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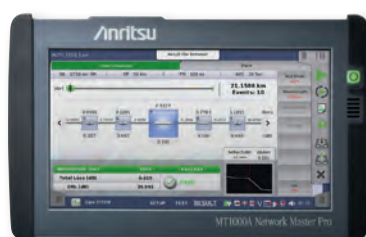
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FROM THE EDITORS

Climate change policy is back in the news, with the Department of the Environment and Energy set to undertake an internal review in early 2017. The review aims to determine how Australia will meet current climate change obligations and it was initially announced that it may include an emissions intensity scheme for electricity generators. The federal government stopped short of calling it a carbon tax, saying that it rejects an economy-wide view and that any policy change will be done on a sector-by-sector basis. Within 24 hours, the stance had changed somewhat, with assurances that such a scheme would not be implemented. We'll know more when the discussion paper is released early in the year.

This is our Insights issue, so we've asked some of the industry's leading lights to give us their view on what 2017 holds when it comes to new technologies gaining traction in Australia, the impact of IoT on your industry sector and business, as well as the challenges being faced through changing client demands. We've also taken a look at where smart cities are headed. Previously disparate systems and ideals — including building automation, smart grids and water-wise principles — are now at the point of convergence, facilitating the shifting mindset needed to realise the hyperconnected built environments of tomorrow.

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FUTURE SMART CITIES

— ARE WE READY?

In most Australian cities, we rarely think about our water supply, power supply or waste disposal — unless something goes wrong. Most of the time we take it for granted that we can switch on a light, turn on the tap and put the rubbish out for collection or flush it away. Our cities are smart, but with growing populations and limited resources they will need to get smarter in order to maintain the lifestyle we have become accustomed to. There is a proliferation of technologies and smart devices currently available to make cities smarter. But when data is not standardised across technologies, one of the challenges for smart cities of the future will be ensuring ease of use and smooth implementation of the latest technology. This may require new business models with integrated infrastructure that can mix and match a variety of technologies into the whole process. Whereas with other technology, such as recycled water, the power of education should not be underestimated.

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Perfect storm for the smart grid

Glenn Johnson

If there was any event that shows us that we are in need of accelerating the development of a smart grid, it was the power outage in South Australia on 28 September 2016. A rare convergence of events left South Australia without electricity, with some remote parts of the state without power for over a week. According to the preliminary report by the Australian Energy Market Operator (AEMO), the majority of the failure seems to have been the loss of three major transmission lines within a few minutes, along with the loss of a significant proportion of wind-generated electricity.

The politics of renewable energy aside, it is easy to see from a map of the SA electricity grid that the storm struck at the heart of the state's electricity generation capacity and the core of its grid network, north of Adelaide. The map also shows that the SA grid is, in general, centralised around its generation stations, with very little redundant, geographically distributed sources or grid interconnection. While it is easy to criticise, it should be remembered that this type of grid structure is a legacy of the 'pre-renewables' era of power distribution, and even if all the power had been non-renewable, such a storm could potentially have still caused almost as much damage.

Traditionally, electricity grid networks have been centralised in structure, with power stations at the heart, near sources of fuel or other requirements (such as water). Energy suppliers had complete control of the flow of energy out from the centre to the end users on the periphery of the grid (disasters aside). Now, in times of increasing demand and increasing use of distributed renewable energy sources (mainly solar and wind generation), the structure and management of the grid is being challenged. Demand and supply fluctuate much more erratically than ever before, presenting challenges for grid operators in maintaining the flow of quality electricity supply.

Modern smart grid automation, along with sufficiently redundant network design, promises to alleviate the current issues and assist in lowering energy use across the grid. There are a number of technology elements that come into play in developing a smart grid, not the least of which is the availability of large data processing capacity in the 'cloud'.

At the end-user points, smart metering provides the ability to monitor and control demand at the point of consumption. Smart meters and smart appliances allow end customers to have more information about their energy use, and greater control, while at the same time providing real-time end-user consumption data to the energy supplier, allowing finer control of supply

to meet demand. For those end customers with their own power generation capacity (typically rooftop solar power), smart metering allows the electricity supplier to understand the distributed generation flow occurring from these privately owned power sources.

Modern automation technologies are also finding their way onto the electricity distribution network. The old days of the centrally controlled SCADA system is giving way to smart substations that themselves monitor critical operational data in real time, such as power factor performance, and circuit breaker and transformer status and performance. The use of internet-based data technologies is now providing the ability to gather and process such data better than ever, making it possible to build smarter distribution networks that are self-healing, self-balancing and self-optimising.

The greater availability of usage and performance data also makes it possible to provide real-time feedback to power generation sources, enabling 'smart generation' that is capable of adjusting production to automatically maintain voltage, frequency and power factor standards based on feedback from the grid.

At the centre of the smart grid are the emerging technologies that make it all possible: the so-called 'big data' analytics and the much-hyped Internet of Things (IoT). The increasing availability and reducing cost of internet- and network-ready sensing technologies is making the collection of electrical data easier and more cost-effective to build into electrical distribution switchboards, final subcircuits and appliances. Internet 'cloud' data services are already available for end users (individuals and organisations) to monitor and control the electrical devices in their premises via the internet, using common tools such as smartphones.

For electricity suppliers, the effective utilisation of ever-growing amounts of sensor data will allow them to monitor and control electricity production and distribution at a much higher level of sophistication. The ad hoc availability of such a large amount of data opens up new opportunities for novel types of analysis, but this of course requires an information infrastructure that is capable of supporting very large data-sets and the ability to apply machine learning algorithms to the data. Patterns in the data can then be used to derive insights about existing and future grid and power generation equipment, load and performance. The resulting models can be incorporated into operational flows so that as device data is received, the models generate projections, forecasts and recommendations for improving the current operational situation, or predicting problems before they occur.



Mental mind shift for sustainable water

Carolyn Jackson

The water industry has an opportunity to do more for sustainable growth and optimising water treatment using technology that is already currently available. Clean water and sanitation with a resilience to a changing climate are all essential elements for sustainable water-wise smart cities of the future.

At the World Water Congress held in October 2016, 17 new principles to create water-wise cities were launched by the International Water Association. Principles for Water-Wise Cities are designed to help city leaders ensure that everyone in their cities has access to safe water and sanitation; that their cities are resilient to floods, droughts and the challenges of growing water scarcity; and that water is integrated in city planning to provide increased livability, efficiencies and a sense of place for urban communities. The 17 principles are grouped into four categories: regenerative water services, water-sensitive urban design, basin-connected cities and water-wise communities.

Xylem Sales & Industry Marketing Director – Oceania Brian Krishna was at the congress and said that Xylem endorses these water-wise cities principles. He said they are driven by three paradigm shifts:

- Limited resources.
- Increasing densification of cities.
- Uncertain future, climate change, etc, underlying the planning of our cities.

The IWA advises in its water-wise principles to:

- use diverse sources of water with treat-

ment that matches the use, applying the 'fit for purpose' water quality approach and Integrated Water Resources Management (IWRM5);

- recover energy from water whether through heat, organic energy or hydraulic energy;
- recycle and recognise the value of 'up-cycled' materials such as nutrients or organic matter.

Because resources are limited, we need to be doing more with less and recycled water could provide a 'fit for purpose' solution. "We need to set our mindset back to re-use," said Krishna.

Xylem recently conducted a statewide survey in California, which was released in March 2016. The severity and impact of the drought remains top of mind among Californians and the survey results revealed:

- 76% of respondents thought recycling water should be used as a long-term solution for managing water supply regardless of whether water shortages continued.

However, back in Australia in 2006, most will remember how the residents of Toowoomba, in Queensland, voted against using recycled water, even though the town was in the middle of the 'Millennium Drought' and facing unprecedented severe drought conditions. It was the 'yuck' factor that was blamed as one of the main reasons for the negative local opposition to the use of recycled water.

Interestingly, Xylem's Californian survey respondent results also revealed:

- 89% were more likely to use recycled water after learning about advanced water treatment processes and understanding how the water is made clean and safe;
- there would be a 10% uptake of recycled

water if it was called purified water. "The importance of education and language should not be overlooked," said Krishna. "It may sound almost too simple, but the [Californian] survey results revealed that just by renaming the recycled water to purified water, a mental mind shift can occur that can achieve better results. Even calling it reclaimed water had a better result [in California], so this is something we need to look at more of locally."

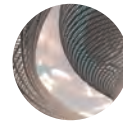
Water and wastewater treatment

One of the actions detailed under the IWA water-wise principles is to look at regenerative water sources for all. Within that, the IWA advice is to "protect the quality of water sources from wastewater and urban run-off so that it is fit for ecosystems and for use with minimal treatment requirements".

"Disinfection is a big area on the radar for the water-wise principles and goals," said Krishna. "Thankfully in Australia, our water treatment principles are quite rigid. But it was only a decade or so ago that the city of New York had a *Cryptosporidium* outbreak. The risk of such an outbreak is only going to get higher if we don't consider using the technologies that are available in the current market."

Krishna said Xylem is at the forefront with its UV disinfection technology and its sustainability principles, and goals for the future include mitigating the use of chemicals and continuing to develop the technology by using different methods to identify new waterborne diseases and improve kill rates of known waterborne diseases.

By 2030, it has been predicted that over 6 billion people will be living in cities, and this will create an urban challenge on a scale that has never been experienced



before. Although hidden away, wastewater management is an essential component to growing, sustainable communities. So, there will be need for energy-efficient wastewater solutions to accommodate this growth.

Xylem's 'Powering the wastewater renaissance' report assessed the wastewater management capacity of three regions (US, Europe and China). It showed that nearly half the electricity emissions related to wastewater management can be abated by installing high-efficiency wastewater technology that exists today.

"Unlocking significant emissions abatement in the wastewater technology sector does not require new technology or an aggressive carbon pricing," said Krishna. "It does require an accelerated adoption and investment in existing high-efficiency technology and that's where we are working closely with existing water authorities."

Intelligence for our buildings

Dannielle Furness

Building automation in both commercial and residential environments is by no means a new concept.

In its infancy, smart home technology focused largely on lifestyle benefits. It was a costly solution grounded firmly in the integration of high-end services including home theatre and security systems. By contrast, application of the same building blocks in commercial projects was aimed at reducing overall energy consumption,

particularly from HVAC and lighting, which are two of the largest energy users.

With increased consumer awareness, the energy savings argument became more prevalent in residential projects, and commercial jobs increasingly incorporated more complex integration with other systems such as building management and access control.

Initially, both applications required expensive dedicated wiring, multiple load control devices, integration tools and peripherals like time clocks, sensors and wall panels. The choice of load controller dictated the types of lighting that could be installed and system changes required a technician to attend the site and be physically connected to the network.

Smart building technology became easier to install, commission, operate and monitor through the introduction of wireless internet, mobile devices and the Internet of Things. Simultaneously, costs eased and automation became more accessible through entry-level, home-based solutions like Google Home and Amazon Echo.

As residential systems simplify, the introduction of building rating schemes and government incentives for commercial development has helped expand the definition of a smart building. Energy use is no longer the sole focus — building managers and owners must now consider additional infrastructure elements, incorporating parking systems, water and waste management, as well as security components such as surveillance, access control and emergency management.

The global push for smart cities will take the concept further still, with a Market-sandMarkets smart building report released August 2016 projecting 34% global growth per annum for the sector over the next five years, up from the current US\$5.73 billion to just under 25 billion by 2021.

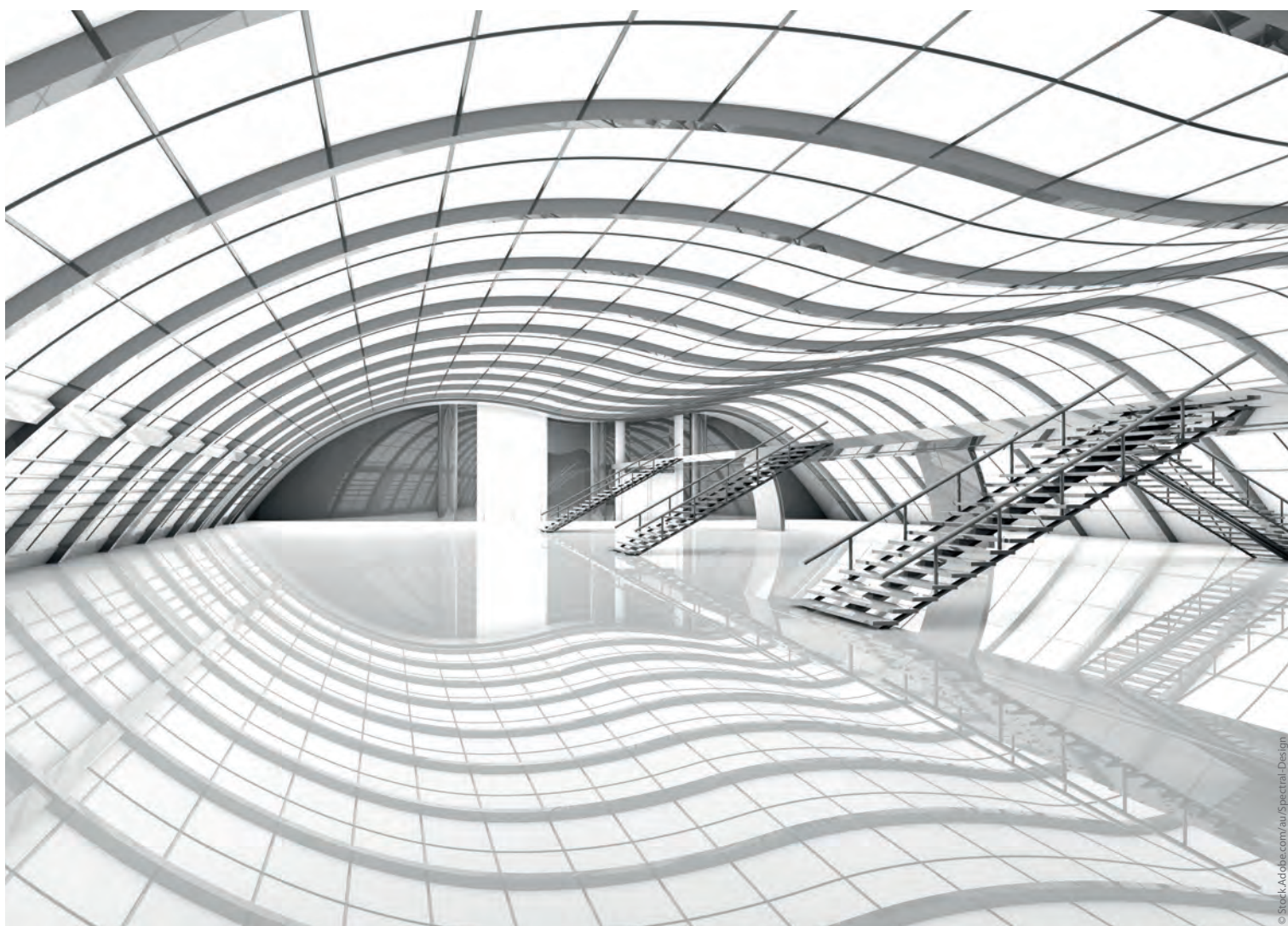
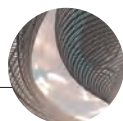
Underpinning the automated building is networked communications management, as total building intelligence depends on the effective and efficient transfer of information between largely disparate systems that utilise discrete, (and often) proprietary communication protocols.

In addition to the increasing complexity and the need for seamless integration between unrelated services, there are still other factors to consider — the wellbeing of the occupants should be paramount. No matter how 'smart' the building, if it doesn't provide an enhanced environment for the people working or living within it, it is failing to deliver. In the face of more elaborate requirements, how will future technology developments be incorporated to produce an outcome that simultaneously serves the needs of building owners, managers and occupants?

Jim Sinopoli, managing principal of design and engineering firm Smart Buildings, recently authored an article for automatedbuildings.com in which he said that the intelligent building of the future will be self-learning.

Sinopoli suggests that much of the technology to achieve self-learning already exists. He uses the ability of some distributed antenna systems (DAS) to form a self-





organising network (SON) as an example. Certain DAS networks can automatically configure and integrate new equipment and optimise the network based on data that the system itself generates. They can also self-heal by identifying faults and failures and carrying out actions to minimise the impact. Finally, they can move cell capacity from one location to another, providing on-demand capacity based on real-time feedback.

In the case of automated buildings, Sinopoli suggests a few kinks will need to be ironed out before the self-learning building can be fully realised.

Granular vs system-wide data. Buildings comprise many spaces, each with its own set of requirements. Granular data provides for more provision in the adequate management of each space, but requires additional equipment such as sensors, as well as tailored controls for individual space. More outlay, but eventual lower operational costs.

Policies and logic. Sinopoli acknowledges that this will be onerous, but development of policy that encompasses every scenario affecting energy use, operations and ten-

ant comfort is required to determine how a building should adapt to change and how to perform. Data is drawn from the building systems itself, as well as system-to-system communication with the utility grid and other external sources including weather or energy markets.

Analytics. The same data used to develop policies will deliver an avenue for trend analysis and relationship inference, much of which already exists — energy consumption and occupancy levels, for example. This will allow building managers to predict how the building will perform in a range of scenarios.

Sensors, sensors and more sensors. Today's buildings meter and report on energy drawn from HVAC, lighting and water use, with less emphasis on plug load, where Sinopoli believes improvement can be made. He believes occupancy measurement will be the key to self-learning, but is difficult to obtain even though there are many solutions already available to capture that data, including infrared sensors and RFID tags. Many existing building subsystems already use that information to perform conditional logic — eg, if an occupant is sensed in an area and it is after

business hours, turn light levels to 10% for 30 seconds — but the self-learning building will develop this logic based on actual use, rather than predefined presumed behaviours.

Proactive vs reactive operations. The final hurdle circles back to policies and requires both attitudinal and behavioural change. Rather than working on a break-fix model, the self-learning capability delivered by truly automated buildings will rely on the establishment of logic sequences, themselves based on a huge number of variables, which must be considered and used to drive policy development.

