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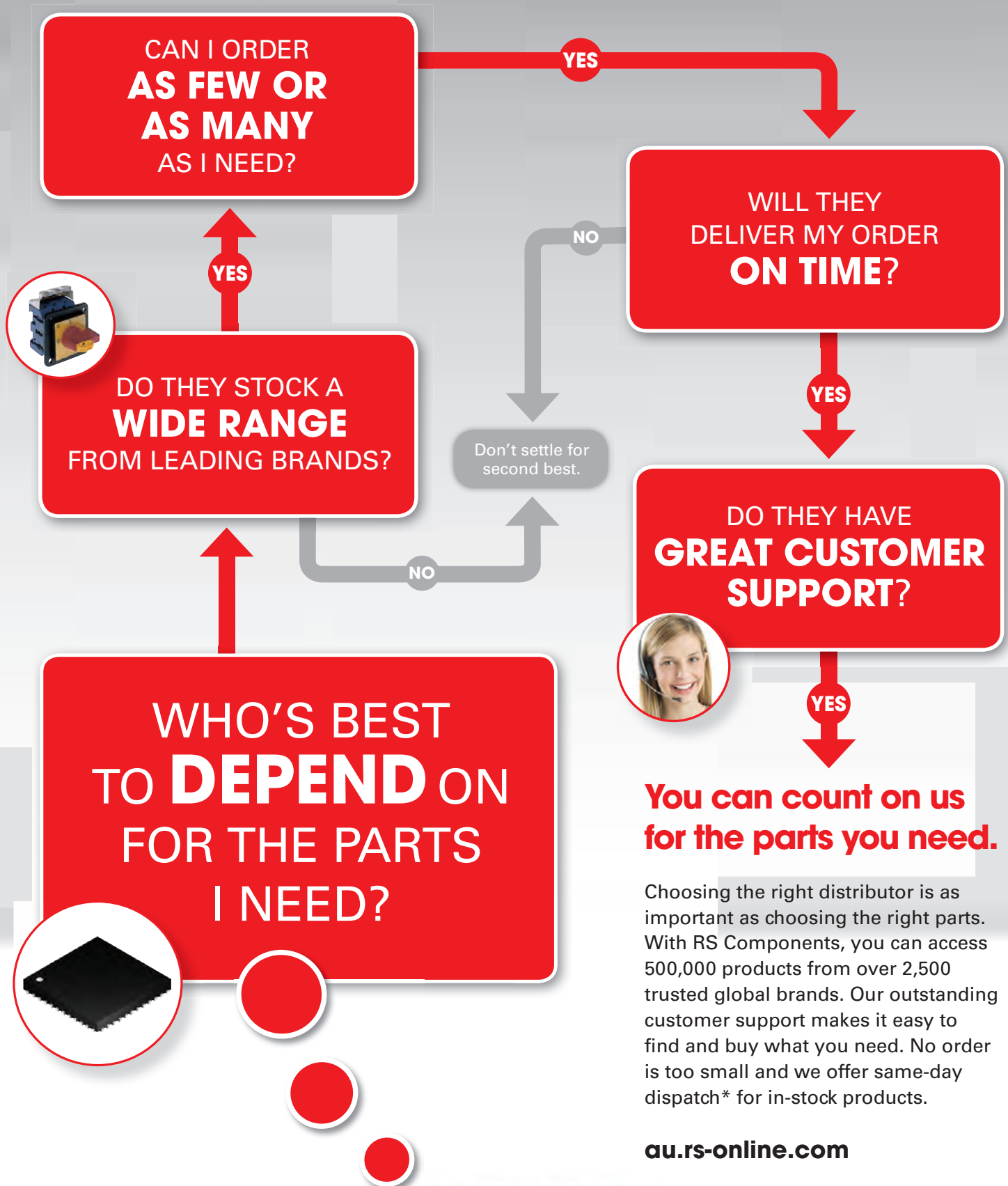
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A decade ago, who would have believed that the majority of Australians would have access to a vast array of advanced technology in the palms of their hands? Even though technologies such as the internet, GPS, digital cameras, movies, music, mobile phones, etc were in existence, improvements in data storage, communication technology and battery capabilities has meant that this technology is now affordable and easy to use. With sensors being installed in so many devices, and sensing devices being network-capable - along with the ubiquitous smartphone, smart metering technology, the 'cloud' and 'big data' - we are entering the era of the IoT (the Internet of Things). Environmental monitoring, industrial automation, security and safety systems are all examples of systems that stand to benefit from the massive increase in data that this technology is beginning to provide, opening up a whole new world of opportunities, not only for the domestic market but also in business and industry. What are these opportunities? In this special CEO Insights issue we find out some of the answers and opinions from top executives across the process, sustainability and safety industries.

We hope the 2015 brings success, wealth and happiness to you and your business!



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THE IMPACT OF THE INTERNET OF THINGS

Carolyn Jackson and Glenn Johnson

Traditional information systems are based on static architectures in which data follows known routes and has a predefined application. Current technologies in industrial process control and automation, in security and safety monitoring systems, and in environmental monitoring are all examples of specific applications of these types of information systems. But these data flows are changing in such a way that the physical world itself is now becoming a type of information system. With the Internet of Things (IoT), sensors embedded in physical objects, from household appliances to pacemakers, are linked through wireless and wired networks, and are producing enormous volumes of data. With all this sensing data becoming available, the IoT is expected to become a valuable tool for businesses and for society at large to optimise and automate.



The risk for organisations that today base their businesses on static information architectures is that they may miss out on new opportunities to improve business outcomes, efficiency, safety and sustainability through not having access to the useful information that the IoT can provide. Those that adapt earlier to the information available from the IoT will have a competitive advantage.

The efficiency, safety and sustainability benefits of this type of pervasive sensing can be well explored in a manufacturing or processing environment:

- The IoT can provide constant feedback on consumer buying behaviour, allowing manufacturers to better optimise their product marketing and packaging, as well as their manufacturing process, in real time, or at least more responsively than is currently possible.
- Manufacturing systems with a multitude of sensors can be controlled more efficiently and provide feedback on their condition and maintenance needs in real time.
- Autonomous or semi-autonomous manufacturing technologies such as robots can monitor their own environment for hazards and automatically take corrective action, improving safety and uptime.
- Products on the production line fitted with RFID-based sensors can initiate specific made-to-order options in their own assembly and manufacturing, eliminating or reducing retooling.
- Workers in a plant can wear IoT-enabled identification that enables them to be monitored for location and safety-related parameters, such as exposure to harmful environments, or to locate them in an emergency - a powerful application also in the mining and process industries.
- Process plants and mines can more easily deploy and take advantage of safety and environmental monitoring through IoT technologies.
- IoT-enabled sensors outside the environs of a plant, mine or wellhead could provide data that can be used by the plant operator. For example, environmental sensors monitoring groundwater in the vicinity of coal seam gas extraction could provide real-time data to not only environmental authorities and local councils, but also to the wellhead operator itself.

Giving our bridge a 'voice' with IoT technology

The Sydney Harbour Bridge (SHB), like many iconic structures around the world, is ageing

and requires regular preventive maintenance. Frequent inspections are essential and best practice but this alone may not be the most cost-effective and efficient way to maintain the majestic 'coathanger' in peak condition. What if the SHB could talk to us and tell us when she needed attention? Well, using the latest computer science and data techniques, Australia's ICT Research Centre of Excellence - NICTA - is effectively doing just that.

The Structural Health Monitoring project being developed by NICTA for Roads and Maritime Services (RMS) uses lightweight, low-cost sensor technology and advanced data analysis to provide real-time monitoring of the structural health of the SHB and the safety of its concrete deck.

"In essence, the bridge tells us when it thinks it needs attention," says Peter Runcie, business leader - structures NICTA. "We can sometimes think of this as giving our infrastructure assets a 'voice'."

What inspired the project?

"RMS wanted to extend the life of certain bridge components without significantly increasing maintenance expenditure," said Runcie.

The bus lane on the eastern side of the SHB was built in the 1950s to replace the tram line that was there previously. Underlying this lane are almost 800 supporting components that bear the load of the 1.2 km-long roadway above. These concrete and steel components have been exposed to salt spray and weather over the years and are showing signs of their age.

Physical access is difficult. In order for RMS to conduct its regular two-yearly inspections on this part of the structure, workers need to either abseil down, use cherry pickers to come up from the ground or access via the maintenance gantry that travels under the bridge.

Runcie says what RMS required was an early-warning system that could monitor the condition of this part of the bridge between inspections and help determine when preventive action was needed. This would be complementary to the existing ongoing scheduled inspection program.

"When RMS could not find any technology on the market that could help them do what they wanted, they came to NICTA and we had to invent it.

"We like solving difficult but worthwhile problems, so it was a good fit for us," says Runcie.

Why use IoT technology?

One of NICTA's strengths is increasing productivity through data analytics and optimisation.

The use of Internet of Thing (IoT) technology in this and many other projects is due in part to the advancement of communications technology which has increased connectivity of people - ie, we all now have mobile phones and access to apps and data. It's also due to the costs of hardware continuing to come down. This makes it possible to increase the connectivity of things (ie, in this project it was sensors). Being able to use a greater number of sensors and a more capable communications networks provides the ability to access much more information than ever before.

However, Runcie says: "In order for IoT technology to be really useful, we need to pay a lot of attention to how the data is analysed and how information is then made available to users in meaningful and useful ways."

How was the system designed?

The NICTA-developed system uses a combination of low-cost sensors (about 2400 required to monitor this part of the bridge) and several data analysis techniques, including machine learning, to analyse vibrations caused by traffic passing over the bridge.

Using innovative algorithms and simple components, the system can detect movements in the concrete deck that are considered to be abnormal, while ignoring normal movements due to vehicle traffic.

"Off-the-shelf equipment was too expensive then, and still is unaffordable," said Runcie. "So we designed and built some hardware and a new sensing system using accelerometers (inexpensive accelerometers like you will find in a mobile phone). Each accelerometer is controlled by a small computer, also low-cost technology, which just a few years ago would not have been feasible.

"All the sensors are connected by weatherproof ethernet and a fibre-optic network. Some data is processed by the computers on site and the results of that processing together with some of the raw sensor data is sent back to NICTA's data centre in Canberra."

Data analysis is the key that unlocks the value in all the data that is collected. NICTA's machine learning research group has recently been recognised as being in the top five in the world. This team of scientists has developed new analytical techniques that have been applied here.

"The neat thing about machine learning analysis is that it is a data-driven approach that can be applied even when the physical structure or system is very difficult or not feasible to model in an engineering sense," says Runcie.

If any anomalous readings are detected, the asset manager and bridge inspectors



are notified by email and text message so they can schedule an inspection. They also have a web-based application to monitor the bridge - this is a decision support tool that helps bridge management schedule maintenance resources.

"What RMS wanted us to do was to interpret the information for them and just give them the answer that they wanted," says Runcie. In other words they wanted to know: Do I need to go schedule an inspection or don't I?

The system is therefore designed to be easy to use for the asset manager. Basically, it provides a web page that shows the map of the bridge which is colour coded. "If it's all green, everything is good; if orange, it means that some anomaly has been detected and an inspection should be scheduled," says Runcie.

"They still do their two-yearly inspection but this just gives them additional situational awareness in a form they can understand."

Can this technology be applied to other applications?

