, learn and do business safely, AWRE 2020 has been reimagined into a two-day interactive online event, set to run from 25–26 November.

Attendees at this year's Australasian Waste and Recycling Expo online event will be able to explore a range of unique approaches to resource recovery, including innovations in the e-waste and waste-to-energy sectors, and the progression of the industry into a circular economy.

More than just an online event — the program will be an interactive and engaging experience that is easy to navigate. Those that tune in will gain access to hours of content, with two jam-packed days of leadership webinars, keynote sessions and product launches, involving over 20 industry experts and professionals.

Hosted by Mike Ritchie, Managing Director of MRA Consulting, other featured speakers include President of Local Government NSW and Vice President of Australian Local Government Association Cr Linda Scott, Board Chair of Australian Organics Recycling Association Peter Wadewitz, CEO of Australian Packaging Covenant Organisation Brooke Donnelly and President of Australasian Bioplastics Association Rowan Williams.

"We are proud to continue our Major Partnership of AWRE, as we have done over the 10-year history of this important event," said Kathy Giunta, Environment Protection Authority Director Circular Economy Programs.

"In these changing times it is wise to go online and continue to provide the waste and recycling community with an accessible event."

Register free now at awre.com.au.

Certified organic, vegan friendly and sustainable – is this the future for Aussie wines?

Angove Organic is a 134-year-old, multi-generational family wine company based in McLaren Vale, South Australia, home to sustainable winegrowing and world-class wines. The company has a longstanding commitment to certified organic viticulture, once a niche industry that has now entered the mainstream as consumer demand grows for certified organic products in Australia.

Managing Director Richard Angove talks to us about the innovative sustainable farming and production techniques that Angove Organic uses to manage its carbon footprint and focus on sustainability for today and into the future.

What methods have you implemented to create a more sustainable production system?

At Angove Organic we have had a longstanding commitment to Certified Organic viticulture, which means farming in a natural way without relying on conventional agricultural methods that use synthetic fertilisers and sprays. We pair modern technology like the use of drones, robots and aerial imaging from satellites with organic farming practices, which gives our farmers a better understanding of when to tend to their vines. Technology allows us to be more precise with the use of fertiliser, water and other resources, helping us avoid waste and maintain a sustainable approach. We can also time picking of the grapes to absolute precision with the use of technology and our farming insights.


Angove family.

How has modern technology like the use of drones changed the way you farm?

Because organic farming is all about not adding elements that are synthetic, modern technology like drones and aerial imaging work hand in hand with our farming practices and allow a more sophisticated analysis of what the plants need. In the past, farmers would be adding fertiliser and hoping for the best, whereas now we can look at the requirements of our fertilisation plan through aerial imaging and adjust our approach accordingly. By embracing technology from the modern world, our inputs are better placed, better applied and use fewer diesel tractor inputs — all these things allow us to produce a purer product.

What about water use at the vineyard: what sustainable practices have been put in place to conserve water?

Using technology like drones also helps to conserve water because we can take photos of a vineyard patch and work out if there are any water leakages or irrigation issues which can be quickly resolved. You can't see that when you're driving along the road but with drones you can. We have also converted to drip irrigation in all vineyards, which reduces water consumption by 25%. Winery wastewater is also re-used in a woodlot planted to grow native species. This woodlot provides a carbon sink for the winery activities, rehabilitates a salt scald and provides a natural habitat for native wildlife.

Wine can have quite a high carbon footprint; how do you offset your energy consumption?

We use several innovations in our organic viticulture to reduce energy consumption, CO_2 emissions and landfill. These include upgrading irrigation pumps with variable speed drives to reduce power consumption by 25%, installing a 250 kW solar system which covers 50% of power usage, insulating tanks and barrel stores to greatly reduce heat loss and energy use, as well as investing in centrifuge and crossflow filtration technology to clarify wine, which has eliminated over 150 tonnes of landfill waste.

Certified organic viticulture is about more than just creating the perfect vine conditions, we consider our impact on the environment every step of the way. We believe that our certified organic wine is made with the gentlest touch to both produce the best wine and remain sustainable both for today and into the future.

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to industry and business professionals

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