In terms of pulling it all together, Sinopoli said we will need new skillsets and knowledge, as well as building analytics software that outperforms current offerings, moving beyond fault detection and diagnostics into automatic error correction and predictive maintenance — something he sees as akin to autopilot capability in aircraft. Change, it seems, is inevitable. Given the amount of behavioural adaptation and new technology required, it will be interesting to see exactly how self-learning functionality develops and and over what time frame. ■

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Generating a power solution for Micronesia

Electrical systems manufacturer RJE Global Pty Ltd is building two diesel generators at its headquarters in Adelaide, South Australia, which it will install in the Pacific nation next month.

The company provides tailored electrical services to the global mining and heavy industrial sectors through a range of diesel and renewable energy projects. It specialises in control, grid connection solutions, switchrooms and generator sets. RJE's products are tested and built in Adelaide and installed on-site, eliminating the need for additional trials or construction.

It has designed many bespoke electrical solutions for leading companies such as Rio Tinto and is building a replacement system for the Chuuk State Power Station in Micronesia.

Chuuk is one of Micronesia's four states and is home to more than 50,000 people. The existing generators in the state's capital Weno are coming to the end of their life cycle.

RJE Managing Director Robin Johnson said the two new 1.8 MW diesel generators would increase access to electricity.

"Each product is designed specific for a customer's needs and ready to go once it's built," he said. "We are working closely with the power authorities (at Weno Island) and are building the electrical infrastructure as well as the switchroom to go along with it in Adelaide at the moment.

"It'll be finished in the next few weeks and then will be simple to install once it arrives there."

Johnson said Micronesia's remote location made it difficult to obtain quality electrical systems. The few islands that have generators experience frequent shutdowns and limited hours of service because of the unreliable energy supply.

The Chuuk electricity grid serves about 80% of Weno's population but the new project would increase the power supply reach to 95%.

The project consists of two enclosed GE 12V228 diesel engines to form a 13.8 kV 60 Hz 2 MW generator set. It also includes a



corrosion-proof and fireproof switch room for medium-voltage distribution and control.

The new site will assist with maintaining a reliable power source for Weno as well as the surrounding villages and is projected to be fully operational early next year.

Johnson said RJE's base location, and Southeast Asian offices in Myanmar, Indonesia and Mongolia, made it the ideal electrical solutions facilitator for the Asia-Pacific region.

"In Adelaide we are able to source a lot of good suppliers in the Adelaide region with enormous support," he said. "The only other people that do what we do, to the quality we do, are in the United States, Europe and South Korea. The US and Europe are too far away to service this region and then you have the language barrier with Korea.

"We may be stuck in one corner of the world, but from the operational perspective we deliver unique quality systems — we are the low-risk solution."

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Drying Green Square to allow sustainable urban renewal

Located between Sydney Airport and the city, Green Square is Australia's largest urban renewal project. Until recently the recurring likelihood of major flooding during torrential rain hindered the development, but work is well underway to significantly reduce the flooding risk and pave the way for world-class community facilities and infrastructure for the area.

At the heart of the development is the \$13 billion Green Square project to transform old industrial land into a modern, sustainable hub for more than 61,000 people and 21,000 workers. To address the flooding risk, the City of Sydney and Sydney Water established the DG Alliance with UGL Engineering, Seymour Whyte Constructions, WSP | Parsons Brinckerhoff and RPS Infrastructure Solutions to deliver the Green Square Stormwater Drain Project.

The DG Alliance team formed in early 2015 to develop a solution to the flooding problem that was sustainable, innovative and respectful to the community.

Delivering a project of this scale in a busy urban environment presents significant technical, logistical and community-related challenges, but the alliance delivery method means the wider team has been involved in evaluating the options and determining infrastructure with the greatest benefit and value to the community.

Designing for sustainability

Using a thorough planning process and rigorous modelling, the DG Alliance developed an innovative design and construction solution for a new 2.4 km underground stormwater drain from Link Road, Zetland to the Alexandra Canal. The client's reference design consisted of box culverts installed by trenching. The alliance design used mainly pipes (twin and triple DN1800 RCPs) installed by a combination of open trenching and microtunnelling.

Microtunnelling, which involves using a tunnelling machine to install pipes underground without disturbing the surface, is being used for more than half the drain. Below is a comparison of the impact of microtunnelling versus open trenching.

Sustainability benefits are realised through reducing the use of resources, land disturbance, generation of waste, the quantity of material needed for backfilling and groundwater disposal. The alliance maximises the benefits by tracking energy consumption such as petrol, diesel, oil, gas and renewable and non-renewable energy, generation and recycling of spoil, general waste, concrete waste and drilling mud.



Microtunnel pipe installation inside caisson.

In particular, the alliance is focused on minimising impacts on people and maximising opportunities to improve the amenity of any public areas that may be disturbed during delivery of the project. This includes restoration and landscaping, and installing a shared pedestrian and cycle path between Maddox Street and Alexandra Canal, providing a community facility along a previously unused corridor.

Furthermore, the new stormwater drain will reduce the risk of flooding to enable further residential and commercial redevelopment in Green Square, a place that will combine sustainable infrastructure with community spirit, lifestyle and character.

Item	Microtunnelling	Trench
Spoil volume	10,000 m ³	25,000 m ³
Dewatering rate	40 kL/day	1000 kL/day
Footprint disturbed	7000 m ²	25,000 m ²
Underground utilities diverted or supported	5	86

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DRY CLAW VACUUM PUMP

The design of the Atlas Copco DZS dry claw pump showcases simplicity, robustness, efficiency and good contamination handling capabilities. Designed and built with the demands of the end user in mind, the dry claw pump provides users with a trouble-free solution to meet their needs.

The pump is built to last with materials and coatings that will last the life of the pump. It features easy maintenance, stainless steel claws and long-lasting bearings and seals. There is also a separate and isolated pumping element designed for quick access to the pumping chamber, allowing for easy removal of the claws for cleaning in the event of product carryover.

The unit can be order as a dry vacuum pump or set up as a 2.5 bar lower pressure blower. It is a particularly versatile product.

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The Leveltec Engineering BSH local switching station is available pre-assembled in 316 stainless steel enclosures. It has various mounting methods and installation applications available, from door interlocked switchgear to quick connect 22.5 mm hole mount. It also has metal threaded cable entries for earth continuity and hole allocations on application. Positions for bolted label identifiers make maintenance and correct isolation seamless.

The modular 3D CAD enclosure design lends itself to flexible application and mounting. The multihole mounting tabs allow for installation to a number of struts and structures. Accessories such as pipe clamp kits are available for mounting to structure areas where penetrations are not possible. No drilling on-site means the IP ratings are maintained.

The product features on/off, changeover, undervoltage release and multistep switches from 10–125 A up to 12 poles. Gold flashed contacts arrangements are available to reliably switch extra low voltage control signals under the harshest conditions. Non-standard cam switching circuits are available, as well as a full range of handle options. The product is suitable for single or project applications.

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RUSSELL PALMER

MANAGING DIRECTOR, YOKOGAWA AUSTRALIA & NEW ZEALAND

How should Australian industry respond to global challenges and competition?

Australia should respond to global challenges, including competition, by playing to our strengths. Australia is in the enviable position of having a resilient economy, stable currency and a highly educated workforce that possesses the skill sets required to meet these global challenges and competitors head on. Strong macroeconomic fundamentals should encourage Australian industry to partner and invest in process improvements and innovative solutions to complex problems ensuring we continue to possess a competitive edge.

Yokogawa believes in partnering with clients to co-innovate unique solutions that are relevant and sustainable, and ultimately to help our customers to compete and succeed in what is a highly competitive global market.

What can Australian industry offer that overseas suppliers cannot?

Political stability in Australia is the first thing that comes to mind. Regardless of who is in power in Australia, both major political parties are very closely aligned when it comes to the fundamentals of economic policy and international relations. Doing business in Australia is, and always has been, a very safe proposition. This will continue to benefit us in years to come as the geopolitical landscape becomes more complex and these qualities become more sought after by global capital markets.

Aside from political aspects, Australia is an incredibly innovative country. We punch well above our weight in this regard, which is a credit to our great institutions, many of whom have a long and proud history of partnering with industry to achieve success. Australia has an impressive innovation resume, being responsible for inventing the black box flight recorder, spray-on skin, the electronic pacemaker, Google Maps, penicillin and Wi-Fi technology, to name just a few. We have the runs on the board and should leverage these past successes to promote future investment in industry.

How is the IoT impacting you and your clients?

The Industrial Internet of Things (IIoT), more commonly known as Industry 4.0, is impacting us and our clients in several ways. The demand for IT/OT convergence, which essentially gathers operational data and makes it available to various business units for analysis and optimisation in real time, is driving the need for cyber security to ensure critical information is safe and secure from both internal and external threats.

Yokogawa offer complete plant lifecycle security services whereby our highly skilled security consultants design and maintain maximum security networks, leveraging off our global

partnership with Intel Security (formerly McAfee), a global leader in antivirus protection.

Yokogawa has been one of the leading companies in the industrial automation industry in obtaining GICSP certification for its employees. GICSP or Global Industrial Cyber Security Professionals is a relatively new professional qualification, first introduced in November 2013. This investment in our people reflects our longstanding commitment to bringing our customers safety and asset excellence.

Our commitment to cyber security extends directly to our hardware solutions, ensuring that our customer's infrastructure is secured from the top down and from the bottom up.

Yokogawa ensure that the adverse impacts of cyber threats are detected, minimised and prevented through our investment in people, technology and culture.

Is there a defined job path for fresh graduates within your industry?

I can't speak for the industry as a whole but from Yokogawa's perspective graduates are, and always have been, a great asset to the company and have made many very significant contributions over the years. Just this year two of our past graduates, Joshua Dring and Laurence Harbeck, were an integral part of a team of engineers that were awarded several local and international awards for their work on the Julimar Subsea Project.

It's an exciting time for all employees of Yokogawa Australasia: we are on the cusp of yet another chapter in our evolution and there are countless opportunities for everyone to get involved and contribute to both the company's ongoing success as well as their own.



Russell Palmer is the Managing Director of Yokogawa Australia & New Zealand and has been with Yokogawa Australia for 18 years. Russell has held roles from front-line engineering sales to sales and marketing director — a position he has held for 10 years. Russell's focus is on collaborating with customers to make possible new solutions to the problems faced in industry.

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The NCH logo, featuring the letters "NCH" in white on a blue square background.

Cleaning Water.
Conserving Energy.
Maintaining Equipment.



DAVID WEISS

PRESIDENT AND CEO, NCH AUSTRALIA

What do you see as the biggest challenges that will face your industry in 2017?

One big challenge in Australia is around water — especially in areas where you have droughts, water conservation is most important. Our water treatment program assists companies in Australia with reducing their consumption of water in their heating and air-conditioning systems, through solutions for their cooling towers.

Another big challenge our industry faces is the recent slowdown in the mining and the manufacturing sector, and the overall impact it's had on the economy and business in Australia. This is certainly a challenge as it relates to how companies will continue to maintain their equipment and plants. Businesses begin to look for cost-effective solutions to help them improve their profitability while still maintaining their operating efficiency. We have many products that assist companies, especially in the mining sector, to help reduce their parts, labour and downtime so they can be more competitive in a challenging environment.

What new technologies are you seeing gain traction in Australian industry?

There are a couple of things we see gaining traction in our industry.

Firstly, on the biological side in wastewater, we are the world leader in growing bacteria. The BioAmp system we've developed is able to grow 30 trillion bacteria each day at the customer's site. That is then dosed into their water treatment system, and this bacteria, specially blended, is able to basically eat up or dissolve all the fats, oils and greases. This reduces the biological demand in the wastewater and is able to assist in cleaning up the environment and meet or even exceed strict regulations. The water going back into the municipal systems is much cleaner than before and puts a lower demand on the wastewater treatment plants at municipalities.

In the water treatment business, we recently received a patent for a new product that is able to break up the chemical bridge in biofilm. This is cutting-edge technology never seen before that dissolves biofilm in a cooling tower. Biofilm is one of the biggest problems that can occur inside a cooling tower. It causes a tremendous amount of energy draw, making your cooling system work 40% harder and in turn increasing your energy usage. When you rid the cooling tower of the biofilm, you are able to save that energy, cutting down carbon emissions going into the environment. This technology is the only solution currently available worldwide.

How should Australian industry respond to global challenges and competition?

There is always opportunity even amidst some of the toughest challenges. One of them is the benefit of the weakening Australian dollar in that it can help to fuel industries such as travel and tourism, which is a cornerstone for Australia. Australia is known for exporting high-grade beef and other such products around the world. Focusing on opportunities around our country's core competencies with agriculture, we have developed some new technology that involves putting probiotics into the water system.

In turn, this produces huge economic and environmental benefits for both farmers and the animals they are raising. Another opportunity is the mining sector and the rich mineral deposits here in Australia. Finding ways of becoming more competitive with mining is essential in sustaining the companies in this sector.

What sustainability processes and technology are you planning to implement in 2017?

Our vision statement as a company is to be the world leader in cleaning water, conserving energy and maintaining equipment. Everything NCH invests in across all programs — Wastewater, Water treatment, Maintenance and Lubrication — is geared towards environmental sustainability for our customers. When we set up programs for example in our maintenance specialty, it's around helping maintain our customers' equipment with the objective of reducing downtime and providing safety to workers. In our Wastewater specialty, we focus all our solutions around reducing the amount of pollutants and creating a sustainable environment. In the Lubricants business we have certain products that we add to the diesel to reduce emissions, downtime and parts repair. Sustaining our customers and also sustaining the environment is top of mind at NCH.

What can industry do to support both very young and new workers and those at the end of their careers?

Great question. Within our company we're all about the people in our company and their success. We focus heavily on training first and foremost. The most important thing we can do to equip them is to train and develop them. I have a formula for success — attitude plus skills equals success. I expect new people coming into the workforce to have a great work ethic and attitude, and it's our job to be able to teach them the skills to set them up for success.

For the older, more established workers, they carry an enormous amount of business and industry. Experienced workers can assist with the guidance of our younger workers by teaching them the necessary technical and business skills. The two go hand in hand to help each other out.



David Weiss is President and CEO of NCH Asia, a leading organisation with a greater sense of responsibility for the environment providing superior maintenance products and services that focus on cleaning water, conserving energy and maintaining equipment. With 23 years of establishing and leading high-performance organisations in Asia and the USA, David leads by example and believes this to be a cornerstone to his business philosophy.



ARE WE READY FOR ROBOTOPIA

WHEN ROBOTS REPLACE THE HUMAN WORKFORCE?

*Sean Welsh, University of Canterbury**

Automation has disrupted work for centuries. Two hundred years ago in Britain, the Luddites rose in rebellion, smashing the machines that made their weaving skills obsolete.

Today it's high status cognitive jobs that are under threat. Earlier this year ROSS, a legal version of IBM's Watson, was launched and hailed as the first artificially intelligent lawyer. Future iterations may put lawyers out of work. An artificial intelligence (AI) outperformed an air force colonel in a combat simulation, and a robot outperformed human surgeons in stitching up a pig.

Manual jobs continue to disappear. Truckers, bus drivers and taxi drivers are threatened by self-driving vehicles. The Baxter robot threatens warehouse and labouring jobs while Hadrian X threatens bricklaying.

Payback time on robots is shorter than ever, with 47% of US jobs, 69% of Indian jobs and 77% of Chinese jobs vulnerable to automation. Historically, capitalism has succeeded in generating new jobs to replace the old but past performance is not necessarily a guide to future performance.

While some argue new jobs will be created to replace the jobs lost to automata, many fear economies will be disrupted as never before. Sober professors of computer science and business analysts now routinely predict massive job losses.

If we grant, for the sake of argument, the premise that massive technological unemployment is plausible, how will society cope?

The future is workless

In his newly released book, *Why the Future is Workless*, author Tim Dunlop accepts the demise of jobs as inevitable. Thus, he says, we must rethink our jobs-based economy. Not only that, we have to rethink job-centric human values. Currently our purpose and status in society derive mostly from our paid work. In a world where robots work better, how will humans cope?

It is easy to imagine a dystopian future of increasing wealth inequality, where those with robots live in gated communities and those without live in low-tech badlands. A revolt of colonels leading bot-breaking bricklayers is not unimaginable.

How will society migrate from an economy based on human labour to one based on robot labour, without riots and revolts?

Money for nothing

Dunlop, like many from the left, the right and the tech elite, thinks a universal basic income (UBI) policy is required to handle the transition. UBI is a no-strings-attached, non-means-tested social dividend. All citizens get one to compensate for being shut out of the means of privatised production.

The political philosopher and writer Thomas Paine defended UBI as a moral quid pro quo for private property. In the state of nature, humans can forage for their food from the Earth.



WHILE SOME ARGUE NEW JOBS WILL BE CREATED TO REPLACE THE JOBS LOST TO AUTOMATA, MANY FEAR ECONOMIES WILL BE DISRUPTED AS NEVER BEFORE.

In a privatised world this natural right is thwarted thus an inalienable rent is due by property owners to society sufficient to cover people's basic needs.

UBI could be funded by a land or property tax, a sovereign wealth fund, a tax on automata or a mix of measures. Such fiscal revolution would be a steep political challenge. No major party supported UBI in this June's referendum in Switzerland. Even so, the Yes vote got 23% support. Supporting No, the Swiss government pointed to the moral hazard of making work optional. They also pointed to cost.

Paying UBI at Australia's Newstart Allowance levels (about A\$13,000 p.a.) to all 24 million Australians with no age conditions would cost A\$312 billion. Current Federal tax receipts are A\$383 billion of which A\$158 billion is spent on social security and welfare.

Even assuming UBI replaces all other welfare and social security payments, it requires doubling the social security budget. Eliminating the administrative overhead of means-testing by cutting the 30,000 staff and related expenses in Human and Social Services could only save A\$5 billion. Making UBI less universal by restricting it to Australians of working age would save A\$106 billion, bringing the cost of UBI down to \$A206 billion: still a huge challenge in a climate of "budget repair".