This technology is certainly applicable to other bridges and structures around Australia and internationally says Runcie. "The data that is needed for each application is going to be different. For example, it may not be the vibration around the joint that is important, it could be stresses and strains, fatigue cycles or corrosion that's important, or some combination of these. It could even include other information such as maintenance and inspection records, loading or environmental information. The analytical techniques are then adapted for each application.

"We have made the system design generic in terms of the sensors and data sources that can be used and also the analytical tech-

niques that can be applied. If new analytical algorithms are needed they can be developed and easily implemented as software in the system," he says.

Although it is a bit of a conceptual mind shift for engineers and some asset owners, Runcie points out that data-centric analysis techniques such as this are complementary to more traditional approaches and provide new insights into the condition and performance of structures.

IoT technology with environmental impact

Drones have been capturing the headlines lately with concerns over privacy and security. However, when drones are incorporated with innovative optical sensor technology, some surprisingly positive solutions are possible. One such solution being developed in Australia could also have a real-world impact on environmental issues that concern many industries.

The development is closely connected to the Internet of Things (IoT) because it uses high-tech sensors on drones to provide accurate real-time information about greenhouse gas emissions that can be interpreted and mapped into real-time 3D images for easy analysis. The technology has been specifically designed for wastewater treatment in Melbourne; however, there is potential for many similar applications at sites such as agricultural, oil and gas pipelines, landfills and mines.

Inspired and funded by a challenge set by Melbourne Water under the Victorian Driving Business Innovation scheme, industrial designers Outerspace Design and sensor experts Wirriga joined forces as Draco Scientific to come up with a solution. Dr Maryanne Large, chief scientific officer at Draco Scientific, says the group of scientists that formed this company wanted to do something that had an impact on some of the big environmental issues.

What was the challenge?

While Melbourne Water is already progressive with its green agenda, it believes it is possible to do more, explains Large. It may be able to sequester an additional 10-20% of methane (CH₄) from the sewage lagoons for its bio-gas power station at the Western Treatment Plant in Werribee. Better monitoring could also provide a more accurate picture of its baseline CH₄ and nitrous oxide (N₂O) emissions at the plant.

N₂O and CH₄ are potent greenhouse gases that are harmful to the environment; CH₄ can also be a significant safety risk and its loss also represents the loss of a valuable fuel.

"When the Melbourne Water challenge was first proposed, there was a price on carbon," says Large. "Now this has changed, but the utility is aiming to benefit from reduced emissions under the new Direct Action Plan."

Sequestering CH₄ that would otherwise escape into the atmosphere could provide Melbourne Water with significant savings. Assuming a future carbon price, or value, under the proposed Direct Action Plan of \$5/t CO_{2e}, a 20% reduction in emissions could save up to \$800,000 a year.

Confirming accurate baseline measurements of these gases is also important but the need for more accurate emissions is often offset by costs of getting the measurement. Methane is highly volatile and access over the lagoon is difficult, explains Large. "Currently, the emission of the gases is estimated, using the protocols of the National Greenhouse and Energy Reporting Scheme (NGERS).

"Melbourne Water wanted to see if these NGERS values were an accurate reflection of what actually happens in the system," says Large.

The instrumentation required for this purpose is expensive and the emissions may occur over large areas that may be difficult to access and are associated with safety (OHS) considerations. "Also, because methane rises rapidly, ground measurements of leaks are difficult - you have to be in the right place when the leak happens," says Large.

This challenge identified a real gap in the market for a cost-effective method of monitoring these difficult-to-measure gases at difficult-to-access sites. A design was developed using unmanned aerial

vehicles (drones) that incorporate sensors which could be flown autonomously over the site to collect the data. In order for this data to be valuable, it would then need to be interpreted with other related data such as wind, temperature and humidity, and mapped into real-time 3D images. There was no existing solution on the market.

How does the technology work?

There are two main aspects to this technological development: one is the technique of making compact, lightweight and accurate sensors and the other is incorporating this technology into drones.

The drones can autonomously survey an area, but a line of sight by a qualified person must always be maintained under the current regulations, explains Large. They can also use 'search' algorithms to identify leaks. "We envisage most of our drones will be preprogrammed with search algorithms to allow the drones to respond intelligently to what the sensors are telling them," she says.

In order to accurately measure the gases, sophisticated optical sensor technology is required. The sensors use infrared technology and must have sensitivity of at least one parts per million (ppm).

"There are no good cheap solutions available for measuring these gases," says Large. "The solutions that were available were not only very expensive but also heavy, weighing up to 30 kg.

"Therefore, the challenge for us was to develop a sensor that could measure these gases to one ppm and still be light enough to put onto a drone.

"In order to make the technology accessible in terms of cost, the first rollout will be based on a service model," says Large.

While the sensor is not on the market yet, it is designed to achieve sensitivity better than one part per million and weighs less than 2.5 kg. The Draco Scientific team is excited that Victorian Government funding will

mean that the technology development will happen in Melbourne, and create local jobs.

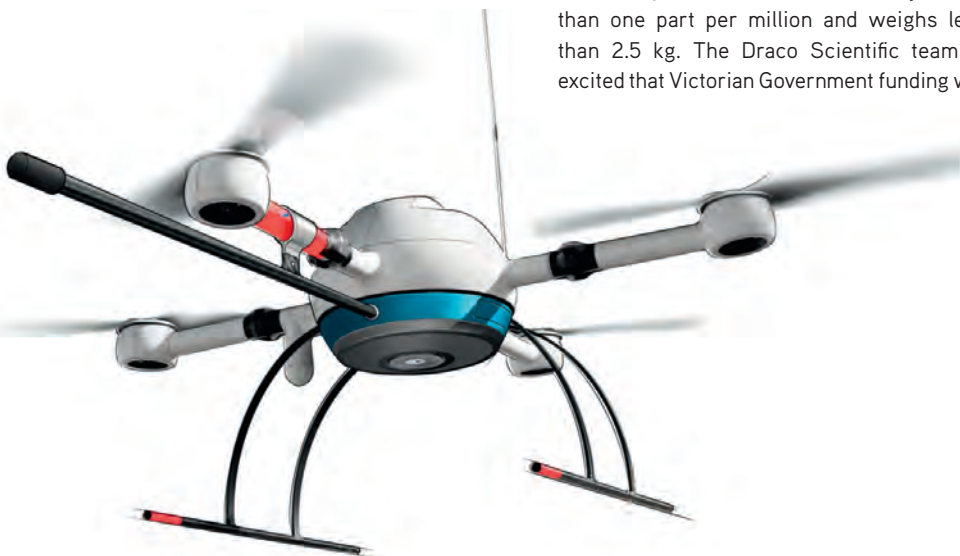
The IoT in process and manufacturing automation

The IoT is a general term being used to describe the interconnection of 'smart' devices of all types, from iBeacons in stores to soil monitoring on farms. The industrial world is already well acquainted with the use of smart devices in specific proprietary applications such as distributed control systems, and in recent years there has been a flurry of research activity around the greater business benefits of increased interconnectivity between automation devices, and the additional data that can be collected from them. These initiatives have been called variously 'Industry 4.0' in Europe, the 'Industrial Internet' in North America and simply the 'Industrial IoT' (IIoT).

These industries already benefit from a large deployment of IP-enabled technologies, but to date these technologies have been deployed in the traditional types of static information systems - proprietary or customised systems specific to a plant or mine that provide the necessary automation and control within a single plant or system. And although much automation technology is IP-enabled today, the processing and manufacturing industries currently use a broad range of different automation protocols, technologies and standards that are not compatible with each other and are each chosen for their specific advantages or benefits to the specific application.

One of the hottest topics in industry at the moment is the integration of business information systems with manufacturing and processing systems - mainly in order to improve efficiency and sustainability. This has already raised many of the issues that will be faced with the IoT - specifically around integration of disparate technologies, data mining and optimisation, and the mitigation of cybersecurity risk as plants are potentially more open to the internet than they previously were.

The IoT is seen as a way in which these disparate systems, technologies and architectures can be more seamlessly integrated, further lowering cost and improving efficiency and business opportunities. With the greater research and financial resources of the large automation firms, and because the automation industry is already working to understand and overcome the risks and challenges associated with greater connectivity, we may see the industrial automation industry lead the way in the safe and effective application of the IoT in the future.





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MATTHIAS GUNKEL

REGIONAL DIRECTOR, PEPPERL+FUCHS ASIA PACIFIC

What do you feel are the three most important things your customers are looking for in a supplier?

The traditional ingredients are as valid as always: 'Product, Price and People'. A reliable and innovative product for a competitive price presented and supported by a technically competent team will be always a winner.

Add some spices, such as consistency and partnership, and you have a winning recipe! However, as a wise man once said: "The simplest things are sometimes the most difficult ones." To maintain a high standard of customer satisfaction, it requires constant and continuous review and investment. In the past years at Pepperl+Fuchs Australia we have invested heavily in our infrastructure as well as our people – from customer relationship management systems to training facilities and an efficient supply chain, these help keep our customers satisfied.

What emerging trends or developing technologies may influence or change the way your industry sector will do business in 2015?

Industry 4.0 has until now been more of a concept than a reality – we are only at the beginning of an evolutionary process that is already much more advanced in other sectors. It means converting large production units and entire companies into networks. This task is far more complex, and more time is required as a result. Customised configuration of products and flexible, yet automated, production at the same unit cost as mass production are the main characteristics of Industry 4.0, and the key to this is the vertical integration of the engineering chain as well as the seamless connection of integrated automation processes. The customer can personally configure the product, and data is automatically sent to production via the internet without any manual involvement.

What do you see as the single biggest challenge facing industry in the years ahead?

Approximately half of the electrical energy consumed in today's manufacturing is used for internal transport and positioning tasks, so this area is undoubtedly where we see the greatest potential for savings. Industry is therefore focusing on energy-efficient automation solutions to rein in energy costs. But plants are not only at their most efficient when they run continuously in their optimised standard operating mode – it also involves using energy when supply is plentiful and prices are lowest. In Industry 4.0, the field level of production will become intelligent. Equipment that does not have to be running constantly can switch itself on automatically when electricity is at its cheapest.

What are your customers demanding of you more today than five years ago, and how will you meet these requirements in 2015?

Today, our customers quite rightly expect convincing product

performance at a competitive price. One of the key challenges of today is an efficient and agile supply chain, serving the customer in a timely manner when needed and where needed. This is a permanent challenge, especially with the full availability of a large product portfolio versus optimised raw material and finished goods management, which are equally important in a well-managed business. Large technical and financial resources are needed, to gain highest flexibility and accuracy in the supply chain to the customer. Pepperl+Fuchs recognises these issues and has continuously invested in its global supply chain. In 2016 a new distribution centre in Singapore will be a major milestone in this drive for excellence in delivering better outcomes for our customers and our company.

There has been much discussion in the general media of a weakening manufacturing sector in Australia. How do you see the future for Australian manufacturing?

Well, I have a very personal opinion about this subject. The manufacturing sector in Australia has, over the past decades, shown a strong resilience to crisis. Personally, I attribute this to a strong technical competence, a unique hands-on curiosity for new technologies and a climate of tough and strong competition from within as well as internationally. The decline of the Australian automotive industry has brought a lot of publicity to this topic, but it is important to understand that this is only one aspect of future development. In many of my customer visits in Australia, I have met many well-informed and bright engineers with ideas and the spirit of entrepreneurship, which gives me confidence the Australian manufacturing sector will reinvigorate and will reinvent itself wherever necessary.