More research is needed

While fiscally daunting, UBI could have positive effects. UBI might encourage more innovation and entrepreneurial activity from people freed from wage dependence. It could reduce stress and improve mental health.

If everyone got UBI it would be free of the stigma of the dole. UBI would recognise the value of unpaid work such as volunteering and stay at home parenting.

Some say UBI would be a "bad utopia" preserving capitalism but it might actualise Marx's 1845 vision of a society where one might "hunt in the morning, fish in the afternoon, rear cattle in the evening, criticise after dinner" as one liked. People could live much like slaveholders of the antebellum South but with robots instead of enslaved humans doing the work.

Certainly, we need to continue the conversation about the threats and opportunities of mass technological unemployment and do more research into UBI. If Robotopia is likely, how we will live our lives and find meaning in a workless world?

**Sean Welsh is a Doctoral Candidate in Robot Ethics at the University of Canterbury.*

THE CONVERSATION

This article was originally published on *The Conversation*.
Read the original article <https://theconversation.com/are-we-ready-for-robotopia-when-robots-replace-the-human-workforce-63653>

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RAFAEL KOENIG

MANAGING DIRECTOR, WEIDMÜLLER AUSTRALIA

What are your clients demanding from you now that they didn't demand five years ago?

Our industry has in recent years been in a difficult generational transition leading to a knowledge drain caused by the retirement of baby boomers. EPCs and end users are more strongly focused on operational costs and we see more and more of them reducing their in-house capabilities for automation, electrical engineering and connectivity technologies.

Over recent years, we at Weidmüller Australia have developed a capabilities and services portfolio that adds value to our customers' businesses. From simple rail assembly to specialist solutions in transport, food and beverage and our traditional process and resources based industries, we successfully complement the value chain of our clients. In addition, we see a strong development towards renewable energies and have a range of tailored solutions for still emerging markets in Australia.

How should Australian industry respond to global challenges and competition?

One of the biggest challenges that is evident is the need to improve productivity and efficiencies in operations. The adoption of innovative technologies that we see in many other countries when it comes to digitalisation and data processing is a must to avoid falling behind further. The key for Australian companies will be to invest in knowledge and capabilities, and seek partnerships with other organisations that understand their problems and can solve them. Weidmüller Australia has always been an active participant in our industry community, and as Chairman of the Australian Profibus and Profinet Association (PAA) it is my ambition to foster our collaboration efforts in the industry and play a leading role in improving the competitiveness of our associated members and their customers.

What do you see as the biggest challenges that will face your industry in 2017?

There has been a lot said about the pressure caused by low resources pricing, the lack of competitiveness of our manufacturing sector and the subsequent focus on reducing operational costs. While this will remain true in 2017, I believe that our industry must find ways to invest in knowledge and technology to be able to secure its viability in the long term. There is a threshold where cost-cutting leads to dysfunction and companies need to find the right balance between reducing expenditure and gaining sustainable advantages.

We at Weidmüller offer a host of technical solutions that assist our clients in realising their efficiency objectives. We have made the conscious decision to invest in regional experts who can provide dedicated face-to-face support for our clients and channel partners. For us, it is imperative that we understand our clients' objectives and translate their needs into tailored solutions.

What new technologies are you seeing gain traction in Australian industry?

There has been a lot of talk about Industry 4.0 or the Industrial Internet of Things. While there is an enormous amount of validity in the opportunities and improvement potentials that our customers link to these megatrends, we feel that the topics are sometimes complex to a point where they are difficult to put in context.

At Weidmüller, we focus on connectivity — and the purpose of connectivity in the digitalised world is to securely and reliably transport data from sender to receiver and vice versa. Digital networks are becoming more and more prevalent and are enabling technologies for Industry 4.0 and IIoT. It is because of this that we heavily invest in products, services and knowledge for industrial network technologies such as Industrial Ethernet.

Would government/industry partnerships assist you in running your business?

Collaboration is essential to produce positive outcomes. In addition to partnerships that have developed with our customers over many years, we are fortunate at Weidmüller that we have a wide-ranging in-depth involvement with organisations such as the Australian Industry Group, the IICA as well as the Profibus and Profinet Association of Australia. As an industry community, we still have a long way to go to make our voices heard, though. When we look at the government's innovation agenda, we sometimes feel the message limited to start-up companies. However, when you drill deeper into the topic, you find out that hardly any start-ups operate in industries such as manufacturing, mining and infrastructure that carry our economy now. We, therefore, continue to need partnerships such as industry associations that form alliances and work with the government to bring effective change. For us at Weidmüller it is an obligation to participate and contribute.



Rafael Koenig is the Managing Director of Weidmüller Australia and responsible for all operations, local production, sales and marketing. He has held several senior roles in Australia since migrating from Germany in 1996. In addition to his role at Weidmüller, Rafael is the Chairman of the Profibus and Profinet Association of Australia, the world's largest association for industrial fieldbus and Ethernet communication networks. With a background in electrical engineering, Rafael Koenig holds a master's degree in business and technology from the University of NSW, Australia.

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xylem
Let's Solve Water

JIM ATHANAS

MANAGING DIRECTOR, XYLEM OCEANIA

How should Australian industry respond to global challenges and competition?

Put water on the national agenda, not only carbon footprint. As the driest continent, with a large agriculture industry and high water use per capita, this is imperative for our future. There is much we can do with the water we transport, use and recycle to drive productivity and sustainability in Australia.

What sustainability processes and technology are you planning to implement in 2017?

Our sustainability strategy ties directly to our business strategy, enabling sustainability to be effectively and seamlessly integrated into all we do. We have a set of ambitious five-year sustainability goals that are aligned with the four key areas of our sustainability strategy: our offerings, our operations, external engagement, and organisation and culture. The goals continue to be incorporated into our business operating planning process, and progress is evaluated through various measures including our goal deployment process. In the spirit of continuous improvement, we are reviewing the best ways to track our progress against some of the harder-to-measure metrics.

How is the IoT impacting you and your clients?

Xylem is an industry leader with an unparalleled portfolio of solutions across the water cycle. By combining the recent acquisition of Sensus's innovative technologies and data analytics capabilities with our broad portfolio, end markets, deep applications expertise and global reach, we are better positioned than ever before to meet customers' evolving needs and solve some of the planet's most urgent challenges.

What are your clients demanding of you now that they didn't demand five years ago?

Customers are demanding a total solution versus just product supply. They seek aftersales service and innovative solutions that reduce their total cost of operation, whilst doing it sustainably. They also seek for 'information/data' to be readily available for them to make real-time and predictive decisions in driving greater visibility, control and hence overall continuous improvement within their operations.

A specific example is the greater acceptance of recycled water, with the need to deliver this cost-effectively, hence Xylem's investment in recent acquisitions with Sensus and Visenti.

Would more government/industry partnerships assist you in running your business?

Government can help to guide local communities to invest in water infrastructure that ultimately drives positive social and

financial outcomes. There is an opportunity to reduce greenhouse gas emissions in the wastewater treatment industry while saving billions of dollars, and a unified state and federal policy will enable Australia to capture this opportunity.

As the world grapples with the challenges of climate change, resource scarcity and economic development for a growing population, new solutions are needed to meet today's urgent needs while building a sustainable future. It is incumbent on all of us — individuals, private businesses, non-government organisations (NGO), academia and governments — to work together to scope and solve these challenges on a sector-by-sector basis.

Now is the time for the industry and all stakeholders in the climate change agenda to work together to overcome the barriers to adopting high-efficiency wastewater treatment technologies. We want to see greater productivity of wastewater operations and a meaningful step forward in tackling climate change.

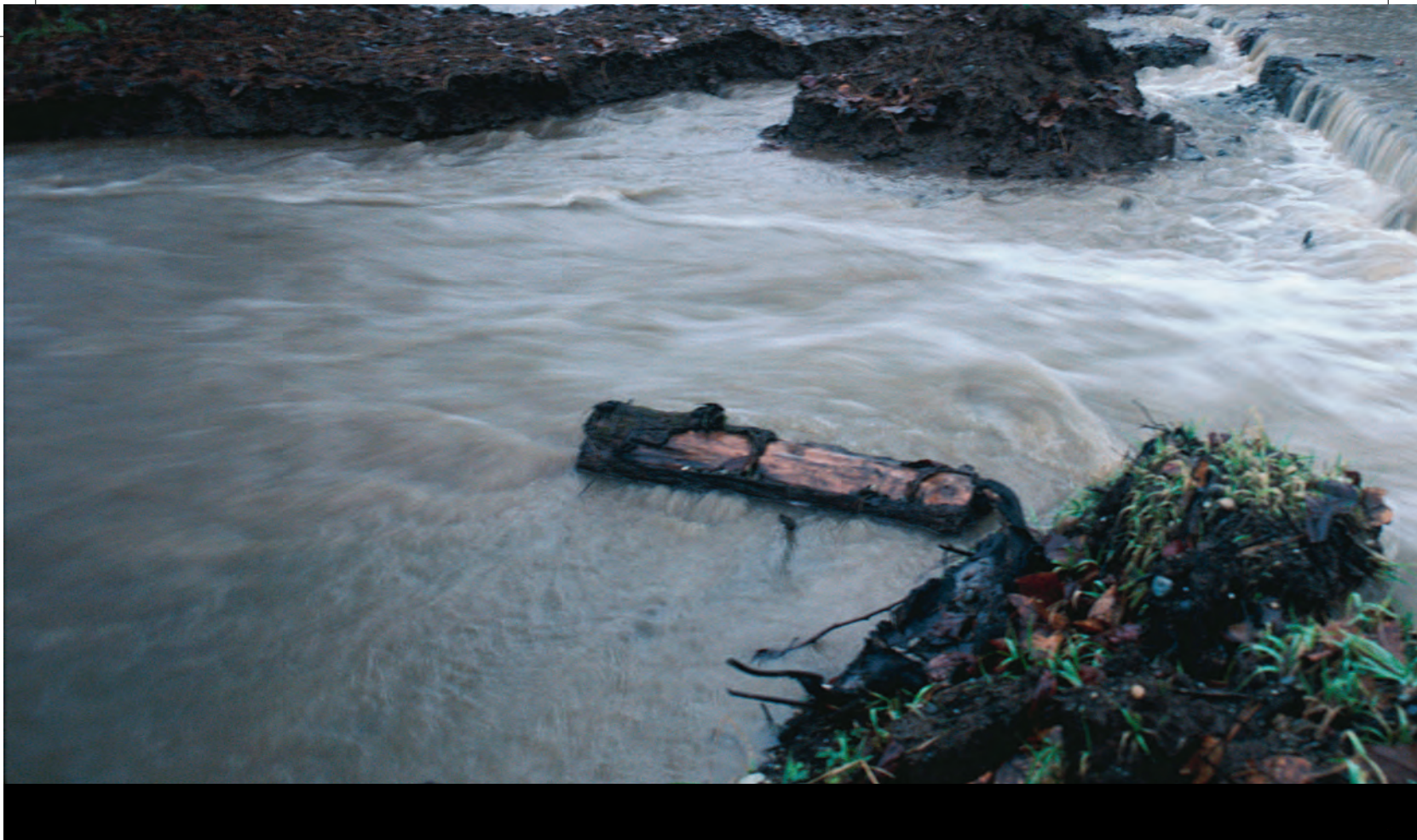
We also seek to see water put onto the national agenda together with greenhouse gas emission in driving a unified policy. It will help create jobs both in the public and private sector, as water is critical in all industries. Without water, there is no life.



Jim Athanas leads Xylem's commercial operations across the Oceania region, encompassing Australia, New Zealand and the Pacific Islands. In this role, he is responsible for all sales and marketing strategy and execution with continued emphasis on operational improvement, growth and profitability. He was named Managing Director of Xylem's

Oceania Commercial Team in July 2015. Prior to joining Xylem, Jim served as managing director at Nilfisk, a global provider of professional cleaning equipment. Before that, he held a number of increasingly responsible positions at Ecolab, including vice president and general manager of the Water Care division for Australia and the Pacific. Earlier in his career, he held various sales and marketing positions servicing the oil, power, steel, food and beverage, pharmaceutical and manufacturing industries.

Jim holds a Bachelor of Engineering (Honours) in Chemical Engineering from the University of New South Wales and a Master of Management from Macquarie University Graduate School of Management. He is a Graduate of the Australian Institute of Company Directors.



WHAT'S IN OUR STORMWATER?

IDENTIFYING STORMWATER CONTAMINANTS IN AUSTRALIAN CATCHMENTS

Nicola Markus

Stormwater runoff in Australia provides a potentially valuable water source that remains underused, despite the growing pressure on groundwater and potable water.

Concerns about possible contaminants in the untreated urban runoff see most of it disappear down the drain with little benefit to people or landscapes. At the same time, not knowing how different land uses impact on stormwater runoff makes it difficult to regulate. What's in the runoff depends on where the rain falls and where it is collected — but are there discernible trends that could help standardise stormwater treatments to minimise threats to human health?

This important question was at the heart of the CRC for Water Sensitive Cities' (CRCWSC) recently completed analysis of urban stormwater runoff (Project C1.2 — Understanding stormwater quality hazards), the first analysis of its type conducted across Australia. Researchers chose a total of 10 catchments in four states — Western Australia, Victoria, NSW and Queensland. The catchments featured residential, commercial and industrial land uses in a variety of climates and were sampled over a number of years. Stormwater samples were collected during rainfall events and tested for a range of potential hazards that could be inhaled, ingested or absorbed through the skin upon contact. While the results provided a useful baseline of information, some were unexpected. The first surprise was greater-than-expected variability. Across and even within individual catchments there



were few discernible trends in contaminants, and the contents of the water samples were highly variable. Chemical contaminants targeted by the analysis included metals, nutrients and traces of pesticides, pharmaceuticals and endocrine disrupting chemicals. Of the 58 pharmaceuticals and personal-care substances tested, only a small number occurred above the limit of detection. Only one substance — caffeine — regularly exceeded the guideline values for recycled drinking water.



Stormwater



ONLY ONE SUBSTANCE — CAFFEINE — REGULARLY EXCEEDED THE GUIDELINE VALUES FOR RECYCLED DRINKING WATER.

level of treatment required varies and depends on the intended use of the water.”

The successful large-scale sampling of stormwater runoff over a number of years was testament to the close collaboration with CRCWSC industry partners across states and councils. Local councils maintained the autosamplers and flow loggers installed at each site, ensuring that these were in good working order during rainfall events. Ku-ring-gai Council in Sydney’s north monitored a sampling site in a local filter garden, collecting samples over two years. Sophia Findlay, the council’s Water and Catchments Program leader, was involved in maintaining the equipment at the site, which collects and filters runoff to water a local sports oval.

“Making sure the equipment worked was quite labour-intensive at times, but we learned a lot about water monitoring and the quality of the runoff in our catchment,” said Findlay. “Some of that information can now be used to inform our local stormwater management plans.”

Ensuring that the outcomes of the study filter down to local communities is the CRCWSC’s ultimate aim. Based on the data collected, researchers are producing a practical ‘catchment auditing tool’ to help communities to characterise stormwater collection sites and understand the hazards that are likely to be present. Once their main water needs have been identified, communities can use this tool to determine the level of treatment required for purposes such as drinking, household use or watering public parks. The baseline data collected also make it possible to further investigate potential sources of contamination — such as sewage in individual catchments — and may lead to better management of upstream land uses and industries down the track.

CRC for Water Sensitive Cities

www.watersensitivecities.org.au

Pesticides also played only a minor role in the runoff. Of the 35 pesticides measured, many were not present at all or found only rarely above the limit. Targeted metals were generally at — or slightly above — the recommended concentrations for drinking water, but there were no clear trends across or within catchments.

Somewhat surprisingly, however, the levels of microbes were higher than anticipated across the sampling sites. *Campylobacter* spp, polyomaviruses, adenoviruses, *Bacteroides* spp and *Salmonella* spp were frequently sampled, and the presence of the viruses and *Bacteroides* spp suggested contact with sewage across all catchments. This was particularly unexpected as Australia’s storm and sewer systems are separate, and the runoff was sampled primarily from urban drain sites: before the two systems come into close proximity with each other.

Jane-Louise Lampard, project leader for Project C1.2, acknowledges that stormwater requires treatment prior to re-use. She said, “Based on the findings of this study, we recommend that stormwater should always be treated before re-use. However, the



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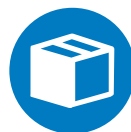
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WAYNE DRIVER

MANAGING DIRECTOR, SMC AUSTRALIA | NEW ZEALAND

What do you see as the biggest challenges that will face your industry in 2017?

As the largest pneumatic and electropneumatic supplier to the manufacturing industry in the ANZ region and globally, SMC works closely with customers in the area of factory automation to determine their current and future needs in terms of product development and associated technology.

It is a challenge for people and companies to keep up with changes in technology, so it is important to take the time to understand what the customer really needs. There has been a significant expansion in the field of mechatronics, and the once big divide between mechanical versus electronic and electrical engineering is narrowing. The manufacturing facility of today is a fusion of various fields of technology and communication protocols, and products need to fit into this fusion effortlessly.

Product developments need to be able to work with old and new technologies as production lines change and transition into more efficient and cost-effective systems. As a result they need to be mechanical and electronic 'friendly'. Products need to be smaller, lightweight, energy efficient and easy to install, and adaptable for the demands of the modern world. The emphasis on R&D and working closely with suppliers is becoming more and more important for business sustainability.

What new technologies are you seeing gain traction in Australian industry?

With the demand for flexibility, customers need to be able to change, and adapt to changing production requirements. With the speed of technological advances, robots are becoming a common sight in manufacturing, and the need for smaller lightweight components for robotic heads is a must. The cost of energy is a major input expense to industry, so products and technologies offering energy savings are an important consideration in order to remain competitive.

Various communication protocols and 'smart' devices are gaining traction, allowing the customer faster turnaround time, increased productivity and a more efficient operation. Flexible automation plays an important role.