Matthias Gunkel has more than 25 years' experience in the automation business in Asia-Pacific. In 1994 he established the first joint venture for Pepperl+Fuchs in China and subsequently managed the Pepperl+Fuchs Asia-Pacific sales organisation. He sits on the Pepperl+Fuchs Factory Automation Division board of directors and resides in Shanghai, from where he covers markets from Australia, China, Korea, Japan, India and South East Asia.

Rental vs Purchase

Why rental is more cost effective than ownership

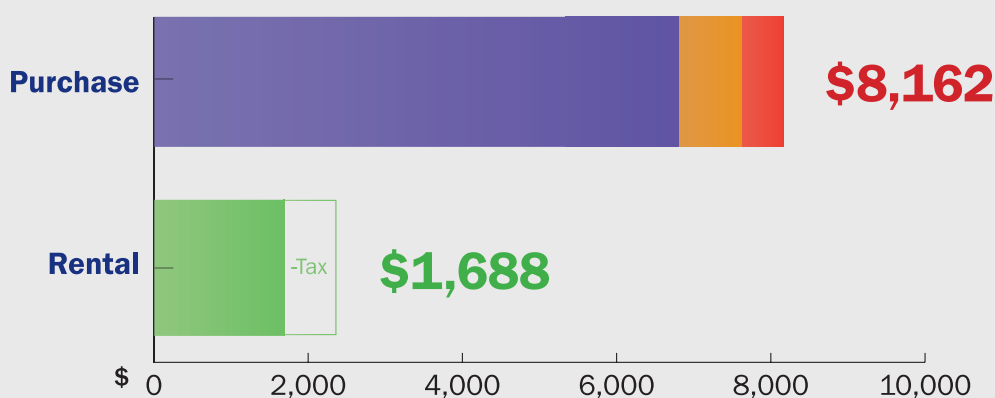
When weighing up whether to purchase or rent, it is clear that the benefits of rental far outweigh the cost of ownership. Not only does rental save you money, but it's the smarter business option, providing you with greater flexibility and control. At the end of your rental period, simply return the equipment and upgrade to a newer version, it's that easy!

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Druck DPI 611-20-NATA 20 bar Pressure Calibrator



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All rental rates quoted are based on a 3 year period.

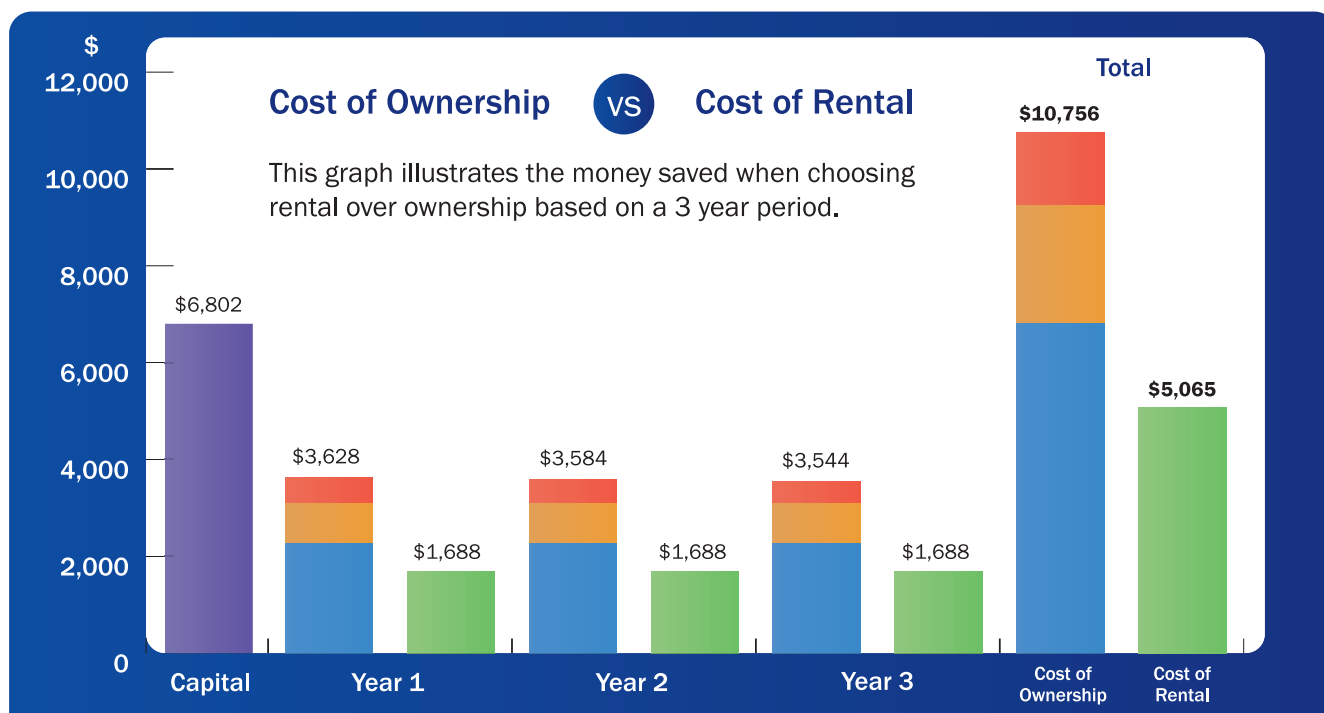


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Rental vs Ownership for the Druck DPI 611-20-NATA 20 bar Pressure Calibrator



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DAVID GALLAGHER

CHIEF EXECUTIVE OFFICER, TR PTY LTD

Will the post-boom resources industry continue to be a primary focus for engineering vendors?

The size and scale of the ~\$23 billion resources industry, with an expected ongoing growth of 4% p.a., means that it will continue to be a large focus of engineering vendors. Mining production will continue to increase and there'll be significant opportunities in maintaining existing infrastructure in what is currently a harsh environment. While new infrastructure requirements have slowed there will be new investment which will again provide opportunities for engineering vendors.

What do you think are the three most important things your customers are looking for in a supplier?

From a TR point of view, I think our customers are looking for consultative advice, good quality customer service, honesty and reliability.

We regularly deal with customers who have an immediate problem that they haven't dealt with before. Often the customer is looking to leverage off our salespeople's considerable experience to obtain advice on how to deal with a particular measurement problem.

Customers also want to know that they will be able to talk to a person who can deal with their particular issue. TR has invested in a range of technology to ensure we understand their requirements, with a particular focus on quickly and efficiently solving their problem.

As we often deal with time-critical applications, our customers need us to be brutally honest in terms of what we can and can't do, so they can make appropriate and timely decisions. Often the cost of our service is insignificant in terms of the costs that may be involved in a breakdown or other problem. We work hard to understand the customers' requirements and to ensure we give realistic expectations of what can be achieved.

What are customers demanding of you more today than five years ago, and how will you meet those requirements in 2015?

Traditionally we have operated in the short-term rental space with rental lengths measured in days, weeks, and in some cases months. What we are currently seeing is that more and more organisations are working to an operating expense model where they are renting equipment for longer periods to satisfy the requirements of a particular project. Rather than purchasing equipment for a 12-month project they are now more savvy and have realised they can pay between 60 and 70% of the purchase cost for equipment, and then hand it back at the end of the term without any residual disposal or asset management issues. We are working closely with equipment manufacturers to ensure our longer term rental rates for 12, 24 and 36 months are competitive and attractive to our customers to assist them in better managing their costs.

Do you see organisations in the industrial and construction sectors taking up cloud computing in the near future?

I do see organisations in the industrial and construction sectors taking up cloud computing - particularly with the increase in smart-phones and the improvement in both costs and speed of internet available from our mobile telephone networks. We are already seeing an increase in cloud computing from our customers in this sector, with many of them now accessing our mobile website and YouTube channel to download information or instructional videos on the equipment that they have hired.

There has been much discussion in the general media of a weakening manufacturing sector in Australia. How do you see the future for Australian manufacturing?

There is no doubt that some sections of the Australian manufacturing sector will struggle into the future and particularly those associated with the car industry as Ford, Holden and Toyota leave the country. However, there are other components of manufacturing that are doing well with strong domestic and export markets. Manufacturers need to be benchmarking themselves globally and ensuring that they are delivering world-quality products at competitive prices, which means they need to invest in people, plant and equipment to ensure that they are not just Australian leading manufacturers but world leading manufacturers.



David Gallagher was appointed CEO in February 2010, having held a number of roles within the TR business. These roles included Branch Manager, Marketing Manager and Director of Operations. Prior to joining TR, David worked as Export Manager for Recoil Pty Ltd. The role covered North and Southeast Asia and the subcontinent, including branch responsibility in Singapore and Thailand. David also worked for Davey Products as Export Manager, covering the South Pacific, Southeast Asia and southern Africa.



IS burst detection system

Elfab's Flo-Tel XD burst detection system is fully Exd approved, negating the need for intrinsically safe barriers and interfacing directly with the user's remote terminal unit, all of which reduces installation costs.

Flo-Tel XD is a one-time only installation unit. The system has no moving parts and is therefore said to be highly reliable. Its method of operation is specifically designed to be fail safe. Any periodic maintenance checks required by the user can be carried out by a non-electrically qualified fitter using the Flo-Tel installation tool.

The sensor fits into a pre-machined pocket in the rupture disc holder while a magnet is attached to all Elfab rupture disc products as standard. When the disc bursts, the magnet arcs away from the sensor and produces an open circuit signal. After functioning, only the disc needs to be replaced, saving on both costs and downtime.

BR Reeve Engineering

www.reevegroup.com.au

Food waste dehydration system

The GaiaRecycle range, distributed by Eco Guardians, allows diversion of food waste from landfill so that it can be dehydrated and sterilised at source to create nutrient-rich fertiliser or a renewable energy source.

Machines with capacities from 50 kg to several tonnes per day take only 10 h to reduce waste volume by up to 90%.

The by-products are clean, condensed water and a solid biomass that is safe to handle and can be used as a fertiliser without fear of introducing non-native plant species.

The process requires no additives and is simple to operate, with no sawdust, no microbes and no water. The conversion occurs within a sealed reactor chamber so that no odours can escape. Versions are available to operate on gas, electricity or steam (depending on size). Greenhouse gas emissions are said to be reduced by up to 90% compared with allowing the food waste to rot in landfill.



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Powered respirator online training

Companies face major challenges with workplace safety training due to remote site locations, site security requirements or conflicting shift schedules. Where workplace safety is concerned, employers and their health and safety officers are responsible for training all staff, managers and contractors in the use of safety equipment. When this involves technically complex topics such as respiratory protection, the learning environment and the time taken for staff to learn vary from person to person. Online training has been shown to greatly assist training in the workplace.

The CleanSpace Respirator Online Training Program provides web-based interactive modules covering aspects of CleanSpace products: setting up, operating, battery and filter information; and cleaning and storage. The program is modularised, allowing individuals to learn at their own pace and in their own time. This can be consecutive or jumping in and out of individual topics to readily access the information they need.

The modules are PC- and tablet-compatible for users to access quickly, around the clock and at times that fit with their shift schedules. A short list of questions is available at the end of each module in order to embed information and identify learning gaps and register completion of the module with management. The program can track employee training participation and provides management notifications, providing an audit trail for compliance purposes.



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MANAGING SUSTAINABILITY IN OUR FACILITIES

Australia is at the forefront of green building and sustainable building practices with a range of programs and incentives in place to ensure greater energy efficiency within the country's built environment. This is particularly the case in relation to new buildings where state and territory government regulations require new buildings to achieve minimum energy star ratings.

Melbourne's Pixel building is a good example of Australia's innovation in sustainability. In 2012, Pixel was awarded the world's highest 'Leadership in Energy and Environmental Design' rating from the US Green Building Council. The building is carbon neutral, with a rooftop garden and state-of-the-art green technologies such as vacuum toilets and an anaerobic digester.

But how do we retrofit these high standards on the country's old buildings or facilities? The responsibility largely rests on facility managers and their knowledge of sustainable practices. Facility managers have the ability to significantly influence sustainability outcomes in a wide range of activities such as waste management, environmental management, purchasing, and building and grounds maintenance.

Next March, facility management professionals are invited to attend Total Facilities in Sydney, which presents a prime opportunity to enhance their knowledge of sustainable technologies and developments in the industry. In particular, the trade show will feature a 'High Performance Buildings Pavilion', showcasing new and bright solutions for optimising efficiency in the areas of energy, waste and water.

Diversified Communications Exhibition Director Brett Judd said Total Facilities offers education and professional development opportunities

for facility managers concerned with sustainable practices. He noted, "The High Performance Buildings Pavilion will grant visitors access to targeted education sessions as well as a preview of products, tools and technologies that create a more sustainable, renewable and carbon-efficient building."

Maser Communications is just one of hundreds of exhibitors at Total Facilities 2015. It is a provider of technology solutions and services for telecommunications, defence, security and industrial applications and will be displaying its Intelligent LED high-bay lighting, by Digital Lumens USA, which is claimed to enable facilities to cut lighting costs by 90%.

Maser will also showcase its voltage optimisation products, an electrical energy-saving technique in which a device is installed to provide an optimum supply voltage for a building to eliminate excessive energy consumption. Maser General Manager Matt Young believes that by implementing energy-efficient improvements, facilities not only meet their energy-efficiency targets but also enhance their operations.

Total Facilities will open at Sydney Exhibition Centre, Glebe Island from 25-26 March 2015. To register for free entry and to find out more, visit www.totalfacilities.com.au.

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Chemsearch BioAmp helps hotel tackle drain back-ups

The Chemsearch BioAmp system, by NCH, was the answer for a major hotel in Brisbane when it was confronted by a sudden flood of raw sewage in its underground car park. The hotel lift station pumps failed when they became choked with fats and greases that had accumulated in the sump, causing the sewage to back up and overflow from the pit and flooding the car park.

The hotel had to call in its contract plumber to clear up the mess and fix the pumps. As the problem occurred over a long weekend, it was forced to pay emergency rates in addition to the replacement cost of the pumps. The hotel has since installed a BioAmp system from Chemsearch.

The patented system delivers over 30 trillion live bacteria to the pit every day - the equivalent of 1100 L of traditional liquid-based biological products currently available on the market. The system uses naturally occurring bacteria derived from the soil to digest fats and greases, breaking them down to their constituents of carbon dioxide and water. This is the same process used by sewage treatment facilities to treat waste discharged to the sewerage system.

The company has a variety of FreeFlow starter cultures that are formulated to digest specific waste mixes. The bacteria used in the FreeFlow, the BioAmp starter culture, contains *Pseudomonas* bacteria, which are renowned for their ability to aggressively breakdown fats and greases, together with five strains of *Bacillus* including some fatty acid degrading organisms. It is claimed that no other company offers this off-the-shelf technology to SMEs.

Advantages of the system include:

- The Chemsearch BioAmp is an automated, self-contained, wall-mounted unit. There are no messy dosing systems and there is no need for staff to remember to mix and apply the product.
- The FreeFlow bacteria release specific catalysts that digest and reduce fats, starches, proteins and BOD contributors. Once dosed to the drains, the microbes multiply every 20 minutes while there are nutrients available.
- The BioAmp microbes have been selected for their ability to convert the fatty acids, which are in part responsible for the low pH levels that contribute to concrete corrosion, in the system, into carbon dioxide and water.



- The BioAmp will deliver a reduction in the sludge levels as the microbes will convert a portion of the waste to carbon dioxide and water.
- FreeFlow is certified as BioPreferred by the US Department of Agriculture, is 94% bio-based and contains no surfactants or free enzymes.
- All strains of bacteria in the FreeFlow are class 1 and guaranteed to be free of *Salmonella*, *E.coli*, *Listeria* and other harmful bacteria. FreeFlow has been independently appraised by the NSF as being acceptable for use in and around food processing areas.
- The system requires no capital investment.
- The system contributes to Environmentally Preferred Purchasing Programs. It was judged as the 'Best Green Product' by the US Green Building Council.

The BioAmp system can protect assets from failure for over 12 months. The service includes the BioAmp generator, supply of FreeFlow starter culture and a monthly service and system clean by a Chemsearch associate. The system is not only used for treating lift stations, it also has applications to improve waste effluent containing organic contaminants.

Since the installation of the BioAmp system, the hotel has not had any major issues with odours or backups, resulting in a more pleasurable experience for its customers and guests.

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KATHRYN WOOD

MANAGING DIRECTOR, POWERFLO SOLUTIONS

What do you see as the single biggest challenge facing your industry in the year ahead?

I believe that our biggest challenge as a wholly Australian-owned company is to remain competitive as a local manufacturer and importer of engineered valve products. The Australian dollar directly affects us as an importer of specialised control valves, regulators and instrumentation - most of which are produced in Europe or North America - but the main concern is the cost of our local design and engineering resources.

In many market sectors, the trend towards outsourcing engineering and technical personnel to Asia and the Indian subcontinent is increasing. But for a company that has quite a specialised product portfolio, the challenge is to find the required level of application expertise, which is rapidly disappearing here and overseas.

Will the post-boom resources industry continue to be a primary focus for engineering vendors?

Following on from my comments above, it is simply too expensive for major EPC companies in Australia to compete in the world market for resource-based projects. In fact, it is becoming increasingly untenable for Australian EPC companies to sustain an engineering team, to compete for business in any industry in Australia. The global players, with engineering and technical scope beyond our shores yet still with a footprint in Australia, are the most strongly positioned. Moreover, the comparative strength of the Australian dollar also directly affects exports of our natural resources, favouring lower capital-intensive investments available elsewhere.

What are your customers demanding more of you today, than five years ago, and how will you meet these requirements in 2015?

In one word: Service. We have seen significant growth in our after-market service business, particularly as most of our customers man-down their maintenance departments, particularly for specialised equipment such as those we manufacture and distribute. Long gone are the days when most of our customers employed technicians familiar with the servicing aspect of process control equipment; so bringing our services to site, utilising mobile facilities with accomplished personnel, is now commonplace. In 2015, we will focus on bringing valve diagnostic programs to our clients, which will crucially provide an overview of the plant's valve assets, so as to aid in preventive maintenance programs as well as long-term maintenance strategies.

What do you think are the three most important things that a customer looks for in a supplier?

Technical product support, order/project management and after-market service. In a recent meeting, one of our clients said to me, "You're not doing your job if I have to ask you regarding the

delivery on my valves, but you are, I never have to ask." That has to be our differentiator. We care about the fact that our customers are looking for technical support; that's why we employ experienced application engineers and not just 'order-takers'.

We know that without efficient and accurate order/project management, late project deliverables turn otherwise perfectly straightforward contracts into a logistical nightmare. For this reason, we employ contract management personnel who are disciplined and who are good communicators - and we don't make promises that we can't keep.

We also believe that after-market service is paramount to maintaining long-term relationships with our clients.

What new and innovative technologies do you see emerging in your field of business in 2015, and how will they help your customers?

There is a huge swing in the control valve industry away from over-complication in trim design, particularly for severe applications that generate high noise. In recent years, many European customers and manufacturers alike have moved away from complicated, hard-to-service control valve solutions in favour of 'source and path treatment solutions', particularly for noise abatement. More focus is placed on velocity management over a series of stages, not just within the control valve but beyond; rendering the control valve easier and less expensive to service. This is complemented by the introduction of 'capsule-like' control valve trims, wherein the whole complement of trims is held together in a cartridge, providing for ease of exchange - particularly in valves that are welded in-line or are difficult to handle. Technically advanced trim materials also provide for extended service life, over more traditional materials.



For more than 30 years, Kathryn Wood has run her own business, specialising in engineered control valve solutions and regulators. She is currently the Managing Director and Chairman of Powerflo Solutions, which commenced operations in 1911. During her working life, she has been involved with the IICA and now dedicates much of her time to the training of young graduate engineers in her field of expertise.



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DAVID DUNCAN

MANAGING DIRECTOR, SICK PTY LTD

What do you see as the single biggest challenge facing your industry in the year ahead, and why?

This is a difficult question as SICK have a unique offering to many industry sectors due to our extensive product portfolio for the factory, logistics and process automation industries. Each of the industry pillars present different challenges, some which are very specific and some more common economic issues. However, I believe that a significant challenge to all industries will be the identification of opportunities and capturing the benefits that big data and Industry 4.0 will bring to multiple industry sectors. The ability of sensor technologies to capture data, store data and convert the data to useable information for business information and competitive advantage will challenge industry norms.

Will the resources boom continue to be a primary focus for engineering vendors? Why/why not?

The resources sector is a primary focus for SICK and will continue to be so as we support the resource sector's progression from construction to production and, in particular, the utilisation of automation technologies. The focus of the resource sector to drive productivity and reduce costs, and to do this safely, are major issues that all companies in this sector are concentrating their efforts on, including engineering vendors. Automation and sensor technologies in particular are creating further opportunities to deliver significant results across these business goals.

What do you feel are the three most important things your customers are looking for in a supplier, and why?

The ability of a supplier to understand the customer's business requirements, to develop innovative solutions and to ensure the ongoing support of the customer is imperative to developing integrated business partnerships with our customers. It is important to SICK that our customers have every confidence and trust in us to provide innovative sensing technology solutions. This goes well beyond the traditional customer-supplier relationship to supply a product or service on time. The need to deliver tangible business benefits to our customers - such as the provision of 'LifeTime Services' to support products, systems and integrated solutions from 'cradle to grave', giving our customers total piece of mind - is highly valued.

What are your customers demanding of you more today than five years ago, and how will you meet these requirements in 2015?

Our customers are demanding total integrated sensing solutions from SICK. This means comprehensive expertise from a single source, ranging from product-independent consulting to traditional

product services. Additionally, our design services, engineering, construction, installation and commissioning, training and education portfolios, combined with the provision of ongoing support services, complete the total integrated approach.

SICK is committed to providing professional services to our customers in the factory automation, logistics automation and process automation industry sectors. SICK LifeTime Services is specifically created to provide the high-quality services stated above to our customers for productivity and sustainable efficiencies worldwide.

What new and innovative technologies do you see emerging in your field of business in 2015, and how will they help your customers?

Dr Erwin Sick was an inventor and this innovative spirit is the cornerstone of the company and remains first and foremost today. Part of our vision 'We see the world today as it will be tomorrow' reflects this pioneering innovative thinking and the ongoing development of intelligent sensing solutions.

Additionally, we use sensor intelligence to detect inter-relationships and create transparency from the huge amount of data generated from our sensors detecting objects and/or conditions. The intelligent sensors collect, store and process this data with integrated computing power within the sensors, thereby converting data to create information to reliably assess our customers' machines and systems at all times, and provide them with predictive and optimisation functionality. This is the core of big data and creates transparency for our customers and a competitive advantage.