How should Australian industry respond to global challenges and competition?

We have all witnessed the ongoing decline in the manufacturing base across Australia in recent years due to a number of factors, some which we have control over, while others, such as exchange rate fluctuations, we do not. It is difficult to compete globally purely on price, so we need to be more 'input cost efficient' and innovative locally at the point of manufacture, while ensuring product quality to compete globally. It is important that companies focus on reducing non-productive time in manufacturing and other processes, and automation can benefit in this area.

What can Australian industry offer that overseas suppliers cannot?

I think Australian industry knows how to be adaptable. With the economic changes we encounter, with certain industries expanding while others contract or even disappear — notably mining and automotive — Australia has no option but to be innovative and adapt.

We see it in the production lines of our customers. OEM companies will often build one machine with the capability to process and pack a range of different products. They know they need to design and build for every eventuality and be adaptable for future changes. Our population doesn't lend itself to mass production for the local market, so in many cases Australian industry needs to target niche markets where they can respond quite quickly to changing demands. Successful Australian manufacturers are able to offer clients flexibility and adaptability for their future needs.

What can industry do to support both very young and new workers and those at the end of their careers?

It can be a vicious circle being young and seeking sustainable employment, only to face the question, "So you have the qualifications, but what experience do you have?" Many employers want both, but without having both, many potential candidates won't even get the opportunity for an interview. More employers need to review their approach and consider a candidate's attitude, enthusiasm, their desire to learn and develop a career, and their fit for the company culture. We call it managing talent. One of the strengths of SMC is our diverse workforce, a mix of young, keen and energetic new blood with the long tenured experience there to work alongside and support their new colleagues. For those nearing the end of their careers it is important they have the opportunity to transition to retirement by going from a full week and gradually cutting down to four days, three days etc while still being on hand to nurture the next generation coming through. With cost constraints and other pressures, it is all too easy to simply consider the bottom line, but the sustainable success of a company rests with the people and not just the product or service supplied. It is an old cliché — but also a truth — that our talent pool is our most important asset.



Wayne Driver is the Managing Director of the SMC ANZ Group Companies consisting of SMC Pneumatics (Australia) Pty Ltd, SMC Pneumatics (N.Z.) Limited and SMC Manufacturing (Australia) Pty Ltd. Having completed a business degree, Wayne joined SMC in 1990 and spent two years with SMC Corporation Japan on a management trainee program. He worked with the New Zealand operation for seven years in the roles of General Manager and later Managing Director, before returning to Australia to head up all three companies.



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MARY HENDRIKS

INDUSTRY EXECUTIVE, AUSTRALIAN ENERGY STORAGE ALLIANCE &
CONVENOR, RENEWABLE CITIES AUSTRALIA

What new technologies are you seeing gain traction in Australia?

Delivery of energy is being reinvented globally, integrating more innovative and distributed generation from low-carbon sources such as solar, wind, wave and tidal power for our electricity supply. Australia is leading globally in the per capita uptake of residential solar PV panels, with an amazing 1.5 million solar rooftops across the country.

Many of these home and business owners are now looking to self-consume more of their own power by storing their excess power from sun or wind in battery storage systems. Being able to have your own power, when and where you need it, even during a blackout, is creating a whole new industry sector for energy companies, and will change the way we consume, sell and pay for electricity.

The electrification of transport is also underway, with many innovations in electric vehicles. China is drafting laws to direct that one in seven new cars sold will be electric, and the Mayors of Paris, Mexico City, Madrid and Athens are the first to ban diesel vehicles by 2025, the same year that Amsterdam plans to have an all-electric bus fleet. This transition to electric vehicles is well underway in Northern Europe and in parts of North America. This is also happening here, albeit slowly as Australia lags behind in the electrification of transport.

Renewable Cities Australia 2017 will showcase the implementation of these technologies with presentations from councils, businesses and organisations, sharing the successes of their renewable energy projects. The event will also feature electric vehicle uptake by individuals, governments and by Australian corporations.

How should Australian industry respond to global challenges and competition?

Globally, the challenge is to decarbonise the economy. Many companies are now taking up that challenge at the same time as improving their profitability. Underpinning this profitability is cost of energy and security of supply, key factors in global competitiveness.

In the area of electricity supply, this means more than solar panels and battery storage units. It means modernising our electricity grids and rethinking how power is supplied to our cities, our towns and to our transport infrastructure. It means managing energy demand and being smart about when we use power and when it's profitable to share or sell our excess electricity.

Many new energy companies are now offering smart services, selling power via innovative retailer business models, or building virtual power plants from aggregated stored power in various energy storage units across many locations. Cities are the hub for these innovations, with leading cities such as San Francisco and San Diego in the US and Vancouver in Canada setting goals to become 100% renewable, and with whole countries in Europe such as Denmark and Portugal also on the same path.

Would more government/industry partnerships assist for business and industry?

In Australia, the city of Adelaide has defined their plan to become carbon neutral, and Canberra's target is to be powered by renewable energy by 2020. Sydney and Melbourne also have action plans, and NSW has recently launched a Draft Plan to save NSW Energy and Money. Other cities and states have their own programs, and all these will need well thought out input from industry to meet their targets.

Industry partnerships with both local and global companies are key to the success of these initiatives, enabling the transition to low-carbon, smarter electricity supply systems while retaining security of supply.

This applies to the electrification of transport as well. Australia imports the bulk of our transport fuels and our energy security in this area will be strengthened by serious uptake of electric vehicles, particularly for urban-based cars, taxi fleets, small utility vans and buses.

States such as California have provided incentives for the purchase of new plug-in vehicles, with their local utilities taking up the challenge to provide many thousands of EV charging locations. With support from government, Norway is now the leading per capita user of electric vehicles, which are charged from electricity generated from their hydropower.

In Australia, matching large solar or wind power generation with emerging electric vehicle fleets is essential for this process, and that will be driven by government and industry partnerships. At the same time, batteries in these vehicles could potentially become available to the grid when connected, and this two-way interaction offers innovative demand management opportunities.

The Electric Vehicle Council is a supporter of Renewable Cities Australia and will participate in the inaugural EV Workshop at Renewable Cities in 2017, to advocate for this important industry sector.



Mary Hendriks is the Industry Executive of the Australian Energy Storage Alliance, and is also the Convenor of Renewable Cities Australia, Forum & EV Workshop. Mary has a decade of experience in the solar industry following extensive business experience in her own IT ventures. She is a member of the Australian PV Institute and the Australian Institute of Energy and holds a Science degree from the ANU. Mary is a passionate advocate of smart thinking for the change to clean and renewable energy systems.



LEADING THE CHARGE IN DISTRICT ENERGY

The University of Technology Sydney (UTS) has signed an agreement with Brookfield Energy Australia that will see the supply of cooling thermal energy under Broadway from the Central Park Thermal Plant.

In a move that will offer significant energy efficiency improvements, environmental impact reductions and even greater cost savings, UTS will source a proportion of its chilled energy requirements off-site from Brookfield's Central Energy Plant. The contract is claimed to be the first of its kind in Australia, which sees a central plant providing energy to a precinct beyond its own requirement. If it is utilised to provide energy to other facilities in the wider Broadway and Ultimo vicinity, it will be a true district energy system.

Richie Sheather, the CEO of Brookfield Energy Australia, sees further potential.

"Brookfield Energy Australia is pleased to be working with UTS on this innovative initiative. The more this plant is utilised, greater long-term energy cost efficiencies will be achieved for all users. We look forward to working with more properties in the local area to connect to this district system.

"We see District Energy as a way of the future and anticipate working on similar initiatives in other parts of Australia."

Sydney Lord Mayor Clover Moore said thousands of apartments in the Central Park development were being supplied with clean energy from Brookfield's Central Energy Plant, installed as part of an environmental upgrade agreement with the City of Sydney.

"It's great news the network is now expanding across the road to UTS, and we hope to see other businesses and building owners in

the area take advantage of the environmental efficiencies and cost savings district energy systems can bring," the Lord Mayor said.

"With 80% of greenhouse gas emissions in the City of Sydney area coming from buildings, it's important we keep looking for innovative ways to create sustainable, energy-efficient developments," said Moore.

Innovation

The UTS \$1.3 billion Campus Masterplan will see the development of new buildings and facilities that require further investment in on-site infrastructure, which includes increases in chilling infrastructure to meet increasing air-conditioning demand, crucial to keeping the campus operating smoothly for staff and students.

Rather than investing in new chilling infrastructure that would require utilising significant space and a high capital investment, UTS has taken the innovative approach to source its cooling energy from a recently developed precinct cooling plant located across the Broadway strip and accessed by thermal delivery pipes that have been bored underneath busy Broadway.

Deputy Vice Chancellor (Resources) Patrick Woods said, "UTS is committed to innovating and investing in research, working on new business models that will result in sustainable practices that have a positive effect on the precinct and the environment. We are constantly looking at ways we can reduce waste and our environmental footprint and the District Cooling project is just one example of our commitment in this area."



The Central Park plant.



WE SEE DISTRICT ENERGY AS A WAY OF THE FUTURE AND ANTICIPATE WORKING ON SIMILAR INITIATIVES IN OTHER PARTS OF AUSTRALIA.

UTS Green Infrastructure Project Manager Jonathan Prendergast said the move additionally frees up much needed space.

“Investment in new chilling infrastructure can be capital and space intensive, requiring new chilling plant, pumps, connecting pipework, cooling towers and electrical infrastructure. By procuring a portion of UTS’s cooling from an off-site supplier, UTS can invest in its core business and free up space for teaching, offices and a more active roof space without cooling towers.

“UTS already operate a large central plant that supplies heating and cooling to eight UTS Broadway Campus buildings. Off-site supply of chilling energy from Brookfield provides greater diversity of supply and redundancy for cooling the Broadway campus, reducing the risk of failure and outages,” Prendergast said.

This initiative is made even more feasible as it takes advantage of the peak and off-peak demands of the plant’s current customer, Central Park. The plant currently provides chilled energy to the Central Park apartments, whose main peak demand is typically in the evenings and on weekends. Conversely, UTS’s peak demands are weekdays and during the hot afternoons in summer months including February and November.

Heating, cooling and ventilation accounts for approximately 62% of UTS’s total electricity usage. The partnership will see UTS’s greenhouse gas emissions reduced by approximately 2.2% or 1111 tonnes CO₂-e per annum.

District energy systems are widely used internationally, particularly in North America and Europe. The Chicago District Cooling System supplies chilling to over 100 buildings in the Chicago CBD

from just four energy plants and the Toronto system services over 140 buildings. In Sweden, seven cities incorporate district cooling systems.

Commitment to sustainability

UTS has a history of commitment when it comes to sustainable projects. As part of its Campus Masterplan, UTS is upgrading existing buildings to reduce water and energy use, and is constructing new buildings that are certified to a minimum 5-star Green Star rating, as well as improving cycling facilities, constructing green roofs and walls, installing stormwater recycling and rooftop renewable energy, and setting ambitious recycling targets for demolition and construction waste. Three recently completed buildings — the Dr Chau Chak Wing, the Faculty of Engineering and IT and the Faculty of Science and Graduate School of Health — have won multiple awards for design, architecture and construction, with the latter winning a hat trick of sustainability awards including a NSW Government Green Globe award, AIRAH Excellence in Sustainability award and an Architecture and Design Sustainability award.

More recently, UTS has entered an agreement to source 15% of the annual electricity consumption of the Dr Chau Chak Wing building from a solar farm in Singleton, New South Wales, in Australia’s first off-site solar corporate direct Power Purchase Agreement (PPA). The cooling contract will see the purchase of chilling energy requirements for a 15-year period and is due to be implemented in 2018.

University of Technology
www.uts.edu.au

Solar-powered irrigation

Tofts Sand, a Queensland farm in the Childers area, grows a number of different crops including sugarcane and peanuts and utilises a mains-powered pump to irrigate them. With increasing operating costs and competition, it sought help to see what options were available.

Project scope

Tofts Sand wanted to reduce its production costs by running a pump from solar energy, allowing it to avoid using the mains supply when possible. The mains supply would therefore only be required at night or when there was not sufficient solar power available during the day.



The 22 kW 415 V pump moves water out of a dam along a 400 m underground pipe to a centre pivot that moves around the field for crop irrigation.

Solution

Based on current and expected future requirements, Control Logic recommended and supplied a 22 kW ABB ACSM1 Solar VSD, which was then implemented by Betts Electrical. The ACSM1 Solar VSD has solar-specific firmware to provide maximum power point tracking (MPPT). It is also capable of taking DC directly from the PV array.

Betts Electrical installed the VSD into a cabinet that had the incoming mains supply connected to it, as well as installing DC from a 30 kW PV array. Given that both supplies were connected to the VSD at the same time, blocking diodes were connected in series on the plus and minus coming from the PV array and the VSD DC bus connection. This prevented current flowing back into the PV array.

For the irrigation system to function correctly, a constant pressure must be maintained in the pipes. A pressure transmitter was connected to a PLC, which performed PID control to maintain a pressure setpoint. The PLC varied the speed reference to the VSD, as well as starting and stopping it.

PLC communication between pivot and pump is now possible via a controller on the centre pivot and, using a radio signal, the pump is run only when the centre pivot is ready.

Benefits

In agriculture applications, irrigation is one of the major costs of daily operation and implementation of the new system will see many of these costs dramatically reduced.

The proportion of power coming from the mains or from the PV array will now depend on the amount of solar power available. Because irrigation at Tofts Sand mainly takes place during the spring and summer months, solar power supply availability should be favourable, saving costs and reducing carbon emissions.

On a clear sunny day, all power would be completely derived from the PV array. This means the mains would only be utilised at night or partly during the day, depending on cloud cover. This substantial cost saving will enable Tofts Sand to irrigate 24/7, yet still reduce production costs.

Another benefit of having the pump VSD controlled, rather than being directly connected to the mains supply, is the elimination of 'water hammer'. By smoothly ramping the pump up and down, knocking noises from the water pipe, which occur when a tap is quickly turned off, are eliminated.

"Concerned and frustrated by increasing costs for irrigation, especially for electricity to grow our sugarcane and peanut crops, we decided to investigate alternative ways to defray costs," said John and Deb Russo, Tofts Sand.

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DIRECTOR OF ENVIRONMENTAL AND INDUSTRIAL PROCESS BUSINESS,
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What does your company offer the marketplace that you feel is unique?

Thermo Fisher Scientific manufactures and exports its own premier brands such as Thermo Scientific as well as distributing some of the best global brands to the Australia and New Zealand markets. We work with a strong network of global and regional partners to ensure our local customers consistently receive a reliable and high-level service. With offices and experienced local staff both in Australia and New Zealand, we are familiar with the Australian business environment and legislations and are able to respond to emergency events or provide urgent service. Thermo Fisher Scientific is a unique and favoured brand in ANZ thanks to strong business links with local manufacturers and the community. We have also established strong and positive media relations within various industries to make our capabilities and resources known and available.

How is the IoT impacting you and your clients?

Based on the fact that industrial IoT (and the IIoT) is set to rocket towards 100 billion devices as the technology becomes pervasive in industrial sectors worldwide, we are developing, as well as working with our third-party suppliers to deliver smart sensors, cloud-based data logging and total capability solutions to meet the emerging demands from our pioneer clients. dataTaker Live, a web-based intuitive graphical interface, is built to help companies collect, monitor, analyse, store and share information that improves connectivity and data acquisition from process instruments and industrial systems. Our solution increases operational productivity and efficiency as demanded by industrial customers in the era of the IIoT.

Would more government/industry partnerships assist you in running your business?

The government have great influence in terms of establishing legislation and industry standards to help create a healthier, cleaner and safer world. We work with governments and government agencies, hoping to contribute to achieving this goal. In Australia, environmental legislation as well as primary production and processing standards have been developing to better protect future wellbeing as well as the natural resources to secure our future. By partnering with industrial players, both parties can benefit from shared resources to create a cleaner, safer environment for both work and healthier living.

What are your clients demanding of you now that they didn't demand five years ago?

Our customers are demanding increased speed in response to their needs. Whether that's a quotation, supply of goods, information or on-site service, customers want an almost instant response. This requirement is reflected strongly in our customer surveys across all segments.

Driven by this demand and our mission to enable our customers to make the world healthier, cleaner and safer, we are investing in growing our strong national team located in every capital city in Australia. Further to this we are implementing market-leading customer relationship management and service management tools. This investment will allow us to be proactive in our approach to customer service at all points in the value chain and ensure we can respond to our customers' future demands.

Is there a defined job path for fresh graduates within your industry?

We have been working closely with universities nationwide and sponsoring school programmes that encourage students' innovation and conversion into commercial use.

We found that the majority of the students in their third year would have had great internship opportunities with hands-on experience on projects that utilise their multidisciplinary knowledge and indispensable passion to make a difference. We all know that people can do well if they truly enjoy what they do. Environmental research and industrial process improvement often require creativeness and the courage to think differently and challenge current practice.

Building a connection with people working in industry will help graduates realise and experience real-world working scenarios to help them make the right decisions for their career path. Industry-academia partnerships will support researchers and students realising new technologies, while industrial companies can gain easy access to a range of diverse talents and technological advantages: a win-win situation.



David Crossley is the Director of Environmental and Industrial Process Business at Thermo Fisher Scientific Australia and New Zealand. With more than 24 years of industrial experience in engineering, sales and marketing across different continents, he has been key to the expansion and success of the growing business. David holds an MBA from Monash University and a Bachelor degree in engineering.

Innovation beyond the ISO standard

Engineers must look beyond ISO (International Organisation for Standardisation) standards when developing and implementing industrial solutions, says SMC Pneumatics, a leading manufacturer of pneumatic control devices.

"ISO standards are undoubtedly valuable and set important industry benchmarks and controls; however, it doesn't always deliver the best product solution," commented Bill Blyth, OEM – Key Accounts Manager for SMC Pneumatics (Australia) Pty Ltd.

"Designers and manufacturers often have to think outside the box and then it is important to look beyond ISO to realise product development excellence and ultimately leading industrial solutions."



ISO, an independent non-governmental organisation (NGO), publishes standards that cover almost every industry and has a membership of 163 national bodies. To date, the organisation has published more than 21,000 standards and related documents covering a myriad of industries and applications.

One standard, one approach?

According to SMC Pneumatics, ISO standards must in some cases be set aside when it doesn't address the requirements of an application or excludes important criteria crucial to the design process. "Trying to conform to a standard can compromise the design or process requirements and ultimately the final product," explained Blyth.

"ISO sometimes falls short due to the sheer scope of industries and standards it has to cover. That's why at SMC we believe it comes down to fully understanding

the application of a product and then designing it to be as safe and efficient as possible."

For example, in the food and beverage sector, hygiene is paramount and the resultant ISO standards place it at the top of the priority list. However, ISO standards for pneumatic valve and cylinder design don't specify hygienic design, which means manufacturers could miss out on important criteria if they follow the standards to the letter.

Safe, not necessarily

The perception is that ISO-compliant products are safe, readily available, cost competitive and can be interchanged with other brands. Also, industry players believe they mitigate the risk of developing orphaned products if they meet the necessary standards.

This isn't necessarily true says SMC; products should be developed to deliver optimal features and performance and not whether they tick all the industry standard boxes.

"We engineer our products around applications and not the other way around. At SMC, we assist our customers with selecting the correct components and offer options and solutions that meet their specific applications."

The SMC Series EVS1 valves, for example, comply with the standard ISO15407-1 (Size 01 or Size 02), which includes both size and mounting; however, it also includes features that exceed the ISO specification. These include: clean design; M12 Connector/M8 Connector connections; rubber and metal seal options; lighter weight; and a dust/splash proof design (IP67).

SMC also offers a range of cylinders including the SMC Series C96/CP96 (which meet ISO standard 15552) and the SMC Series C85 (which meets ISO standard 6432). While they do meet the relevant standards, where necessary the company is prepared to modify these items beyond ISO specifications.

This approach provides SMC with the freedom to make the best cylinder for each application. It allows customers to meet specific machine requirements in areas like piston rod modifications; cylinder mounting modifications; corrosion-resistant design; barrel, end cap and porting modifications; and additional rod wiper solutions.

SMC is excited to form part of Auspack, which will be held from 7–10 March 2017 at the Sydney Showground. Visit SMC at Stand 57.

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THE FUTURE OF WIRELESS CHARGING

We could soon overcome the issues with charging smart devices, according to new research from University of Washington (UW), Duke University (DU) and the Intellectual Ventures' Invention Science Fund (ISF).

In a paper published in late October, engineers from the team illustrated that technology already exists that could turn the average living room into a wireless charging station and we simply need to take the time to design it.

According to report co-author Matt Reynolds, who is also a UW associate professor of electrical engineering, computer science and engineering, demand for an alternative to current charging methods is driving the research.

"Our proposed approach takes advantage of widely used LCD technology to seamlessly deliver wireless power to all kinds of smart devices," he said.

The research outlines how a flat-screen Fresnel zone wireless power transfer system could be implemented.

"The ability to safely direct focused beams of microwave energy to charge specific devices, while avoiding unwanted exposure to people, pets and other objects, is a game changer for wireless

power. And we're looking into alternatives to liquid crystals that could allow energy transfer at much higher power levels over greater distances," Reynolds said.

Some wireless charging systems already exist to help power speakers, mobile phones and tablets, but these technologies rely on platforms that require their own wires and the devices must be placed in the immediate vicinity of the charging station.

This is because existing chargers use the resonant magnetic near-field to transmit energy. The magnetic field produced by current flowing in a coil of wire can be quite large and close to the coil, and can be used to induce a similar current in a neighbouring coil. Magnetic fields also have the added bonus of being considered safe for human exposure, making them a convenient choice for wireless power transfer. The magnetic near-field approach is not an option for power transfer over larger distances. This is because the coupling between source and receiver — and



THE ABILITY TO SAFELY DIRECT FOCUSED BEAMS OF MICROWAVE ENERGY TO CHARGE SPECIFIC DEVICES, WHILE AVOIDING UNWANTED EXPOSURE TO PEOPLE, PETS AND OTHER OBJECTS, IS A GAME CHANGER FOR WIRELESS POWER.

The problem to date has been that the antennas in a wireless power transfer system would need to be able to focus on any device within a room. This could be done, for example, with a movable antenna dish, but that would take up too much space and nobody wants a big, moving satellite dish on their mantel.

Another solution is a phased array — an antenna with a lot of tiny antennas grouped together, each of which can be independently adjusted and tuned. That technology also exists, but would cost too much and consume too much energy for household use.

The solution proposed in the new paper instead relies on metamaterials — a synthetic material composed of many individual, engineered cells that together produce properties not found in nature.

“Imagine you have an electromagnetic wavefront moving through a flat surface made of thousands of tiny electrical cells.

“If you can tune each cell to manipulate the wave in a specific way, you can dictate exactly what the field looks like when it comes out on the other side,” said Smith.

In the paper, the research team works through calculations to illustrate what a metamaterials-based wireless power system would be capable of. According to the results, a flat metamaterial device no bigger than a typical flat-screen television could focus beams of microwave energy down to a spot about the size of a mobile phone within a distance of up to 10 m. It should also be capable of powering more than one device at the same time.

There are, of course, challenges to engineering such a wireless power transfer system. A powerful, low-cost and highly efficient electromagnetic energy source would need to be developed. The system would have to automatically shut off if a person or a pet were to walk into the focused electromagnetic beam. Additionally, the software and controls for the metamaterial lens would have to be optimised to focus powerful beams while suppressing any unwanted secondary ‘ghost’ beams.

But the technology is there, the researchers say.

“All of these issues are possible to overcome — they aren’t roadblocks.

“I think building a system like this, which could be embedded in the ceiling and wirelessly charge everything in a room, is a very feasible scheme,” said Smith.

thus the power transfer efficiency — drops rapidly with distance. The wireless power transfer system proposed in the new paper operates at much higher microwave frequencies, where the power transfer distance can extend well beyond the confines of a room.

To maintain reasonable levels of power transfer efficiency, the key to the system is to operate in the Fresnel zone — a region of an electromagnetic field that can be focused — allowing power density to reach levels sufficient to charge many devices with high efficiency.

“As long as you’re within a certain distance, you can build antennas that gather electromagnetic energy and focus it, much like a lens can focus a beam of light,” said lead author David Smith, professor and chair of the Department of Electrical and Computer Engineering at DU. “Our proposed system would be able to automatically and continuously charge any device, anywhere within a room, making dead batteries a thing of the past,” he said.

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CHIEF EXECUTIVE, AUSTRALIAN WATER ASSOCIATION

How is the Internet of Things affecting the Australian water sector?

IoT has fundamentally changed the way the Australian water sector works, with all the essential elements within the water cycle becoming increasingly responsive to live-time interaction with service providers, governments and customers through smart devices and networks.

There is a rapid uptake of innovative management practices, technological developments and scientific research all influenced by the possibilities associated with the Internet of Things. Our behaviours are also changing because of real-time data gathering and device interactions at home or while mobile. While intelligent metering and monitoring systems have been part of the water networks for a while now, the Internet of Things brings the immediate needs and behaviours of customers to the equation.

It is also changing the way the sector communicates and engages with customers to generate more responsive actions by water utilities, government departments and regulators with the overall goal of better managing our water resources and providing better tailored services and products.

With the impressive number of home and personal devices online that are constantly communicating with provider and government networks, one can understand the need for more sophisticated cyber security systems to make sure that end-to-end connections are safe against cyber attacks no matter how small. Water creates life and prosperity, and we cannot compromise on the issues of water safety whilst the sector looks for new and innovative ways to deliver and manage this important asset.

What can the Australian water sector offer the fast developing economies in Asia?

As the world's driest continent, Australia has had to adapt its economic development to the restricted water available. Yet, globally, we have some of the highest levels of productivity in agriculture, some of the best quality scores for drinking water and an increasing range of water sources to provide ongoing water security. These include accessing groundwater and managing aquifers, expansion of man-made water through desalination and other processes, and the recycling of water for non-potable purposes.

There are three core advantages that the Australian water sector can offer the developing countries in Asia. The first advantage would be the innovative technologies to provide high-quality drinking water at affordable prices. Australia has developed many alternative forms of processing water to meet health and quality guidelines without the need of major capital spending on infrastructure. By utilising Australia's proven water technologies, small communities or single households located in remote areas in Asia can be provided with quality drinking water to lift both public health and private liveability.

The second advantage is the implementation of improved water efficiencies for both agricultural and industrial water uses. We lead the world in the application of water to produce some of the highest agricultural yields and we have proven ability to recycle water for industrial or non-potable use.

The third advantage is Australia's use of water as an economic driver to encourage and foster a more sustainable business model at a community level. Australia has a strong track record of delivering appropriate quality water to many decentralised communities that has been the basis of sustainable economic models built around a range of agricultural, commercial and community projects. These models and experiences gained in Australia have direct applicability to many of the developing countries in Asia. Careful planning and strategic selection of industries that are granted access to water will provide both sustainable economic development and long-term water usage.

How is the Australian water sector prepared for the big data era?

From a government perspective many of our national authorities, including the Bureau of Meteorology, are already grappling with elements of big data collection and analysis. Much of the value-added services they offer both the water sector and the wider community relate directly to the use of big data.

Our water utilities across the country have also become significantly more sophisticated in managing their own great volumes of data related to asset management, water quality and customer service delivery. The most successful water utilities are those who have streamlined their processes and products based on big data insights.

With data pouring in from millions of households, towns and individual users, the water sector understands that big data is the future. Suppliers, consultants and engineers working in the water sector are coming to terms with the significant potential to better understand market trends, technology developments and customer opportunities that come with accessing and intelligently managing big data.



Jonathan McKeown commenced work as Chief Executive of the Australian Water Association at the end of May 2013. Jonathan graduated from the Australian National University with combined Arts/Law degrees in 1983. He commenced his career as a commercial lawyer with Mallesons solicitors in Melbourne. In this capacity he worked in a variety

of areas including mergers and acquisitions, mining and resources, and finance and banking. He then transferred to business, gaining 25 years of commercial experience in establishing and consolidating businesses across Asia and the Middle East. Jonathan has advised more than 200 companies in developing business in Asia while managing offices in Bangkok, Jakarta, Tokyo, and Amsterdam. His international project management skills have been acquired through significant development projects across Asia and the Middle East — all requiring regular interaction with senior levels of governments, the World Bank and the Asian Development Bank.

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The I/O modules are easily configured using a standard web browser. Each module has embedded web pages to help in the set-up and to control the unit. Watchdog timers increase system reliability: all I/O modules have a watchdog that monitors the microcontroller for failed operations or a 'lock-up' condition and automatically resets the unit. If host communication is lost and a configurable watchdog timer expires, all analog and discrete outputs go to a fail-safe condition.

Acromag's i2o technology provides an easier way to link inputs to outputs without a PLC, PC or master CPU. With i2o, many BusWorks 900EN I/O modules have the ability to operate like a long-distance transmitter. Users can convert sensor inputs at point A to process control signals at point B, or monitor a discrete device at one site by reproducing the discrete level with a relay output at another location.

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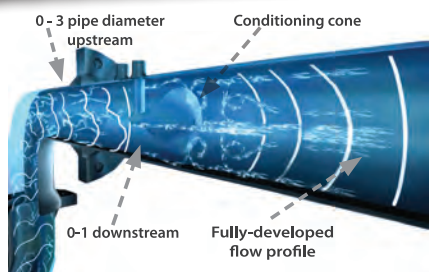
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CLIMATE ACTION TOOL LAUNCHED

AECOM has helped develop a tool that makes it easier for any city — irrespective of size — to develop a tailored climate change action plan. Created in partnership with the World Bank and C40 Cities and known as CURB (Climate Action for Urban Sustainability), it provides cities with strategic analysis on the impact of energy-use interventions and helps them identify and prioritise low-carbon actions.

CURB will be used by member cities of the Compact of Mayors, the world's largest coalition of more than 500 city leaders who are committed to reducing urban sources of greenhouse gas emissions.

"Cities in Australia and New Zealand have been at the forefront of global action to reduce greenhouse gas emissions for over 20 years. Community expectations regarding information provision, accountability and leadership have steadily increased during this time, with support for climate action higher now than at any time in the last 8 years according to The Climate Institute," said Will Symons, head of resilience and sustainability at AECOM Australia & New Zealand and 100 Resilient Cities program advisor.

According to the World Bank, by 2050, cities will be home to more than two-thirds of the world's 10 billion people. They account for approximately three-quarters of global greenhouse gas emissions.

"Cities are the key climate change battleground. The challenge is that there is no one-size-fits-all solution. Each city has its own set of specific demographics, conditions and realities that will shape its ability to act. Additionally, as cities continue to take action to reduce emissions, the ability to produce clear business cases for

investment becomes increasingly important, as the low or no cost actions have, in many cases, already been implemented," said Symons.

"CURB is an important decision-making framework for any city committed to informing its residents about current emission levels and developing strategies that deliver results."

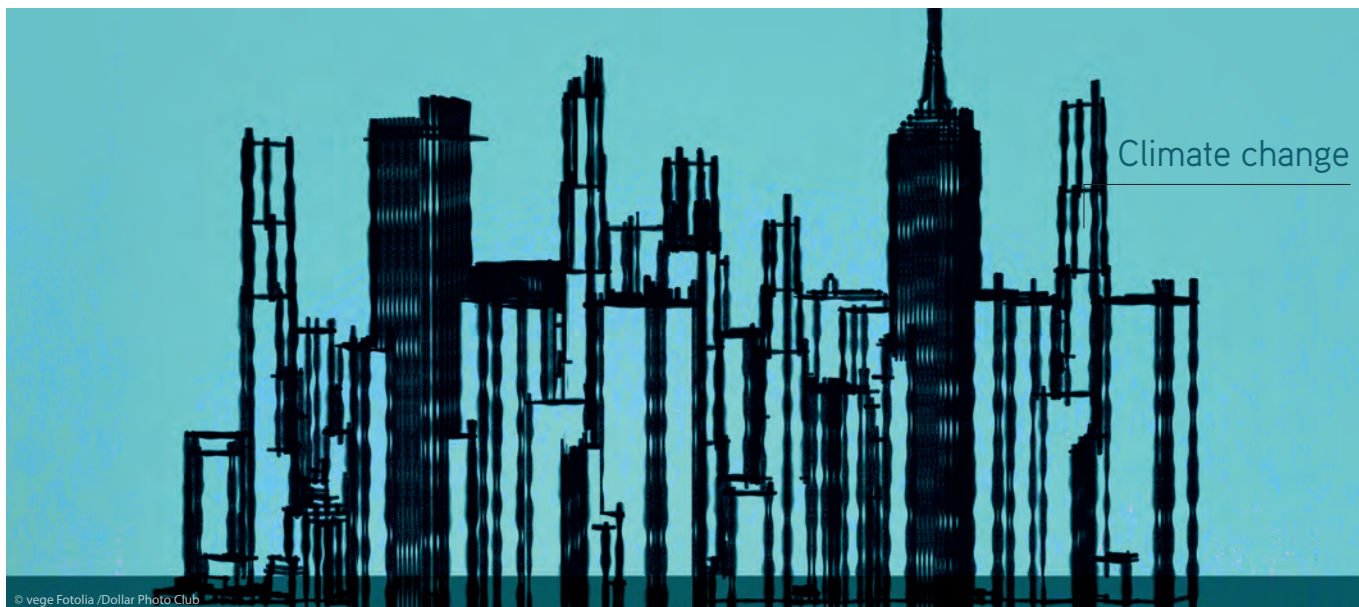
2016 CDP Cities Report

The launch of CURB coincides with the release of a new report published by CDP and AECOM: It takes a city: The case for collaborative climate action.

This year 533 cities disclosed climate-related data through CDP; the vast majority of these cities identified over 1000 economic opportunities linked to climate change, including 299 (56%) cities that report seeing potential in developing new businesses and industry sectors, in partnership with the private sector.

The report examines the emerging business case for city governments to collaborate with companies, investors and regional governments to mitigate the impact of climate change. The key climate-related areas where cities are seeking private-sector involvement are energy efficiency/retrofits, renewable energy and transport. Of the 190 cities with emissions reduction targets, 74% are already working closely with business to achieve them.

Maia Kutner, head of cities at CDP, said: "Our report shows that cities do not need to go it alone when it comes to responding to climate change. They are recognising there is power in numbers, which is why so many came together to form the Global Covenant



of Mayors for Climate and Energy this June. By partnering with the private sector, cities can not only spur the growth of new markets, they can deliver even greater emissions reductions. Tackling climate change is an enormous business opportunity. The time has come for cities to seize it.”

Sponsored by Bloomberg Philanthropies, the CDP report examines the emerging business case for city governments to collaborate with companies, investors and regional governments on addressing climate change.

Commenting on the 2016 CDP Cities report, AECOM Australia & New Zealand’s Will Symons said, “AECOM has been working with the CDP to analyse and prepare the annual report for the past five years, and this year we have seen a huge increase in the level of engagement, with 70% more cities taking part.

“Action by cities will be essential to achieving the ambitious goals of the Paris Agreement, and they will need to collaborate with a wide range of stakeholders to substantially reduce emissions,

adapt to the effects of climate change and benefit economically and socially from a low carbon environment.

“Here in Australia there are some great examples of collaboration already underway. The South Australian State Government has introduced building upgrade loans to support commercial building owners who want to improve the energy, water and environmental efficiency of existing buildings. In Victoria, the Melbourne Renewable Energy Project has brought together local government, universities and the private sector to purchase 110 GWh of renewable energy.

“It is clear that the economic opportunity from collaboration for cities, businesses and investors is substantial. This year’s CDP report captures some great initiatives that show what can be achieved when businesses and cities join forces to take climate change actions,” said Symons.