David Duncan is the Managing Director of SICK Pty Ltd, a wholly owned subsidiary of SICK AG. David has been involved in the industrial automation industry for more than 30 years, holding various roles of technical, sales and management responsibilities during this time. For the last 20 years, he has held management roles with German family-owned companies involved in the provision of electrical, mechanical and pneumatic industrial automation solutions. Completing his Masters of Business Administration and a Fellow of the Australian Institute of Management, he has held the position of Managing Director of SICK Pty Ltd for Australia and New Zealand for seven years.

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PETER DAVIS

REGIONAL DIRECTOR ANZ, ELEMENT14

What do you see as the single biggest challenge facing your industry in the year ahead?

With local manufacturers competing with production in lower-cost markets, maintaining inventory and local customer service is no longer enough to meet client expectations. To be the preferred electronics distributor, businesses need to provide a wide range of in-stock, value-for-money products with fast delivery, exemplary local customer support and value-added services that meet customer needs.

For a local industry to compete on a global stage where technologies are constantly evolving, we have to be one step ahead at all times, and listen to our customers' needs. Engineers and purchasing professionals are now looking to the distribution industry to supply end-to-end solutions; in order to successfully innovate and see their designs through to production, they want information, research, products, collaborative working and manufacturing services all in one place.

What do you see as the two or three biggest growth opportunities for your customers in 2015?

Adopting new electronic trends to stay at the forefront of technology innovation will be critical in 2015. Suppliers are now launching new products at a faster rate than I have seen in my 20-year career, and the ability to keep up with product launches gives customers a competitive advantage in the market. At element14 we nurture the relationships with suppliers to provide our customers access to the latest products; this is one of our key strengths.

The Internet of Things, industrial automation, robotics, wearable tech, renewable energy and 3D printing are all high-profile trends gaining momentum as we prepare for 2015. The new high-growth segments present huge opportunities for expansion in the electronics industry and we plan to support our customers' needs in this space.

What do you feel are the three most important things your customers are looking for in a supplier?

For me this question is simple and not unique to the electronics industry. Customers look for an all-inclusive supplier who can provide a wide range of in-stock, value-for-money products with fast delivery, exemplary local customer support and value-added services. In today's competitive market it's easy for customers to shop around for the product and service they require.

Engineers in Australia have changed the way they purchase electronics immensely in the past decade. With project design and maintenance and repair time frames shrinking, there's greater pressure on all aspects of the supply chain to perform at their best. Fast delivery is now a necessity for customers.

Customers want to order the quantity they need from small to higher volumes in a way that is most convenient for them.

What are your customers demanding of you more today than five years ago, and how will you meet these requirements in 2015?

Our customers want continual improvements in terms of breadth of products, technical support and local inventory for fast delivery.

Providing a comprehensive database of technical information and a wide spectrum of design resources to support engineers through the entire design cycle is also essential. From design concept to research and specification, on to prototyping and testing and finally manufacturing, our customers are demanding all-round support for each step of the cycle.

At element14 we understand what engineers need and how they operate, and we aim to provide electronic design solutions for the entire design cycle.

What new and innovative technologies do you see emerging in your field of business in 2015, and how will they help your customers?

Customers are ever more depending on the electronics industry to support their designs from prototyping through to production. This shift is encouraging the electronics industry to evolve from a product-based business model to a comprehensive resource for customers aiming to support design creation from start to finish.

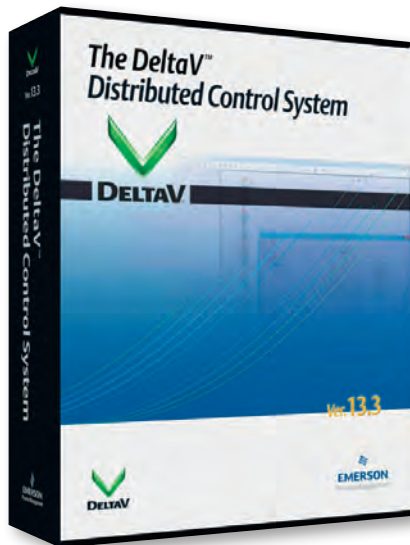
This has led in our case to the development of the element14 Community and, more recently, the element14 Design Center, where customers can access complete end-to-end design solutions, including product data, content and software downloads as well as directly interacting with peers and technical experts to get their questions answered.



Pete joined the Premier Farnell group of companies in 1993, and in 1995 was appointed to lead Product Management, Marketing and Inventory teams throughout Europe and Asia. Over the next 10 years Pete held various senior management roles within Premier Farnell and in 2009 arrived in Sydney to lead the Australia and New Zealand business as Regional Director ANZ. Over the last six years Pete has led the business through the 2010 rebranding to element14, producing new service offerings and partnerships with suppliers.

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PHILIPPE RAMBACH

VICE PRESIDENT OF INDUSTRY BUSINESS, SCHNEIDER ELECTRIC

What do you see as the single biggest challenge facing your industry in the year ahead?

The biggest challenge for industry will be to reduce costs while increasing productivity. Industries as diverse as water utilities, mining, manufacturing and gas all have the same goal in mind - to increase business and operational efficiency. Schneider Electric's vision has long been to see a world where we can all do more while using less of our common resources. With our automation, software and energy solutions we are working with our customers and partners to deliver real business value with locally based expertise as well as globally acknowledged best-in-class solutions and services.

Will the post-boom resources industry continue to be a primary focus for engineering vendors?

While the CAPEX boom may be over in some sectors, Schneider Electric still sees enormous opportunity to work closely with our customers and partners to increase productivity and reduce operating costs. The resources boom has left an enormous portfolio of assets that are operating well under global productivity levels.

With extended software and process automation solutions it is possible to provide accurate real-time insights to the people empowered to take the right action at the right time. This enables companies to detect opportunities to improve reliability, utilise assets more effectively, improve safety and lower operating costs - including energy costs.

What do you feel are the three most important things your customers are looking for in a supplier?

As a solutions supplier, our customers expect us to understand their business; this is why Schneider Electric has experienced people working within targeted segments to deliver specific solutions such as CIP optimisation for liquid food manufacturers, mine-to-port design and supply chain optimisation solutions, water network management suites and workflow management to name but a few.

Our customers also expect us to help protect the operational integrity of our customers' plants, by working closely with them to serve their needs. At Schneider we do this through an extensive partner and distribution network, dedicated account managers, support help-lines and 24/7 service personnel.

And thirdly, recognising that in an increasingly complex business environment, customers need suppliers that are easy to do business with. This is an ongoing mission that is delivered through processes such as tailored supply chains, an online logistics and ordering system like MySchneider, and our dedicated local Customer Care Centre.

What new and innovative technologies do you see emerging in your field of business in 2015, and how will they help your customers?

Digitisation means big data and this explosion of information across industrial operations and enterprises creates a new challenge - how to extract useful information from massive amounts of data, and how to go from there through information and knowledge to wisdom.

Customers will need a unified framework and a suite of function-rich applications that deliver tangible value and optimised business processes linking together operating assets, people and processes to improve competitive advantage through data analysis software, workflow management, asset management, smart operation management and design simulation.

This will be core to the 'Internet of Things' trend as we align smart devices, operational practices and humans into a dynamic but coordinated operational force.

There has been much discussion in the general media of a weakening manufacturing sector in Australia. How do you see the future for Australian manufacturing?

The adverse factors and array of disadvantages that the Australian manufacturing sector faces is well known - the strong Australian dollar, high labour costs and increasing global competition are good examples. However, Australian manufacturing is fighting hard to succeed through ingenuity, operational excellence and becoming increasingly agile.

Schneider Electric's solutions are used by manufacturers around the world to achieve optimal performance and improve overall operations in key areas like quality, production tracking, performance, inventory, order fulfilment and asset management. In Australia we are committed to working actively with our partners and customers, and providing solutions that have been proven successful in other parts of the world.



Philippe has over 15 years' experience in senior management and professional experience in manufacturing, R&D, and program and business management across a range of industries. Prior to his role as VP for Industry Business, Philippe was VP for Schneider Electric in France across the Variable Frequency Drives Business and the Intelligent Electronic Devices Business. Philippe graduated from the prestigious École Polytechnique in France.



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IAN SLATER

MANAGING DIRECTOR, WEIDMÜLLER AUSTRALIA AND NEW ZEALAND

What do you see as the single biggest challenge facing your industry in the year ahead?

The increasing trend towards intelligent systems together with the introduction of Industry 4.0 are creating significant challenges in the process industry. Networks are becoming more complex and require greater signal and data transmission security. Simultaneously, production reliability and environmental compatibility need to be continuously maintained.

While complex automation will help to create a standard environment for meeting industry targets for reduced energy, raw material consumption and overall manufacturing costs, it will also demand more stringent requirements for control technology, operating data capture and monitoring. Hence, the challenges are both significant and numerous.

What environmentally sustainable initiatives have been undertaken that will position your company differently before customers and prospects in the years ahead?

Weidmüller recently launched an integrated energy management system solution designed to directly tackle energy usage issues. The solution is not only available to our customers but has also been implemented by Weidmüller, and is currently being used in our production and manufacturing facilities throughout Europe.

Companies have long grappled with implementing an energy management system with a view to monitoring and improving efficiency. However, the high costs associated with installing such a system have proved prohibitive for many. Our solution helps to overcome this. Highly cost-effective, the system incorporates hardware, software and consulting services from the one source to deliver a wholistic solution.

Now, companies no longer have to go through the inconvenience and time-consuming process of coordinating different project partners to create a solution that meets their needs.

What new and innovative technologies do you see emerging in your field of business in 2015, and how will they help your customers?

As innovative and intelligent production processes continue to flourish across various industries, the need for more sophisticated and capable components will intensify. We have already witnessed the demand for greater data, larger bandwidth as well as faster speed. Clearly, fully automated production will take hold, making increased security for communication devices inevitable and IPv6-capable Industrial Ethernet devices indispensable.

Weidmüller is already addressing network security. Switches and routers are available from our application-oriented Industrial Ethernet portfolio. We offer two IPv6-enabled product families of Industrial Ethernet switches - the Value Line and the Premium Line. The managed gigabit switches of the Premium Line product family provide advanced management and security features, making them suitable for advanced networking solutions.

What are your customers demanding of you more today than five years ago, and how will you meet these requirements in 2015?

Today's customers are demanding products that provide greater flexibility, ease of use and a smaller footprint. More compact cabinets, leaner planning, easier installation, faster commissioning and less downtime are all tough customer requirements.

To help meet these needs, Weidmüller has released its new, modular, remote I/O system. Called u-remote, it provides the user with considerable flexibility and capability. It features a plug-in connection level, high component density and an integrated web server to simplify start-up and maintenance. Its slim 11.5 mm module width and low number of power feed modules allows switch cabinets to be designed significantly smaller while increasing layout flexibility. A component can also be replaced load-free during operation without having to disconnect the bus connection or power supply.

Do you see organisations in the industrial and construction sectors taking up cloud computing in the near future?

I believe organisations in the industrial sector will increasingly take up cloud computing. Customised, highly flexible and self-controlling production units will ultimately be a reality of the future. To materialise, such units will need to integrate cloud computing into their processes.

In anticipation of this need, Weidmüller is already offering concrete solutions that allow firms to prepare themselves for the 'Internet of Things'. These solutions facilitate safe production control from the cloud and eliminate the need for firms to modernise their entire range of machinery. For the smart factory of tomorrow, Weidmüller offers a solution that converts analog machine data to digital data using the network-compatible ACT20C signal converter and the Power Monitor. The centralised storage and processing of complex data is particularly easy using standardised OPC UA services, while user-oriented visualisations via web applications provide relevant information to any location.