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MULTIFUNCTION TESTER

The Anritsu Network MT1000A Master Pro multifunction tester has a tri-wavelength OTDR module that provides field

engineers and technicians with a comprehensive test tool to verify fibre lines in core, metro and mobile networks. The module supports high dynamic range at all wavelengths, including 1625 nm, which allows the product to conduct ‘extra sensitive’ tests to ensure the performance of today’s high-bandwidth networks.

The product can achieve dynamic range of up to 46 dB required for long transit links. The module also features a fibre visualiser, a fault location function

that simplifies the entire testing process. It automatically selects the testing parameters to ensure the proper set-up and provides a simple, graphical summary of the fibre under test within seconds. It also has individualised pass/fail analysis to simplify fibre-optic testing.

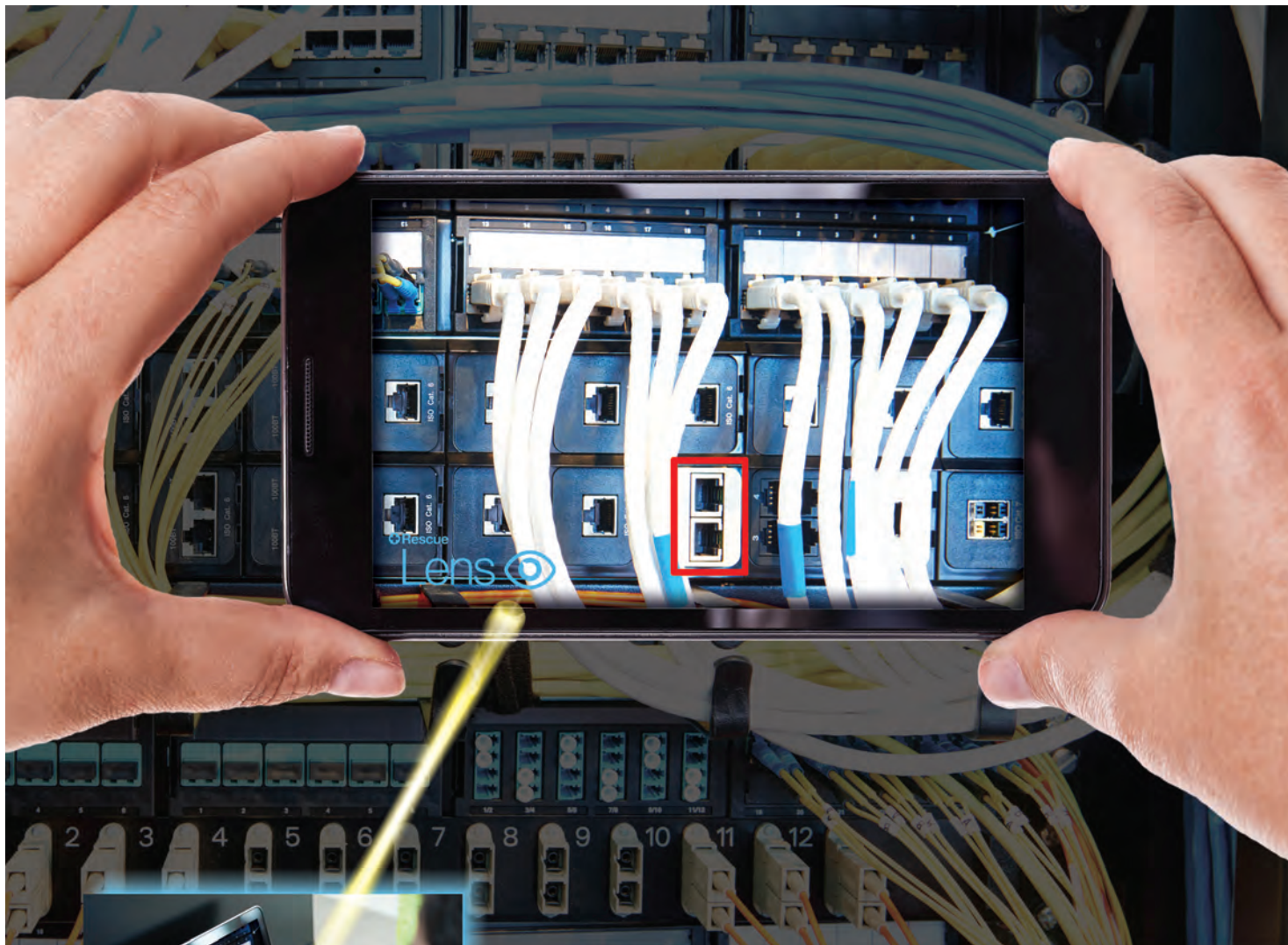
Suitable for installation and maintenance of fibre networks, the product has specialised functions to make field testing more efficient. A construction OTDR mode provides an automated method of testing numerous fibres at multiple wavelengths during cable installation. A single set-up screen initiates a testing wizard, ensuring all fibres are tested and results stored using consistent file naming. Additionally, a bidirectional measurement function has been added for accurate and simple event loss analysis.

The compact, battery-powered and easy-to-use product provides a variety of testing capabilities in a rugged, field-portable package. A lightweight instrument, it simplifies the task of collecting and interpreting data with a GUI and clear summaries, allowing users of any skill level to operate the instrument to its full potential. The product is field upgradeable and can be configured with an array of OTDR modules and transport testing functions, including RFC2544/6349, Y.1564, OTN and CPRI/OBSAI, to address current core, metro and mobile backhaul network needs, as well as the flexibility to expand to support future technologies.

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DANIEL CRAN

APAC MANAGING DIRECTOR, LOGMEIN

What new technologies are you seeing gain traction in Australian industry?

Australia presents a unique challenge for businesses in field services. The country's dispersed population outside of metropolitan areas means that technicians are often required to travel long distances to reach their customers, especially in the resources sector. Compounded by high labour costs, the industry is turning to new technologies that deliver high return on investment in cost, efficiency and customer satisfaction.

Though often overlooked, remote support tools are a powerful option to deliver profitability, productivity and customer retention wins across all industry sectors. It is enabling field services personnel to access customer environments and troubleshoot issues so they are better informed and equipped before heading on-site. In many cases, remote support tools can mean that issues are resolved without having to send technicians into the field, delivering an immediate bottom line benefit.

Some of our clients are now looking to interactive video support tools to not only enable remote technical assistance but drive proactive and predictive support. With the use of its existing remote support tool, Rescue, one customer has seen a significant reduction in costs and man-hours associated with sending field teams to troubleshoot minor issues. Most importantly, it has helped boost customer satisfaction and offered them a clear competitive difference.

But cost efficiencies alone don't guarantee your bottom line. As organisations begin turning their attention to the security practices of suppliers, field service providers are increasingly being evaluated on their ability to secure data. This is being intensified by high-profile security incidents such as Target's 2013 breach that came down to the stolen credentials of the US retailer's HVAC contractor.

In today's digital environment even the most contained security breach can bring a business to a standstill — damaging customer relationships, compromising industry reputation and ultimately affecting a company's ability to do business.

While password management may sound like a simple solution, in reality they are the first and often only line of defence a business has against a cyberattack. Humans will always be the weakest link and password management applications such as LastPass will emerge as the tool of choice to mitigate risk and preserve the integrity of a customer's environment.

How is the IoT impacting you and your clients?

For the field service industry, the increasing prevalence of the connected customer is helping organisations more effectively service client needs by allowing their support teams to proactively provide assistance — often times before the customer even knows there is an issue. Connected machines and products can alert the business to when a customer is offline or experiencing other problems so that these devices can be reset or otherwise managed before the customer is even aware there was a problem.

In the case of reactive support, connected devices can help technicians instantaneously spot an issue and provide quicker time to resolutions. For instance, for a customer experiencing issues with their connected lighting system the IoT allows a technician to remotely access, reconfigure and fix the network — saving the customer hours if not days of frustration and saving the business the man-hours required for on-site visits.

One of our clients was facing the common challenges of a global organisation employing a mix of direct and outsourced sales and service teams. The service teams had limited visibility of how their products were being used and when they had issues, and they relied heavily on human touch points to address issues.

The company developed hundreds of functions to track and monitor in real time, among them being usage, errors and whether certain accessories were enabled. They also connected both its customers and field service agents with custom apps that enabled users to remotely control and monitor their machinery, then store that data in its CRM.

But the power of the IoT extends beyond just issues resolution. The information provided by the device can be a true business enabler. By better understanding when and how people use a machine or product, companies can develop the features their customers want — making the product more desirable, capitalise on cross-sell and up-sell opportunities, and create recurring revenue through replenishables or service contracts. Using the IoT, a business can develop a customer experience that sets them apart from the competition — one that delivers a level of customer engagement and support most companies never thought possible.



Daniel Cran is APAC Managing Director at LogMeIn. In his role, Daniel is responsible for managing LogMeIn's local and international teams, building strategic partnerships and networking throughout the region.

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PAUL BRUNO

GENERAL MANAGER, PEPPERL+FUCHS (AUST) PTY LTD

What do you see are the biggest challenges that will face your industry in 2017?

Due to the vast array of applications that our products are used for, we are fortunate to be active in a number of industries, including manufacturing, mining, oil and gas, warehousing and logistics, food and beverage, and materials handling. Within each of those industrial segments, we will always inherently face similar individual challenges that affect them. Some of our domestic success has revolved around an industry that is heavily investing in capital terms in both downstream and upstream activities. This investment of course is highly dependent on various conditions, such as prevailing and future oil and metals prices, the political will and landscape of many oil-producing nations, and the ever-increasing debate on renewable energy over fossil fuel, mixed in with a desire for becoming low-carbon economies.

The slashing of capital expenditures in such large sectors of the economy brings unemployment and lower real estate value, and plunges resource stock prices, along with the inevitable squeeze on current suppliers to offer more competitive pricing for already committed projects.

This, I know, is no different for any other supplier within our industry; however it's that disruptive volatility that we must guard against and ensure that our own enterprises are optimised from a resource sense, and flexible enough to meet the demands of the customer as they arise — without increasing arbitrary cost.

How is the IoT impacting you and your clients?

The answer is simple. Daily, more and more, and the prevalence of change and demand is already gathering pace. It isn't difficult to understand why this is the case: it's simply a case of adapt, adopt and innovate, or be left behind. The Internet of Things or Industry 4.0 is bringing efficiency, accelerated automation and higher productivity — all leading to savings in cost.

The potential for our customers to be able to remotely monitor, reduce machine downtime, improve asset utilisation and improve overall productivity is great — and where the opportunity arises organisations such as ours must be at the ready to provide the next level of solution for such clients.

At Pepperl+Fuchs we are already providing solutions such as intelligent sensor technologies, networked field devices and new bridge technologies, new transmission technologies to drive autonomy and automation of factories and plants forward.

What can Australian industry offer that overseas suppliers cannot?

When I think of overseas suppliers, I can't help but think of the term globalisation. Two of the things that globalisation cannot offer in the strictest sense are proximity and immediacy. In today's ever-demanding marketplace, globalisation is at the forefront of offering a wide variety of choice, quality and price; however, many customers who conduct business in Australia still require the close proximity to strategic and critical suppliers that in many cases

offer the immediacy of product or service. We must remember that we are still a great distance from many markets, despite the improvements in overseas delivery times and freight routes. Too often we look to overseas for our solution for our supply problems, yet here in Australia we have excellent manufacturers who offer products and services which are largely of superior quality to overseas suppliers, at prices which offer great value.

At Pepperl+Fuchs we offer our customers local design, engineering and manufacturing of high-quality Ex d products (explosion protection), customised to the client's particular requirements, subject to some of the most stringent certification requirements to exacting quality standards. We are local and we are proud of our ability to be able to talk face to face with our customers to understand their requirements and deliver a solution that they are completely satisfied with. We are able to provide them real-time support with lead times superior to overseas suppliers.

How can industry support both very young and new workers and those at the end of their careers?

We have an ongoing dilemma as a nation — let alone as an industry — to be able to offer and support new opportunities for the very young and those people who are at the other end of their working lives.

It's not a question that I can offer a solution for; however, as an employer and an influencer, I believe we need to put our collective minds together to better serve these groups of people for the benefit of an overall healthier economy and as a valuable resource to industry. It's also not one that industry alone can solve and support. A collaboration between academia, industry and government is the only way we can commence to offer meaningful and sustainable opportunities for our younger people and our mature workers.



Paul Bruno has more than 25 years' experience within several industries, including government, food and beverage, automation and manufacturing. Having briefly worked in the government sector, Paul's experience stretches from SMEs to large global business such as Campbell's Soup, and now with Pepperl+Fuchs, as the General Manager. From humble beginnings as an accountant through to CPA, Paul has enjoyed positions within finance, IT, marketing, HR and now general management.

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We hear a lot about digital transformation these days. However, digital transformation is not just applying new technologies to do something different from before. It's also about doing what you do today but better. It's about innovating in new products and services and transforming your business model for competitive advantage.

We want to inspire organisations to get more out of their business applications by connecting new technology with their people and processes. So IFS Labs looked at what drones had to offer. In many industries, drones now offer a way to realign resources, gather data, reduce costs, ensure safety, optimise processes and increase efficiency. Combining that with other new technologies, such as the Internet of Things (IoT), enlarges the opportunity even more.

We recently demonstrated a prototype that showcased an actual flying drone connected to our IFS Applications enterprise software using our new IoT Business Connector. To create a proof of concept combining drones with enterprise software to provide real business value, we looked at aerial power line inspections in forested areas.

Autonomous power line inspections

While aerial power lines are generally easier to run and more cost-effective to build, they are also vulnerable to severe weather. If a tree falls on a power line, it disrupts service and typically requires a helicopter to be sent out for inspection. Drones are more cost-effective than helicopters in doing such an inspection.

We went a step further, using computer image analysis to allow the drone to work fully autonomously. The drone flies over the power line, where the video that the drone provides is processed in real time, detecting any obstructions, and those observations are sent through the IFS IoT Business Connector to IFS Applications. Then, a work order can automatically be scheduled and dispatched in the most optimal way.

The integration with business software is what makes the proof of concept so exciting. We demonstrated that linking a drone

directly into a business application could effectively multiply its value out in the field. If you look at drones standalone, they are already cheaper to operate than a helicopter. They cost less and require fewer people to operate. In addition, the drone can work autonomously. When you add in advanced analytics such as computer image analysis and connect it to business applications you can gain even further efficiencies.

Making field engineers more productive

Enterprise software can perform scheduling and route optimisation on the work orders that the drone creates. Then the field engineers contracted to fix the breaks that the drone has logged can also do their work more efficiently. The software could also work out what spare parts are needed and produce a plan to deploy engineers in the optimal way. The exact GPS coordinates would be sent through to their mobile devices, along with any other information required to complete the job.

We can think of dozens of applications for drones working in combination with enterprise software to transform existing ways of doing things. Oil and gas pipeline inspections, environmental inspections, inspections of hard-to-reach transmission towers or industrial equipment — everywhere you have a difficult or dangerous place to get to, drones can help to make people safer and more efficient.

Then there are all the places drones can be used for deliveries. If I am an engineer on an offshore oil rig, I can use a drone to deliver urgently needed supplies. Even better, if the drone was connected to business software, deliveries could be scheduled whenever spare parts were running low. The software could also



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plan the contents of each delivery to optimise the load weight for maximum efficiency.

Changes to laws and regulations

Unfortunately, organisations can't deploy all these drone applications right now. Legislation in Australia — and most other developed countries — restricts the height that drones can fly and requires them to remain in line of sight of an operator. While this might be important in populated areas, exceptions should probably be made for applications like remote powerline and pipeline inspections. But first you need to have organisations that are willing to do it and make a case to change the laws and regulations that are holding them back.

Our proof of concept shows how the power of digital transformation doesn't lie in individual technologies, but in combining new technologies in an integrated way. It's how you connect

these technologies with people and processes to solve problems within your business or your industry that makes a difference. And maybe we'll need to update some laws as well. What we have demonstrated with drones, the Internet of Things and business software for aerial power line inspections is just a taste of what's to come.

**As Director of IFS's in-house technology think tank, IFS Labs, Bas de Vos is responsible for innovation projects that illustrate the future of enterprise software. de Vos and his team research and develop ideas that derive from concepts and technologies beyond the usual context of traditional enterprise IT.*

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The guided radar level transmitter type 2291 is suitable for tougher applications. It provides consistent measurement even in turbulent process vessels. The radar signal is sent down the probe assembly, eliminating the interferences caused by low dielectric liquids, heavy fuming, slightly conductive foams or internal tank obstructions.

Transmitter type 2290 is available with PP or PTFE antennas. Type 2291 can be delivered with either stainless steel or FEP coated rope, or stainless steel or PFA or PP coated rod. The transmitters are equipped with a big LCD display for clear visualisation and easy configuration. The communication can be either via HART or analog.

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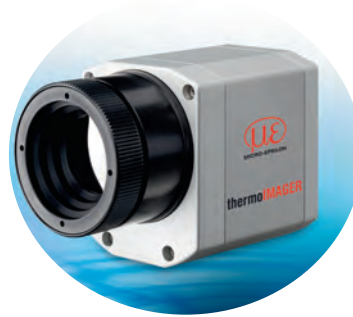
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At its technical strategy meeting this September, PROFINET International (PI) decided that the L-coded variant, which is internationally standardised through the standard 61076-2-111, will be the future single standard for 24 V Profinet devices with round connectors. The key factors behind this decision were compact design and its high current-carrying capacity (16 A) at a conductor cross-section of 1.5 mm².

In addition, L-coded M12 Power Connectors for Profinet devices in a TN-S system can be connected via the fifth contact for the functional ground to a common bonding network (CBN), a meshed grounding concept in accordance with DIN EN 50310.

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The Micro-Epsilon TIM G7 is an industrial thermal imaging camera specially tailored for the glass industry. Its applications include glass processing and finishing, and glass for displays and solar energy. It is suitable for most applications due to a large measurement range from 200 to 1500°C. It also features a spectral range of 7.9 µm, permitting it to measure even thin glass sheets reliably, and a thermal sensitivity of 130 mK. The included line scan feature enables the monitoring of thermal processes even with difficult fields of vision.