Ian Slater, Managing Director of Weidmüller Australia and New Zealand, has worked for Weidmüller for over 16 years in various roles and has a wealth of experience in delivering power, signal and data solutions and services designed specifically for the industrial sector. A proponent of building long-term partnerships, Ian has been instrumental in developing a loyal network of channel partners and key customer relationships for Weidmüller.



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CHRIS HOEY

MANAGING DIRECTOR (PACIFIC), BÜRKERT FLUID CONTROL SYSTEMS

What do you see as the single biggest challenge facing your industry in the year ahead?

Industry in Australia is under extreme pressure at present, and there currently seem to be no initiatives that will drastically change the status quo in the coming year. Many manufacturing facilities have become casualties of the strong dollar or market pressures, or at best are reducing their costs in order to survive. The challenge for suppliers will be changing their focus to delivering real value to these customers, rather than concentrating on components. Suppliers who cannot make the transition to being value driven will face extinction in such a tight marketplace.

What do you feel are the three most important things your customers are looking for in a supplier?

The question here for suppliers is seeing what the customers are NOT asking for. Customers have been trained over time (by suppliers) to be focused on individual items and their price points. Suppliers need to look beyond the first questions to a deeper understanding of what is truly important to the customer - the value it creates or the risk it mitigates. As an example, a customer might approach a supplier and ask for a sensor, but the real customer requirement is accurate and reliable measurement of a parameter in their process. The application itself, depending on how critical, should determine the choice of hardware, potential price point, as well as the broader service offering to deliver the real customer demand - which in this case is accurate and reliable process operation.

What are your customers demanding of you more today than five years ago, and how will you meet these requirements in 2015?

The engineering industry is currently experiencing a generational change which adds many challenges to customers and vendors alike. While this brings a fantastic vibrancy and openness of ideas, which simply wouldn't be possible otherwise, it does cause a drain in experience. In other words, simple mistakes are often made as these new hands need to learn for themselves. Vendors need to step up in such instances, offering advice, technical or industry training, ongoing support and the like. Like the customers, the vendors also must meet the generational change.

What new and innovative technologies do you see emerging in your field of business in 2015, and how will they help your customers?

Many technologies to date have been rudimentary compared to what will soon launch onto our doorstep. MEMS technology, biosensors, sensor-on-a-chip or even lab-on-a-chip technologies will change the marketplace as we know it. Analyser bundles no

bigger than a shoebox, flow sensor technology with no wetted parts (apart from the tube) and cloud-based data acquisition to name just a few. Plus the merging of technologies where the IT person will be integral to process control system design and security, and operators will wander plants with remote tablet-based operator interfaces. Technology developments beyond the realm of hardware are revolutionising other parts of business, such as the supply chain, where stronger focus on efficiency and effectiveness in all departments and at all levels is at the fore. All this is here now, but it is just the beginning!

There has been much discussion in the general media of a weakening manufacturing sector in Australia. How do you see the future for Australian manufacturing?

Define your market niche strategy, implement it and stick to it - this applies to individual manufacturers, industry segments and the country as a whole. For too long manufacturers in Australia have cried about our market size, the competition from our neighbours, the market conditions, etc. There are many examples from New Zealand, Sweden, Denmark and Switzerland (all smaller countries than us, all with similar price competition from their neighbours) where they become market specialists and build highly profitable businesses. The companies that excel in such economies, regardless of specific niche, leverage evolving technology and the high education level of their populations to achieve market leadership and niche dominance. Government in those countries spearheads initiatives designed to support growth in sectors for which the country had a competitive advantage. Australian industry has the opportunity to achieve the same, but it will take courage from all stakeholders to make it happen.



Chris Hoey is described by those that work with him as a 'suit with his sleeves rolled up', bringing his 25 years of hands-on experience to the boardroom. With an energetic approach to leadership, Chris is involved with key accounts, system design and new solution development. As a long-standing IICA committee member, and treasurer of the Profibus Association, Chris is active in the industry and continuously campaigns for more efficient, ingenious and smarter systems.



Richmond Tigers kick carbon emissions with Yingli solar panels

Yingli Green Energy Australia has announced the installation of a 99.77 kW solar system, using Yingli Solar photovoltaic (PV) panels and Enphase Energy microinverters, at Richmond Football Club.

Metro Solar, a family-owned, national solar installer and official Sustainability Partner for the club, provided the solar solution to meet the high energy consumption of Punt Road Oval. The system now powers the roof of the black-and-yellow ME Bank Centre, the club's headquarters and training facility.

The Richmond Tigers are one of the first AFL clubs to go green and are proud of their decision. Club CEO Brendon Gale said, "Metro Solar was able to deliver a solar solution to meet the club's power consumption and exploit the roof's energy potential, using a top-quality solar system that can generate more energy than other systems."

The elite sports facility - housing a high-performance training gym; treatment and recovery clinic; education, workplace and retail spaces - has an extremely large base load, most of which is consumed during the day. To achieve maximum yield and performance for the system, Metro Solar utilised Yingli Solar's high-efficiency multicrystalline panels with the Enphase Microinverter System to produce the highest energy utilisation for the club.



Daman Cole, managing director for Yingli Green Energy in Australia said, "Commercial and sporting organisations like the Richmond Football Club are increasingly realising the full potential of solar power and how it can reduce their reliance on grid electricity for greater environmental sustainability and major cost savings. Yingli Solar is delighted to be part

of a project that will raise the awareness of renewable energy and sustainability in everyday life."

Enphase's 'Burst Mode' technology, which initiates during low light conditions, allows the system to produce additional generation in the morning and at dusk, increasing overall savings for the Tigers. During



Burst Mode, the microinverter stores a small trickle of power coming from the panel, until there's enough to send a burst of energy. By doing this, the microinverter is able to maintain highly efficient operation during low light conditions, extending the system's daily production hours.

"We're proud to assist Richmond Football Club in becoming greener and of our role in giving them energy independence," said Metro Solar CEO Anthony O'Connell. "On such a high-profile site, quality and reliability are paramount. Both Yingli and Enphase are world leaders, and their proven reliability is something we proudly stand behind as a solar installer."

The solar system is part of a broader effort by the Tigers to make their 170-year-old training headquarters eco-friendly, and they are now considering ways they can promote renewable energy to the broader community through the example they have set.

Yingli Solar has a long history of involvement with sporting organisations across the world in developing and implementing sustainable energy solutions at stadiums and other sporting facilities. Most recently, as a sponsor of the 2014 FIFA World Cup in Brazil, Yingli Solar equipped the Maracanã stadium in Rio de Janeiro and Arena Pernambuco in Recife with over 5100 Yingli Solar PV panels.

Yingli Green Energy is the world's largest solar panel manufacturer and a leader in solar PV technology. With over 40 million panels installed globally, its high-efficiency panels are suitable for commercial solar installations of all sizes. Yingli is the first manufacturer to have been endorsed by the Australian Solar Council's Positive Quality program, which means that its production lines have passed a comprehensive 60-point quality check, giving customers confidence in the quality and longevity of their panels. Its Sydney office offers full technical and sales support.

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Expandable I/O safety controllers

The Banner XS26-2 safety controller has been designed with the ability to add up to eight expansion models, easily adapting to changing automation requirements. Users can choose from six expansion models with a variety of safety inputs, solid-state safety outputs and safety relay outputs.

The safety controller is said to provide a simple and flexible safety solution for machine safeguarding. It is an alternative for multiple safety relay module applications, or when a safety PLC is excessive and too costly. They can be programmed in minutes with easy-to-use, free configuration software, customising the safety design with several logic and function blocks.

The safety controller interfaces with a wide selection of safety devices and its LCD screen allows for fast error status and troubleshooting, while diagnostics provide active monitoring of I/O on a PC.

Micromax Pty Ltd

www.micromaxsa.com.au

Flotation level transmitter for flotation cells

FloLevel Technologies launches a self-cleaning flotation level transmitter (FLT) that offers a simple, low-maintenance device for very difficult environments, like flotation cells.

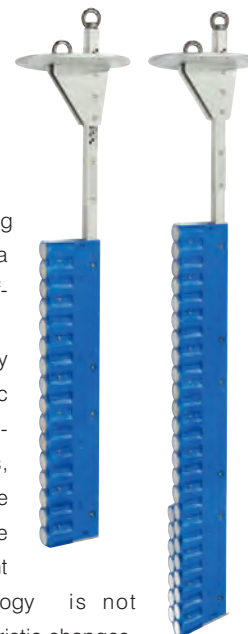
The FLT will increase operational efficiency of the flotation cell because the acoustic technology is not affected by density, build-up, scaling, hydraulic imbalance affects, conductivity or sticky froth conditions. The FLT FloLevel Array will provide a repeatable pulp/slurry level (froth depth) with constant high resolution because the acoustic technology is not affected by the ore slurry (gangue) characteristic changes.

The system is easy to install from the top of the flotation cell and easy to calibrate. It comes with adjustable 316SS bracket with flange mounting options and a colour display controller mounted in a stainless steel enclosure. The product can measure all types of flotation cells, with a maximum control range of 6400 mm. Resolution accuracy options available are 2, 15 and 25 mm. Output capability options include 3 x 4-20 mA, Modbus, Profibus, Foundation fieldbus, DeviceNet and ethernet.

The array is suitable for all mineral recovery, eg, copper, molybdenum, gold, silver, lead, nickel, iron ore, coal, potash, oil sands, zinc, gypsum, etc.

FloLevel Technologies

www.flo-level.com/home.html



Air compressors

Sullair Australia has relaunched its range of Champion compressors. With good performance in tough conditions, the Champion family - comprising the CSA and the VOC (variable output control) line-ups - ranges from 18 to 250 kW. With a suitably sized compressor for every application, the streamlining of the range simplifies the selection process, supplying the right product at the right place.

As part of the relaunch, the company has incorporated the most popular compressor options into a standard package for each model. It has retained the less-common preferences as selectable options in order to match the products to the precise demands of each application. The move to direct drive for the latest models is said to reduce transmission losses, improve reliability and simplify maintenance.

The CSA series is available from 18 to 37 kW and the VOC series from 45 to 250 kW. A variable speed drive (VSD) is available for each of the 13 models across the range. The VSD technology allows the air output to be electronically turned down by as much as 70% of the rated air output for each compressor, while the VOC air end enables a further mechanical turn down up to 50%. When combined, a VOC/VSD compressor can regulate the output air anywhere between 100% of its rated output right down to 15%, providing an energy-efficient compressed-air solution for industries that experience variable air demands. The compressors are designed to meet the tough extremes of climate commonly experienced across Australia. This makes them suitable for any application where continuous operation in a hostile environment is normal, such as mining and the oil/gas industries, as well as for critical applications where downtime can have high consequences on production.

Sullair

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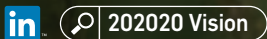
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Find out why government, businesses and NGOs are getting together to create 20% more urban green space by 2020.

202020VISION.COM.AU

JULIAN GRAY

SMART WATERMARK AND 202020 VISION

What do you see as the single biggest challenge facing your industry in the year ahead, and why?

At a time when resources are tight, we have a real issue in the pending abolition of the National Water Commission and the impact of having no national voice on water in government at the moment. Specifically in regard to water efficiency we've got a second issue in trying to communicate the business case for water efficiency outside of crisis management during drought, and not lose all the world-leading knowledge and skills built up within Australia over the past decade.

What do you see as the two or three biggest growth opportunities for your customers in 2015, and why?

Households and businesses having more flexibility and choice in the way they use water. This has been enabled by advances in technology such as smarter metering technologies coming into place which are giving more information on how and where we use water. But the other interesting addition is our increasing understanding of the nexus between water and energy and where the synergies can be utilised. For example, a 15% reduction of hot water use around the home and businesses would equate to the combined energy inputs for collection treatment and distribution of water for water utilities. At the household level, the opportunity is in giving people accurate real-time information about their water use and potential impact on bills.

What environmentally sustainable initiatives have been undertaken that will position your company differently before customers and prospects in the year ahead?

In terms of what we do, Smart WaterMark was established to inform how people could save water around the home during drought by identifying and certifying water-efficient products and services. As the scheme has evolved over the years, we have expanded certification into the non-residential sector and are now looking more holistically at water-conservation systems. The latest initiative is investigating issues such as water foot-printing, and we're looking at whether or not we can identify and certify water efficiency across the supply chain so you can then buy a product in a supermarket, such as milk, and have a water-efficient label on it.

What emerging trends or developing technologies may influence or change the way your industry sector will do business in 2015, and why?

In his World Water Day address this year, the UN Secretary General, Ban Ki Moon, reaffirmed that water is at the core of

sustainable development, stating: "The many strong links between water and energy demand coherent integrated policies and innovative strategies." Better integration and understanding of the water, food, energy nexus will allow us to make sensible decisions to reduce our impact across the whole environment, not just in one sector. We need to understand the intricacies of those interactions, which are often quiet complex and sometimes counterintuitive, so we can hopefully identify the most effective interventions.

What new innovations do you see emerging in your field of business in 2015, and how will they help your customers?

In addition to identifying water-efficient technology, our other two aims are to promote innovation and help people understand water-conservation issues. One really great example of this is the 202020 Vision, which is acting as an umbrella to promote a lot of urban greening activity that is happening on the ground - and how Australia is starting to lead the way - and promoting it under one vision, helping participants understand what their individual part of that wider program is.



Julian Gray combines an educational background in international communications and environmental science with 20 years' experience in the public, not-for-profit and private sectors. He has been involved with a series of national, regional and international projects branding sustainability. He currently heads up Smart WaterMark, Australia's water conservation label. Julian is co-author of the AWA Position Paper 'The Case for Water Efficiency' and is an advocate for the 202020 Vision.

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NATHAN DUNN

MANAGING DIRECTOR APAC, ENPHASE ENERGY

What do you see as the single biggest challenge facing your industry in the year ahead, and why?

From my perspective, the biggest challenge facing the solar industry is educating consumers on the trade-off between quality and price.

For a number of years, solar panels have been sold solely on the entry price point in order to take advantage of feed-in tariff and government subsidies. Under the auspices that the product would last for a 20-year period, some of these products don't have the longevity of a more quality product. The burgeoning solar retrofit market, particularly for Australian operations, is growing exponentially as a result of the installation of these substandard panels. If we don't address this price versus quality nexus, this could be one of the major concerns for the solar industry in the longer term.

Quality is central to everything we do at Enphase, and our focus is on lifetime value as opposed to the up-front cost. This does a couple of things: it helps the end consumer understand that they have a viable product for a long period of time and this engenders confidence. It also helps the installer to generate increased gross revenue and therefore build scale into the business over time.

What do you see as the two biggest growth opportunities for your customers in 2015, and why?

With a focus on quality, the two primary growth opportunities for our customers (who are primarily the solar installers) are education and safety.

There are obvious opportunities for educating the market on the benefits of quality, and the long-term paybacks and greater returns that result. If the installer community themselves have a better understanding of the quality of the product they are installing, they will be able to do a better job of educating the end consumer of the benefits from installing solar on their roof.

Safety is also an area of focus for the solar industry but the Enphase system eliminates these risks completely. There is a significant growth opportunity for an Enphase installer who focuses on the distinct safety benefits achieved by installing an Enphase system. Voltages on the roof are well and truly minimised with a microinverter system; it's not 600 V on a roof, it's only 40 V.

What do you feel are three most important things your customers are looking for in a supplier, and why?

The three most important things are value, training and support.

When Enphase entered the Australian market at the beginning of 2014, we invested in a serious level of resources on the ground. We didn't just employ salespeople, we employed a field-application engineer and a trainer, and that trainer's mandate was to educate the installer network on how best to leverage the Enphase system as a key opportunity in their business. Part of this process is learning how to sell on value, not on price. Ultimately installers don't want to fall victim to the 'race

to the bottom'. They want to grow together with a product that is going places.

Enphase does not subscribe to a 'set-and-forget' mentality. Our installers are provided with a high level of support with access to a highly skilled Enphase engineer at any time during an installation.

What emerging trends or developing technologies may influence or change the way your industry sector will do business in 2015, and why?

The big development, particularly in the last 12 months, has been the development of energy management storage. Enphase is not just a solar company; we're an energy company and, as part of this, we have invested heavily in R&D into a storage and energy management proposition. We see this as a great development profile and extraordinarily promising direction for our business.

What new and innovative technologies do you see emerging in your field of business in 2015, and how will they help your customers?

At Solar Power International in October, Enphase announced a suite of new products essentially called the Enphase Energy Management System. In combination with our microinverters, there is now an AC battery storage solution that enables the consumer to manage their solar generation and loads at the residence.

In the near future, there will be opportunities for the system to connect with data derived from household appliances to allow the consumer to manage the complete energy flow within their house from the palm of their hand.

Companies that succeed in connecting the dots from generation, load management and usage, particularly in the solar space, are the ones that will occupy mind share of the market and ultimately win the consumer.



Nathan Dunn is Managing Director APAC at Enphase Energy, a company that was in 2013 named both fastest growing clean tech company in Deloitte's Technology Fast 500 and World Economic Forum Technology Pioneer. Enphase is responsible for producing the world's first commercially available microinverter in 2008, shipping its 6,400,000th microinverter in early 2014. Nathan leads efforts to grow Enphase Energy's share of the Asia-Pacific solar market.

He has a rich blend of experience from his previous roles as Managing Director, GE Lighting Australasia, and General Manager, Mobile Communications for the LG Electronics business in ANZ.

Vane compressors for sludge mixing

When it comes to sludge mixing in anaerobic digesters, the method used should be energy efficient, provide high biogas yield and be easy to install or retrofit. Hurl Nu-Way offers a gas-mixing diffuser method using vane compressors, manufactured by British company Utile Engineering.



In this method, the gas produced by the heated sludge is compressed by the sliding-vane compressor skid and feeds the biogas at high pressure to the gas diffusing system, placed on the bottom of the digester. The gas creates a large-scale mixing pattern in the digester, providing homogenous mixing to the sludge.

No dead spots are found within the tank and there is no sedimentation build-up or pipe blockage. The method offers reliable and efficient sludge mixing, warranting high yields of biogas and pacification of volatile organic compounds.

The sliding vane gas compressor uses a simple, proven design to compress the gas inside the heavy-duty ductile iron cylinder, resulting in a quiet machine that delivers pulsation-free gas. Vane compressors are easy to maintain, absorb roughly a third of the power required for pump mixing and have considerably low whole life cycle costs.

Hurl Nu-Way Pty Ltd
www.hnw.com.au

In-situ gas analysers

SICK's in-situ gas analysers are suitable for direct installation in devices at the respective measurement site, eg, on the chimney. The analysers measure directly in the process under actual operating conditions. Characterised by their minimal maintenance requirements and short response times, they are available in two different



versions. The cross-duct devices supply representative measurement results across the entire channel cross-section, while measuring probe devices are only fitted to one side of the stack. One example is the GM32 gas analyser, which is suitable for emissions monitoring as well as in process control applications. The rugged analyser is also available as an Ex version for gas temperatures of up to 650°C.

The analyser is mainly used in power plants, cement works, in the kraft pulp industry, as well as for measurement tasks in the oil and natural gas industry, and for emission monitoring downstream of sulfur recovery units or fluid catalytic cracker units. Even the emission of dust particles results in air pollution. With the Dusthunter T product family, the company offers reliable technology for high-precision dust measurement. The measurement principle of laser-based light scattering allows even very small dust concentrations to be measured. The compensation of background radiation and ambient light, automatic testing of zero and reference points, as well as a soiling check mean the system delivers stable and reproducible measurement results. The device is suitable for measurement tasks even in hot or aggressive measurement media.

SICK PTY LTD
www.sick.com.au

M12 connectors

With the ability to transfer up to 10 Gbps of data, Turck's M12 X-Code connector is designed to increase throughput and efficiency in high-end systems and applications. The M12 X-Code connector offers improved signal strength for high-speed Ethernet data transfers, compared to traditional M12 connectors that support up to 10/100 Mbps Ethernet. The ability to handle high bandwidth files and minimise transfer time reduces data bottlenecks and improves performance. To achieve 10 Gbps Ethernet transmission speed, the M12 X-Code connector features an advanced shielding design paired with Category 7 copper cable. Each of the four data pairs



are shielded from each other within the connector, providing increased isolation against crosstalk or unwanted signal coupling from one balanced twisted pair to another. Featuring a robust, compact design, the IP67-rated M12 X-Code connector operates in temperatures ranging from -20 to 70°C. The overmoulded construction eliminates time-consuming hand-wiring and misconfigurations, and they are suitable for any industrial Ethernet applications requiring high speed and greater bandwidth.

Turck Australia Pty Ltd
www.turck.com.au

High-resolution thermal cameras

FLIR T-Series cameras feature UltraMax, an image processing feature that significantly improves the IR resolution and sensitivity of the cameras. The company says UltraMax images have four times the thermal pixels, twice the resolution, and 50% greater sensitivity than standard unprocessed images. Images are viewed and processed in FLIR Tools software for PCs. UltraMax images allow users to zoom in on smaller heat anomalies, get more accurate measurements and see more detail than with previous unprocessed images. Select T-Series cameras



also come with improved thermal sensitivity - as low as 20 mK - and improved temperature measurement accuracy. The T460 and the T660 include all of these features plus temperature ranges expanded to 2000°C, continuous autofocus, and onboard recording of real-time radiometric video files. Data can be played back and analysed in FLIR Tools and FLIR Tools+ software so thermal changes over time can be studied in detail.

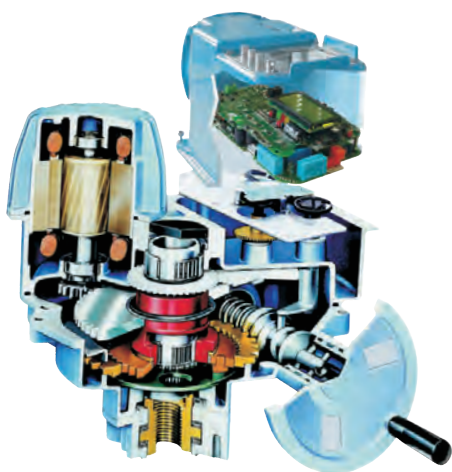
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Industrial plant in a small format

Some 1700 students are pursuing bachelors and masters programs in construction and engineering at the School of Engineering and Architecture at Lucerne University of Applied Sciences and Arts. In the mechanical engineering program, the specialisation in process engineering gives insight into the processes of material transformation. Rectification is one of the basic operations of thermal process engineering - it is used in biofuel production and in whiskey distilleries, for example, where liquid mixtures are separated in a multistage distillation process. To promote a fundamental understanding of such material separation processes, staff at Lucerne University decided to replace the existing rectification plant with a larger system that would allow all the important process parameters and their interdependencies to be reproducibly analysed and presented.