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Powered and operated via a USB 2.0 interface, this plug-and-play unit is supplied with a full software package, TIM Connect, that enables the user to configure all device parameters, as well as enabling the real-time capture (with a switchable 80 Hz or 27 Hz frame rate) and storage of images or video of an event for slow-motion playback or snapshots at a later date — an important feature in R&D and failure diagnostics work.


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Looking Forward **VEGA**



Sweet plans for renewable power in Qld

MSF Sugar owns and operates four sugar mills with a total crushing capacity of 4.7 million tonnes and produces around 550,000 tonnes of raw sugar per annum.

MSF Sugar has announced that a \$75m green power station will be built at its Tableland Sugar Mill near Mareeba in Far North Queensland. It will use a 100% renewable sugar cane fibre, known as bagasse, to produce 24 MW of electricity — enough to power every house in the Tableland region.

The green power station is expected to have sufficient bagasse to run for around 8–9 months of the year, but the company is looking to extend that to 11 months by using other feedstocks such as cane trash, peanut shell, sawdust wastes and the like.

Bagasse, a natural cellulose fibre found in sugarcane, is used to power boilers that produce steam under high pressure. This steam is used to power turbo-alternators that produce electricity — much like those found in hydroelectric power plants.

The company said the emissions from the sugar mill will not increase as a result of this project. It said the project will be using new state-of-the-art boiler and emissions reduction technology, with no increase in emissions. It will also be recycling waste from the power generation process back on to its cane farms, adjacent to the sugar mill.

MSF Sugar CEO Mike Barry said the Tableland Sugar Mill power station is the first of hopefully four green power stations to be built by MSF Sugar, with the others in the early stages of planning for construction at its sugar mills at Mulgrave near Cairns, South Johnstone near Innisfail and at Maryborough.

“The go-ahead for the remaining three green power stations




will depend on the success of the Tableland project as well as stability in the relevant legislation. If all four green power stations are completed it will equate to approximately 100 MW of renewable power generation capacity.

“Building this renewable power station is the next step in our long-term vision to transition our industry towards producing a range of higher value products, moving away from mills that produce solely raw sugar,” Barry said.

It is expected that in the future, the company’s cane growers will produce cane varieties for sugar, power and other value-added products that will make the industry more profitable for all.


Construction at the Tableland Sugar Mill is expected to commence in May 2017 with completion planned for June 2018.

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SECURE ACCESS CONTROL

The Euchner EKS allows secure access control to processes and software applications. It consists of an electronic key, an electronic key adapter and interface electronics.

The product is simple to integrate into existing systems due to its Profinet interface. The compact design and small installation depth make it suitable for installation in shallow control panels with standard holes measuring 22.5 mm in diameter.

The closed and rounded shape of the electronic key adapter prevents dirt from entering and allows it to be easily cleaned. It is suitable for industrial environments and can be used in hygienically sensitive areas such as the food industry. An additional output is available as a second system channel in the FSA version in order to realise safety-relevant applications.

Treotham Automation Pty Ltd
www.treotham.com.au



PRESSURE TRANSMITTERS

Dwyer Series 628 pressure transmitters are suitable for OEMs and provide an accuracy of 1% FS. The corrosion-resistant 316L stainless steel wetted parts allow the transmitters to measure the pressure in a multitude of processes from hydraulic oils to chemicals.

They are available in absolute and gauge pressure ranges with a variety of optional outputs, process connections and electrical terminations to allow users to select the right transmitter for the application. As a robust oil-filled sensor, the transmitters have high shock and vibration resistance, ensuring stability in controlling pressure for process applications.

There is a wide range of models and connections that can meet pressure measurement specifications from low to very high. Applications include compressors, pumping systems, irrigation equipment, hydraulics and industrial process monitoring.

For more information, click [here](#).

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NEW PRODUCTS



REDUCED DIAMETER PATCHCORDS

AFL Category 6 and Category 6A reduced diameter patchcords are channel compliant to international standards. They are both suitable for use in high-density cross-connect solutions in computer rooms, storage area networks and data centres.

The Category 6 product uses a cable diameter of 3.6 mm, while the Category 6A diameter is 5.3 mm.

**AFL Telecommunications
Australia Pty Ltd**

www.aflglobal.com

POWER DISTRIBUTION UNITS

The RackLink High Density range of power distribution units maximises the number of outlets without compromising on safety or reliability. More outlets in the same space provides good return on investment for the power distribution in rack enclosures.

According to the company, the product contains up to twice the number of outlets of other similar products.

The product range has been designed to allow users to mix and match outlets to give maximum configurability to the high-density power distribution unit.

Optional extras include branch circuits for higher current requirements, LED indicators and LCD current meters.

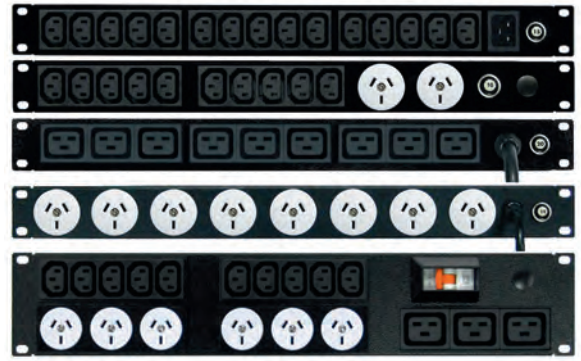
Horizontal models (1RU) contain 15 x IEC C13 outlets; 9 x IEC C19 outlets; and 8 x GPO 10 A outlets (9 x model planned).

Horizontal models (2RU) contain 30 x IEC C13 outlets; 18 x IEC C19 outlets; and 16 x GPO 10 A outlets. Vertical models (0RU – 1.3 m) contain 30 x IEC C13 outlets; 18 x IEC C19 outlets; and 20 x GPO 10 A outlets.

Vertical models (0RU – 1.7 m) contain 45 x IEC C13 outlets; 27 x IEC C19 outlets; and 30 x GPO 10 A outlets.

RackLink Pty Ltd

www.racklink.com.au



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VIDEOSCOPE

The GE Mentor Visual iQ Inspect videoscope allows the user to make informed decisions about critical assets and improve overall inspection productivity. It is available to rent from TechRentals.

With this device, users can capture both video and still images using a high-intensity LED light and advanced processing for enhanced image brightness. The product is easy to operate as it features an ergonomic joystick and hard keys for use. Powered by rechargeable lithium-ion batteries, the product eliminates the need for a charging cradle as batteries have an in-built charging circuit. These lithium-ion batteries are compliant with air travel regulations, making it even easier to travel with this lightweight, handheld device. Other features include 5 x digital zoom SUPER HAD CCD video camera; comparison measurement; 440,000 pixel count; and 6.5" active matrix XGA colour LCD.

TechRentals

www.techrentals.com.au

WATER NETWORK OPTIMISATION SUITE

Schneider Electric has introduced the Water Network Optimisation (WNO) Suite, a water and wastewater industry solution powered by Aquis 7.0 and built on the Wonderware System Platform. Water network operators can use WNO to acquire and centralise real-time data from network critical points for complete visibility and control of their water distribution network.

The water industry, among others, faces the challenge of doing more with less. Infrastructure asset life cycles must be extended, drought conditions have created significant sourcing and demand forecasting difficulties, and increasingly stringent regulations must now be adhered to. At the same time, greater focus on sustainability, energy cost and carbon reductions is putting new pressure on operations.

The Water Network Optimisation Suite is an industry solution designed to deliver both real-time and predictive visibility into water and wastewater networks. This offers operators the ability to perform 'what if' analysis of potential maintenance actions (for example, isolating a section of the network for maintenance and simulating the impact on delivery pressure through the next 48 h).

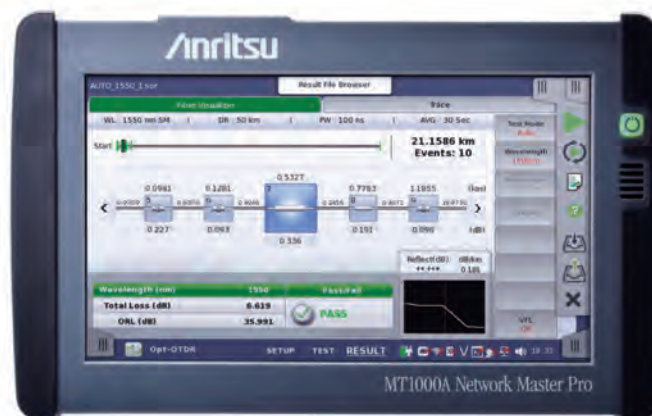
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NEW
PRODUCTS



DC SWITCH-DISCONNECTORS

ABB DC switch-disconnectors for 16–32 amperes have various DC voltage ratings with the same footprint area. The switches are specifically designed for DC use.

Despite its compact size, the product's insulation voltage ratings are good. Due to its modular design the rated operational voltage can be scaled according to user needs, all the way up to 1000 V. This ensures safe and reliable PV systems at a wide voltage range.

The product has rising PV system voltages. It meets the standard thermal requirements even in elevated temperatures and is suitable for warm locations. Low resistive losses minimise the waste of energy, which helps in maximising total energy efficiency of the PV system.

The application is cool and energy efficient. It has simple installation, with the DC-rated switch-disconnectors suitable for screw or DIN rail mounting. Tunnel terminals capture fine stranded wires and they are wide enough to allow wires up to 16 mm². It has short-circuit bars as standard.

ABB Australia Pty Ltd

www.abbaustralia.com.au

ACTIVE HARMONIC FILTERS

ABB has introduced a range of active harmonic filters that can mitigate harmonics whilst also improving power factor and load balancing.

Poor power quality costs businesses thousands of dollars each year due to increased bills and damage to the electrical network. Power supply failures, breakers tripping and blown fuses are signs of poor power quality which may also include failure or malfunctioning of equipment, reduced lifespan, damage to sensitive equipment and electronic communication interference.

Starting at 30 A and extending up to 450 A, the active harmonic filters are available as either a wall-mount cabinet or a freestanding cabinet for larger current ratings.

A range of filter options are available, including Modbus RS-485 communications modules for remote monitoring and the ability to link multiple filters together to increase capacity or to build in redundancy for mission-critical applications.

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NEW PRODUCTS

TIME SWITCHES

The Muller slimline SC08.13 Astro Digital and VS10.18 time switches are designed to be solid and accurate.

The Astro Digital saves power by accurately tracking the sun's progress and switching lights, appliances, equipment on or off in relation to sunrise or sunset.

The time switch will accurately switch at any fixed period before or after sunrise or sunset, any time in the year. The product has a daily/weekly program, block programming, 60 locations and memory reserve of six years.

Measuring one module wide, 17.5 mm, the single module VS10.18 is a 24 h time switch. If a battery backup is required, it provides security if power drops or other power disturbance occurs.

Ampere Electrical Manufacturing Company Pty Ltd
www.ampere.com.au



SMALL FORM-FACTOR PLUGGABLE GRANDMASTER CLOCK AND GNSS RECEIVER



The OSA 5401 Syncplug is an accurate small form-factor pluggable (SFP) grandmaster clock and global navigation satellite system (GNSS) receiver. According to the company, it has the smallest footprint and most compact design on the market. The product brings precise IEEE 1588v2 precision time protocol (PTP) frequency and phase synchronisation as well as synchronous Ethernet deeper into access networks, including radio access and small cell networks.

With its miniature form factor and low-touch provisioning, this product can be deployed in the most space-restrictive environments. No additional power source or real estate is needed, since it can be easily integrated into existing network elements.

The timing-optimised, dual-frequency GNSS receiver achieves good performance even in urban canyons. Design and network redundancy techniques provide resilience against local GNSS jamming.

Features include compatibility with SFP electrical MSA; built-in GNSS receiver supporting fully featured PRTC and IEEE 1588-2008 (PTP) grandmaster; precise IEEE 1588v2 PTP frequency and phase synchronisation to radio access networks and small cells; easily plugs into hosting devices with no additional power or space required; OEM product customisation for host vendor branding; decouples development of network element from implementation of GNSS receiver; robust design with local Stratum 3E oscillator and Sync-E input; fallback in case of GNSS outage; and extended operating temperature range.

TelecomTest Solutions
www.telecomtest.com.au



RUGGED TABLET

The Panasonic 10.1", Android-powered FZ-A2 Toughpad delivers ruggedness and is suitable for highly mobile outdoor workers in challenging conditions. With its capacitive, sunlight-viewable, 10-finger multitouch IPS display, flexible configurable ports and business expansion capability, the device can be used in the field whilst benefit-

ing from specially configured connectivity options to ensure data is always available when needed. The product has a magnesium alloy chassis, military spec MIL-STD-810G certifications, an IP65 rating against dust and water and 1.2 m drop resistance. It is said to lower the total cost of ownership and provide high field productivity.

Panasonic Australia Pty Limited
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The integrated charge regulator constantly monitors the charge status of site's batteries. If necessary, EFOY Pro can switch itself on automatically and off again once the battery is charged. This means that you not only have a constantly full supply of energy, but your batteries also last much longer, since continuous charging protects against harmful deep discharge.



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- Quiet & Emission Free
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- Efficient use of fuel
- Made in Germany
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M 28* - 28 litres / 23.4 kg

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- Autonomy 622 h

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- Capacity 66 kWh
- Autonomy 1320 h

* M28 Adapter required

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NEW
PRODUCTS

IOT BUSINESS CONNECTOR

IFS IoT Business Connector is designed to shorten the time from ideas to tangible benefits for IoT initiatives by providing an end-to-end architecture and the ability to turn IoT discoveries into actions. It has been designed to de-risk and accelerate IoT initiatives in areas such as predictive maintenance, service management, asset management and manufacturing.

It provides the ability to harness data gathered from products, assets and equipment to identify actionable observations that trigger user-defined, automated or semiautomated workflows in the IFS enterprise software. IFS IoT Business Connector provides plug-and-play connectivity with the Microsoft Azure IoT Suite for device communications and data analytics, alongside open APIs to connect other IoT platforms or specialised IoT discovery applications.

IFS IoT Business Connector bridges the gap between analysis of IoT data and using the output from such analyses to execute maintenance, service and manufacturing more efficiently. It adds the ability to turn an investment in IoT connectivity and data analytics into savings through process efficiencies, and into new revenues through service innovation.

The key components of IFS IoT Business Connector are: the IFS IoT Controller, which determines what actions to take when IoT data analysis reveals observations relevant to the business; the IFS IoT Gateway, which enables secure communications between the cloud-based discovery and analytics of IoT data, to the on-premise or cloud-based IFS products; and the IFS IoT Discovery Manager, providing additional management and monitoring capabilities when using the Microsoft Azure IoT Suite as the discovery platform.

IFS Australia

www.ifsworld.com/au



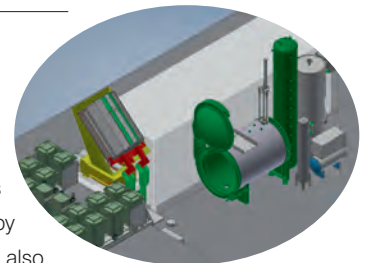
BIOHAZARDOUS WASTE MANAGEMENT SYSTEM

The AWS ANT is an ISO certified biohazardous waste treatment system. It features total automation and full enclosure, thereby offering complete infection control. It is also capable of interfacing with hospital AGV systems.

Intended to replace incineration, the product uses waste heat from on-site hospital central energy facilities (cogeneration and trigeneration), reducing treatment emissions. It is designed for on-site installation, thereby eliminating untreated biohazardous waste transport and associated emissions. Features include: an automatic bin feed with storage, empty, wash, disinfect and return; an ISO17025 certified agitate and turbo air biohazardous waste treatment process; and a post-treatment collapse vacuum to remove vapour.

AWS Clinical Waste

www.awsclinical.com



HANDHELD DIGITAL MULTIMETER

The Keysight U1233A handheld digital multimeter features a built-in LED flashlight, audible and visual alerts and non-contact AC voltage detection in one device.



The device incorporates a flashing backlight as an additional visual alert during continuity testing in noisy environments. Vsense capability permits non-contact voltage detection and a data logging capability stores up to 10 readings. IR-to-USB connectivity allows transfer of data to PC for a permanent record.

The product features an ergonomic shape which allows users to single-handedly illuminate the test area while selecting measurement functions using the rotary dial. It has an IP42 rating and 500 h battery life.

Soanar Limited
www.soanar.com

SECURITY ENCLOSURES

MFB Class B and Class C Security Enclosures have been tested for certification by the Australian Government's Security Construction and Equipment Committee (SCEC). Both versions of the security enclosure, in both floor-standing and wall-mounted styles, are now approved for supply.

The enclosures feature newly designed door construction, including added security in and around the boltwork, as well as re-styled door hardware. The Class B versions are also fitted with the latest Kaba X10 certified locking system. The high-security cable entry system is designed to provide flexibility and ease of use for the installer.

Other features include venting options, forced air management systems and a large range of accessories.

MFB Products Pty Ltd
www.mfb.com.au



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NEW PRODUCTS

HOME SECURITY SYSTEM

Uniden's Guardian Hybrid digital video recorder (DVR) range of security systems is suitable for home and small to medium-sized business (SMB) owners. Users can choose a combination of wired internet IP cameras, which rely on an Ethernet cable for internet connectivity, as well as wireless IP cameras which connect to the local Wi-Fi network via an app.



Installing the hardwired cameras requires drilling holes into wall and ceiling surfaces to run cables for power and internet connectivity. The wireless version requires a power connection only, making them suited to locations where it's difficult to extend a video cable, such as a garage or patio.

The system can be used to monitor the interiors and exteriors of a property and can be scaled up as needs change. Remote monitoring is via a dedicated app on smartphone or tablet devices, which also sends alerts to connected devices whenever the security system detects movement.

The system is expandable, with up to 16 wired cameras and up to eight optional wireless cameras. It captures full HD 1080p resolution and includes up to 2 TB internal storage. The cameras provide up to 20 m of night vision and are weatherproof.

Uniden Australia

www.uniden.com.au

COMPACT AC UPS

The Phoenix Contact TRIO2G AC-UPS is a space-saving DIN rail mount UPS designed to deliver uninterruptible AC power to critical loads in automation and shipping environments. At 210 mm wide by 170 mm high, the device can be installed quickly and easily. It can be easily latched onto a DIN rail due to its low installation depth, or wall mounted.

It is available in 120 and 230 VAC versions, and the pure sine curve at the output enables a seamless transition as the battery operation runs in sync with the mains previously used for the supply. The built-in 3.4 Ah battery offers a maximum of 600 W for 1.5 min. If required, additional capacity can be mounted onto the DIN rail to increase the time to four minutes at full load. The units have LED status indicators for signalling and function monitoring. Three digital outputs provide remote monitoring, and two digital inputs provide visual indication for remote shutdown and start-up. Apart from signal contacts, the Phoenix Contact TRIO2G AC-UPS models come with a mini USB port, which can be used to configure the UPS and to command a controlled shutdown of an industrial PC following a defined period of time to avoid data loss, corruption or downtime.

Phoenix Contact Pty Ltd

www.phoenixcontact.com.au



TOUCH-SCREEN MONITORS

Faytech's resistive touch monitors are available in sizes from 7" to 21.5" and are designed for demanding applications. They offer features including lockable standard connectors, a cable-channelling back cover, an LED backlight, resistive touch screens, extra robust components, wide range power supply (8–36 VDC) multiple video inputs and an extended temperature range.

The sunlight-readable (1000 nits) rugged monitors are dust- and water-resistant to the IP65 protection rating and sealed in an aluminium enclosure. For connection, Faytech provides an all-in-one cable solution with HDMI or VGA video connection, USB for touch and 8–36 VDC power connection. The operating temperature range is -25°C to +75°C.

High-performance LCD panels with LED backlighting, long life, specialty films and enhanced polarisers allow a clear picture even under direct sunlight. Buttons are available on the front to change brightness levels. The mounting is VESA 75.

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EtherCAT at an abattoir

SMC and a leading Victorian-based OEM specialising in wastewater processing equipment have teamed up to provide a solution for the treatment of wastewater in a large Victorian abattoir. The requirement for the project was a rendering plant with a large capacity to receive, store and process waste effluent with an integrated system redundancy. The aim was to ensure continuous 24/7 operation from an operational and maintenance point of view, and increased volume of throughput resulting in a more efficient and lean process.

In addition to the upscaled mechanical equipment that facilitates the physical sequential rendering process, the electropneumatic system employed for the job has significantly enhanced the functional and operational features of the system.

"This system sets a new benchmark within the Australian process industry by challenging the perceptions that a leading-edge networking system such as EtherCAT is only suitable for very high speed, complex and demanding applications within the industrial automation sector and successfully demonstrates the benefits of its application over the traditional system design," SMC Pneumatics Business Development Manager for Electronic Platforms Jozef Ceh explained.

The objective was to provide a system with an increased volume of effluent processed per day by improving the receiving, storing and processing efficiency of the wastewater. The plant's current production schedule needed to be accommodated, and future increased demands taken into consideration.

The system was set up to return higher quality water back into the environment while exceeding the minimum specifications of the water authorities. The recycling of water back into the plant for repeat usage also reduced the water consumption and running costs of the plant.

The result was a rendering process plant with capacity to receive up to 1.5 ML of effluent on a daily basis.

EtherCAT is by and large the fastest Industrial Ethernet technology, but it also synchronises with nanosecond accuracy. This is a huge benefit for all applications in which the target system is controlled or measured via the bus system. The rapid reaction time works to reduce the wait time during the transitions between process steps, which significantly improves application efficiency. Lastly, the EtherCAT system architecture typically reduces the load on the CPU by 25–30% in comparison to other bus systems (given the same cycle time). When optimally applied, EtherCAT's performance leads to improved accuracy,



greater throughput and thus to lowered costs.

Accommodating the current effluent requirements and allowing for about 35% more capacity for future expansion was quite a challenge. Safety and hygiene requirements as well as the refining of the process that deals with extracting the suspended solids more efficiently was another obstacle that the technical team had to overcome as well as the measuring and dosing process of the required chemicals. All of these elements had to be incorporated into one process. In the end, water with the right pH balance had to be put back into the system and this had to be done all in one cycle of the process.

The whole SMC EtherCAT solution was designed, manufactured and delivered in an integrated control panel solution, ready for plug and play, in two weeks.

"This project successfully demonstrates the value in challenging the traditional approach to solving problems and looking outside of the comfort zones of historically specified legacy systems that were significant in their time, but may impose limitations when encountered by demands of the modern plants," concluded Ceh.



SMC Australia | New Zealand

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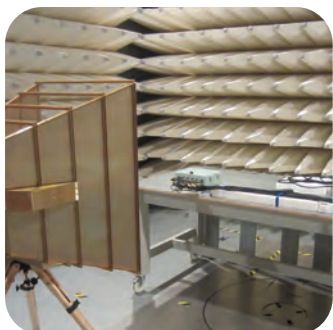


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GAS ANALYSER FOR HYDROGEN-COOLED GENERATORS

Michell Instruments has added an analyser dedicated to monitoring hydrogen-cooled electricity generators to its current range of moisture and oxygen analysers. The XTC601 for hydrogen-cooled generators has been designed with three phase profiles to cover all of the gas analysis requirements for operation and maintenance.

High-purity hydrogen is required for the cooling to be effective, as well as for safe operation. As it is not possible to hermetically seal the generator set casings, too much moisture in the system not only reduces efficiency, but also introduces the risk of arcing and generator damage.

Operators also routinely purge the system with CO₂ to remove all the hydrogen safely, before carrying out scheduled maintenance.

The XTC601 for hydrogen-cooled generators has three phase profiles to cover all stages of the process: under normal operation to measure H₂ purity, where air is the contaminant; while purging H₂ with CO₂, indicating when all the H₂ has been removed from the system; and when purging CO₂ with air, to ensure that the atmosphere is safe for the engineers to work.

The analyser has three calibration maps to enable measurement in each of the above gas mixtures. Switching between them is simple using the integrated HMI or via an input from the plant control system. Having just one analyser to monitor each of the phases reduces installation costs and capital expenditure. The non-depleting sensor makes it highly cost-effective over its lifetime as there are no consumable parts to replace.

AMS Instrumentation & Calibration Pty Ltd

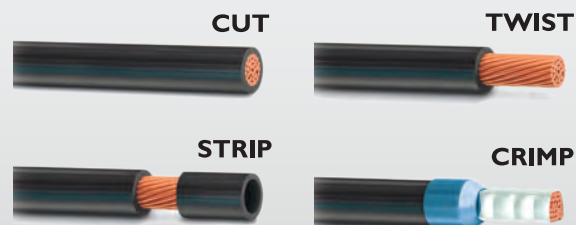
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WALL-MOUNT POWER SYSTEM

The Eaton wall-mount power system is suitable for users in the industrial control, electrical switching and telecommunications industries who require the capability to access and monitor reliable battery-backed DC power.

The power system is packaged in a format that consumes minimal space. It has a form factor that better suits industrial control and electrical switching boards, as well as small service closets. It has good monitoring and control capabilities.

The product is able to be configured for either AC mains or solar PV power, providing the convenience of a single power system type for both scenarios.

Another key benefit is that the product's battery backup and redundancy can support the majority of process controls systems which use PLCs, valves, solenoids, switches and sensors that are powered from 24 or 48 VDC.

Key technical specs include AC supply of 100–240 V, 50–60 Hz (nominal); efficiency of APR48-ES, >96% peak; DC output power of 48 V, 2.00 kW (42 A); operating temperature range of -40 to +70°C; and communication features including USB direct, 10BaseT Ethernet, TCP/IP, SNMP, Modbus TCP, Modbus RTU and on board web server, RS232 to external PSTN or GSM modem.

The product is suitable for the oil and gas, mining, commercial buildings, rail and transportation industries, as well as system integrators and switchboard builders or any business that designs and manufactures large turnkey process control systems.

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Pumps replaced on cement slurry projects

In China, specially equipped engineering boats (about the size of small tugs) are fitted with concrete-carrying silos or holds. The boats ferry between tidal, pile-driving and quayside construction sites to deliver concrete grouting in line with project requirements.

Earlier this year, Watson-Marlow Fluid Technology Group (WMFTG) China secured five orders comprising a total of 90 Bredel heavy-duty hose pumps required for a €1.8 million series of new grouting projects performed in seas around the Chinese coastline. Including Bredel 65 and Bredel 80 models, the pumps will be installed across six engineering boats (15 pumps aboard each vessel). The pumps were ordered for drawing the abrasive cement/sand/water slurry from the mixing tanks into the holds of the seafaring vessels and for metering the grouting accordingly.

The pumps were selected in place of piston pumps, which on previous grouting projects created issues such as fluid leakage, component wear and unplanned maintenance. WMFTG got the opportunity to supply a Bredel pump for trial, which proved that Bredel technology could overcome the leakage and wear problems. This reduced costs through greater uptime; reduced the need for maintenance and spare parts; and helped create a safer working environment.

The reason that the previous piston pumps struggled was the abrasive nature of the cement, sand (8%) and water mix (0.7 water-to-cement ratio). Discharged into the pile driver at pressures of over 10 bar, conventional pumps are subjected to continual wear problems. In Bredel pumps, nothing but the hose touches the fluid. This means that the only wear part is the hose, which can be quickly and easily replaced if required. As a result, Bredel is suitable for all slurries, as well as viscous, shear-sensitive or aggressive fluids.



The larger Bredel 80 models used on the grouting projects draw the slurry from the mixing tanks into the hold at 330 L/min. These pumps run for approximately 2 h periods at 29 rpm. The smaller Bredel 65 pumps, which meter the grouting, run for the same amount of time (at 30 rpm), at a flow rate of 200 L/min. The running time of the pumps is controlled automatically via a PLC. WMFTG has already delivered 30 Bredel pumps for the first two engineering boats, and another 60 pumps are in production and will follow shortly.

Watson-Marlow Fluid Technology Group
www.wmftg.com.au

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UQ sewer technology bound for overseas

Researchers from The University of Queensland's (UQ) Advanced Water Management Centre have developed technology which uses free nitrous acid to remove biofilms that adhere to the inner surfaces of sewer mains, thus controlling odour and corrosion.

Now, UQ commercialisation company UniQuest has negotiated an exclusive licence agreement with USP Technologies, a US provider of chemical treatment programs for water and wastewater applications.

"Corrosion and odour problems in sewers are most often caused by sulfate-reducing bacteria in sewer biofilms that produce hydrogen sulfide," explained lead researcher and Advanced Water Management Centre Director Professor Zhiguo Yuan.

"Hydrogen sulfide is released into the atmosphere above the wastewater, causing odour problems, and is converted by sulfide-oxidising bacteria into sulfuric acid, which is corrosive to concrete sewer pipes.

"Sewer networks can include many kilometres of sewer pipe and various topographical elements, such as rising mains. "These can create 'hot spots' where sulfate becomes sulfide, accelerating corrosion and causing odours,

leading to community complaints. "Most existing treatments for managing sulfide-related problems in sewers involve sewer pipe lining, sewer air ventilation with follow-on air treatment and round-the-clock chemical dosing, resulting in high operating costs." USP General Manager Tom Walkosak said the "innovative and cost-effective" UQ technology is different from existing treatments because it is "delivered intermittently, provides longer duration control and effectively stops the production of hydrogen sulfide at its source".

"It is highly effective, can be used in sensitive environmental areas or to treat smaller lines, and offers water utilities the opportunity to make significant reductions to their maintenance costs."

The first Australian field trial of the UQ technology was undertaken by UQ in 2012 in collaboration with USP and the Gold Coast City Council in 2012, followed by a second field trial in partnership with USP and Unitywater at Scarborough on Moreton Bay in 2014.

Advanced Water Management Centre
www.awmc.uq.edu.au



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NEW
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COOLING SYSTEM FOR DATA CENTRES

Schneider Electric has introduced the second generation of the InRow DX (direct expansion) 600 mm, expanding the company's cooling portfolio to meet the evolving cooling needs of an ever-changing data centre environment. Providing the high-density cooling data centre managers need to maintain critical facility temperatures, the product features enhanced controls and an updated user interface.

The second-generation release improves cooling efficiency by reducing power consumption while also increasing capacity. Capable of high-density cooling up to 42 kW with a 4000 SCFM max airflow in a 600 mm-wide footprint, the product provides high partial-load energy savings, cutting energy consumption by 50% over first-generation technology. The savings are enabled by the use of brushless variable speed scroll compressors and EC fans.

The design closely couples cooling with the IT heat load, preventing hot air recirculation while improving cooling predictability and allowing for a pay-as-you-grow environment. Available in self-contained, fluid-cooled and air-cooled configurations with or without humidity control, the products meet the diverse requirements for closet, server room and data centre cooling.

Active flow control, which measures air pressure inside the containment system and automatically adjusts fan speed to match the exact airflow of the IT equipment, increases precision and efficiency. With a user-friendly design, the device also features an intuitive 4.3" colour touch-screen display and network card to provide fast, easy access to data and increased visibility into cooling system performance.

Schneider Electric

www.schneider-electric.com.au



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HMI PLCs WITH CODESYS 3

Turck's TX500 HMI PLCs are suitable for use in small to medium-sized machines whose processes have to be controlled, displayed and operated locally. Each TX500 is equipped with a Profinet master and EtherNet/IP scanner, as well as a Modbus TCP and Modbus RTU master. The HMIs can also be run as field devices for both Modbus protocols.

CODESYS 3 allows the lean and simple programming of the PLC and visualisation functions. The latest processor technology in the units provides for the smooth handling of computing-intensive processes such as moving image visualisation. The high-resolution TFT display with 64,000 colours enables attractive and high-performance display of graphics and animations. The front panel of the TX500 series is protected to IP66.

Two RJ45 Ethernet ports, a serial interface for RS232 or RS485 as well as two USB ports are provided on the terminal side. An additional SD card slot makes it possible to expand the 128 MB internal data memory. Turck is offering the TX500 series in three variants with different display sizes and resolutions: two 16:9 displays with 7" or 13" (TX507 and TX513) diagonals, and one 10" device in 4:3 format (TX510). The two smaller displays offer 800 x 400 pixels, while the large TX513 comes with 1280 x 800 pixel resolution.

Turck Australia Pty Ltd
www.turck.com.au




SOLAR-POWERED VARIABLE SPEED DRIVE

The ACSM1 range of solar pump drives, from ABB, enables the user to reduce their carbon footprint. With a maximum power point tracking (MPPT) algorithm built in to maximise the power available from PV arrays, it has the ability to be run from either solar or from a back-up AC source via mains or a generator.

The product is designed specifically to run three-phase 415 V induction motors featuring a wide range of power ratings from 5.5 to 45 kW. With the option of fieldbus communication modules, the user will be able to remotely monitor their system as well.

The range also includes pump-specific protection such as a sensorless flow calculation, dry run detection ability and automatic pump-cleaning sequences that can be configured to suit any application.

Control Logic Pty Ltd
www.control-logic.com.au



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AS I SEE IT



SURF THE GREEN WAVE OR DROWN?

What are Environmental Product Declarations (EPDs) and how are they changing B2B sales conversations? Jonas Bengtsson, CEO and co-founder of Edge Environment, provides his opinions.

A recent market study conducted by Accenture and the UN revealed that 85% of consumers expect companies to improve their quality of life, which goes in hand with addressing environmental and societal impact of their business. In fact, they put as much pressure on business as on government.

Blame it on generational turnover, regulatory pressure, The Great Sinister Hippy Lobby or common sense — it doesn't matter — the market is growing eco-savvier and the trend isn't slowing down. A business unwilling to pick up its slack, or hoping to hide within complex supply chains, is more and more likely to face scrutiny or be selected out.

Ask VW, BP, BHP and Bhopal how the environment factors into their share value and business success. Ask the merchants for palm oil, rainforest timber furniture and tiger prawns if they have to spend much of their time on the defensive before they get even close to pitching their product. You have two options:

1. Hope that a competitive price and track record will keep you sweet.
2. Adapt and excel in the new information and transparency-hungry world.

As a supplier, you don't want to carry around a thousand-piece jigsaw puzzle of documents and reports to demonstrate your credentials in the technical, environment and social spheres. You'll want a one-stop-shop, straight-to-the-point, comprehensive, credible and transparent document.

As a customer, wouldn't it be great if you could have complete transparency and trust in the products and services you buy? And wouldn't it be great if you could find that information in one place?

Enter the one-stop shop for product information — Environmental Product Declarations, or EPDs. An Environmental

Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as PCRs (Product Category Rules). Industry experts can develop EPD reporting rules for any product or service and the ISO 14025 standard sets the reporting scope. Every EPD is independently verified to ensure the information data is correct and balanced.

Green buildings and infrastructure rating tools and government design and procurement guidelines are singling out EPDs as the go-to credentials and building block for optimised designs and solutions.

According to Jorge Chapa, the Green Building Council of Australia's director of market transformation, both manufacturers and buyers benefit from EPDs.

"EPDs give manufacturers a tool that can help them identify opportunities for improvement along their supply chain and also a strong selling point that increasingly resonates with environmentally aware consumers. For buyers, an EPD provides a framework for making informed product comparisons."

EPDs are ideal for organisations looking to source goods and services in a way that achieves value for money and generates benefits — not only to the organisation but also to society and the economy — while minimising damage to the environment. The new sustainable procurement standard ISO 20400 (currently BS8903) coming out next year provides the framework for how EPDs and life cycle thinking fits together.

"EPDs provide transparent and clear information to help us identify products that will reduce the environmental impact of our developments across their entire life cycle," said Paolo Bevilacqua, general manager, sustainability — Frasers Property Australia.

Life cycle management is added to the new ISO 14001:2015 for environmental management. EPDs offer the standardised information exchange format from your suppliers to you, and from you to your clients and stakeholders.



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