The school's competence centre for thermal energy systems and process engineering wanted to implement a plant for the education of students that would be constructed similarly to an industrial plant and controlled and monitored with a process control system suitable for industry. Prola AG was commissioned to provide the electrical design and configuration of the control technology. The engineering company from Emmenbrücke has broad experience in the configuration and programming of control systems and process control systems for process plants. As a Siemens Solution Partner, Prola had frequently used Simatic PCS 7, but never the Microbox version.

"The plant also serves the students as a subject of study and demonstration in the field of process automation. For this reason, we chose the Microbox version of the PCS 7 process control system - it is an ideal solution for plants of this size," said Heinz Müller, managing director of Prola.

Ensuring occupational safety was one of the main requirements during the implementation of the control software. The manual options for intervention therefore needed to be designed in a restrictive manner. The operator runs the specified formula and

can adjust individual set points and parameters within the limits of their authorisation. The thermal conditions and the design of the system as Ex Zone 1 determined the basic requirements for measurement and control technology. The constant monitoring of the temperature values defines alarm and tripping values, and the system is automatically brought into a safe state when these values are reached.




In order to promote process transparency, the system has many measuring points. Thanks to the Advanced Process Library (APL) modules in use, all the process parameters and actuators can be clearly displayed on the screen. In addition, all the components are made of glass, which allows visual tracking of the process. Reporting was also of great importance, and the batch history is stored in a database with all the relevant data. This data can be output in Excel, which makes it easier for the students to create lab reports.

"PCS 7 handles a great deal of routine work for the programmers. This allows them to focus on the system, processes and operator interface," says project manager Simon Wernli, describing one of the advantages of the process control system.

The system was put into operation after a configuration time of only about three months. In collaboration with Lucerne University, Prola developed a special user interface that intuitively supports and guides the user in their actions, making the system easier to operate. The result: after a one-hour introduction to the process control system, the students were able to operate it themselves. Prola AG is a qualified Siemens Solution Partner in the area of process control applications. In the Lucerne University project, Prola was responsible for the electrical design as well as the design of the control platform, including industrial PCs, frequency converters and distributed I/O devices. The functional specifications also included the programming of the control software, operator interface and formula management.

Siemens Ltd
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- Under/Over Speed
- Voltage Level HTL to TTL
- Voltage Level TTL to HTL



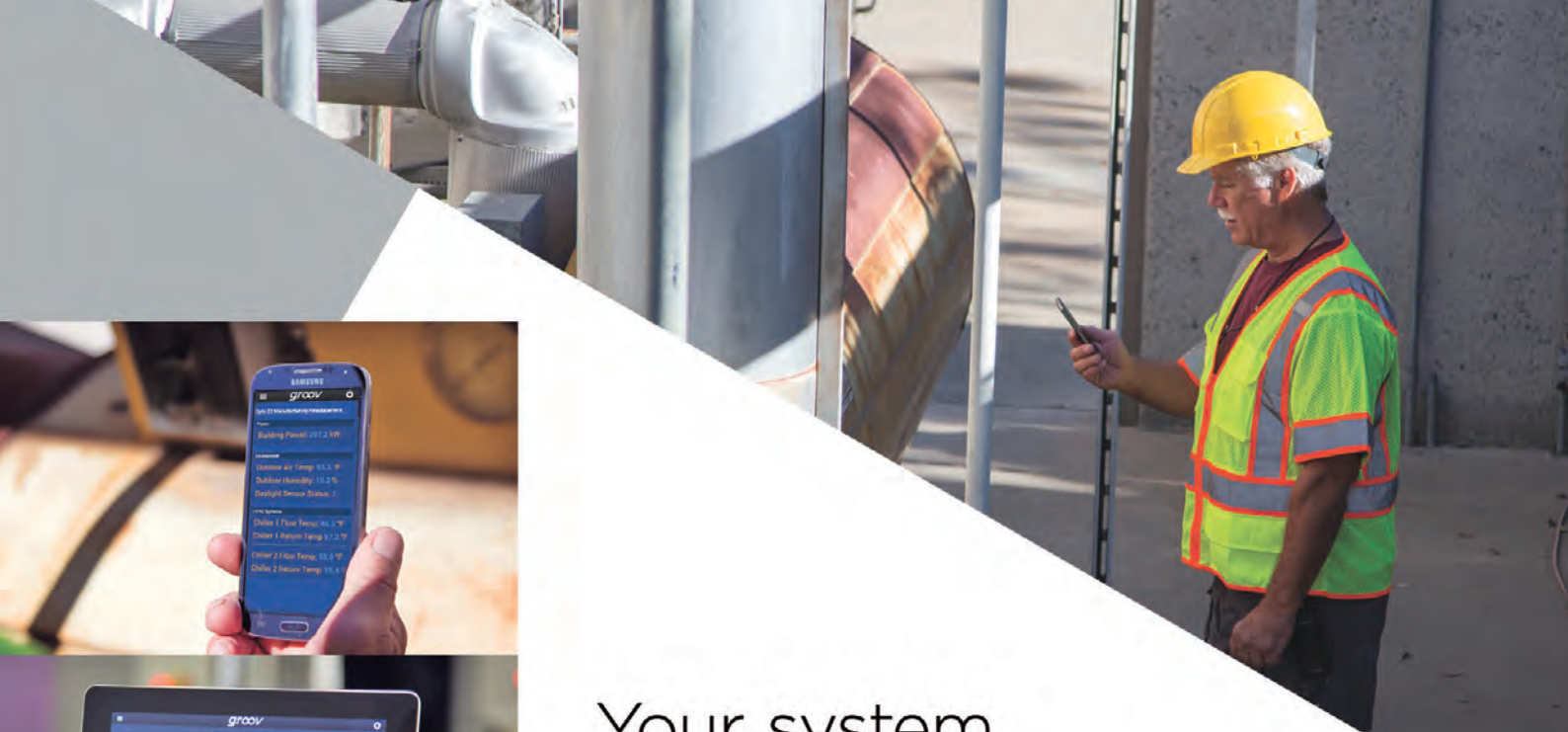
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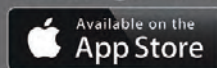
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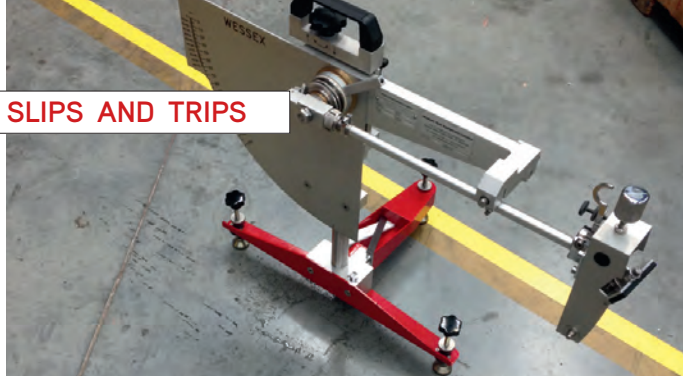
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SLIPS AND TRIPS - ARE YOU COMPLIANT?

Test Slip Australia provides details on some of the latest changes related to slip-resistant flooring standards.

Falls that result from a slip or trip result in thousands of injuries every year, the most common are musculoskeletal injuries, cuts, bruises, fractures and dislocations but more serious injuries can also occur, says Safe Work Australia (SWA).

Persons conducting a business or undertaking (PCUBs) must manage the health and safety risks associated with slips and trips by eliminating the risk so far as is reasonably practicable, and if that is not reasonably practicable, minimising the risk so far as is reasonably practicable. According to the hierarchy of control (available from SWA), there are various ways to control the risk of slips and trips. In order of their effectiveness, they include:

1. eliminate the hazard;
2. substitute the flooring with a more slip-resistant surface;
3. isolate the high-risk area;
4. implement engineering controls such as floor treatments, lighting, drainage, etc;
5. implement administrative controls such as signage, good house-keeping practices, etc; and
6. wear personal protective equipment (PPE) such as slip-resistant footwear.

Slip-resistant flooring

Common slip hazards include: slippery surface; fluid, spills and contaminants on surface; sudden changes in surfaces, downward slope; moss on an exterior surface; and inappropriate footwear.

Floor treatments that improve slip resistance are those which increase the surface roughness of the flooring. The main floor treatments include sand blasting or grinding, chemical etching, coating with resins and using floor mats or adhesive anti-slip strips.

PCUBs have a duty of care to ensure floor surfaces in the workplace are fit for purpose, meet a minimum level of slip resistance and do not pose a safety risk, explains Clark Ahearn from Test Slip Australia. He says its important for PCUBs such as property owners, architects, facility managers, floor suppliers, etc, to keep track of their floor safety obligations. Detailed below, he has provided an update on some of the latest changes related to slip-resistant flooring standards.

Changes to Slip Resistance Australian Standards 2013

The Australian Standards for slip resistance of pedestrian surfaces have recently been under revision by Standards Australia Committee BD-094. New revisions of these Standards were published on 28 June 2013 and include:

- AS 4586 - 2013 Slip resistance classification of new pedestrian surface materials, now supersedes AS/NZS 4586 - 2004.
- AS 4663 - 2013 Slip Resistance measurement of existing pedestrian surfaces, now supersedes AS/NZS 4663 - 2004.

A number of minor changes have been made throughout both the AS 4586 - 2013 and AS 4663 - 2013 standards, however, according to Test Slip Australia, the wet pendulum slip resistance test method has had the most significant change of all the test methods. The 2013 revision of these two standards incorporates an additional requirement

in the wet pendulum slip resistance test method for preparing rubber slider test feet with 3 micron lapping film. Research has shown that when a rubber slider is prepared this way, it is a closer representation of a worn and polished heel and may best reflect the lower slip-resistance attributable to the contact of two smoother surfaces under water-wet conditions. Adoption of the lapping film preparation to condition the slider enables more sensitive differentiation between potentially slippery surfaces than was previously the case and, as such, will cause some pedestrian surfaces to provide a lower slip resistance test result than what would have been obtained if tested according to the 2004 version of AS/NZS 4586 or AS/NZS 4663. This is likely to have the biggest impact on smooth flooring materials such as glazed/polished tiles, sealed terrazzo, sealed/polished natural stone, polished timber, vinyl, etc. As the changes to the new wet pendulum test method will potentially change the classifications of some flooring products, a new classification system has been introduced to clearly identify which revision of the Standard it was tested to, ie, AS/NZS 4586 - 2004 or AS 4586 - 2013. The 2004 version used V, W, X, Y or Z Classifications which are no longer being used. The 2013 version of AS 4586 uses the following classification system:

Classification of pedestrian surface materials according to the AS 4586 wet pendulum test

Class	Pendulum SRV	
	Slider 96	Slider 55
P5	>54	>44
P4	45-54	40-44
P3	35-44	35-39
P2	25-34	20-34
P1	12-24	<20
P0	<12	

Classification of pedestrian surface materials according to the dry floor friction test

The dry floor friction test method classifications have also changed in AS 4586 - 2013. The 2004 version used F or G Classifications which are no longer being used. The 2013 version of AS 4586 uses the following classification system:

Classification	Floor friction tester mean value
D1	>0.40
D0	<0.40

Further information

Partner of NATA-accredited independent slip testing authority ATTAR, Test Slip Australia provides floor safety health checks and independent assessments associated with floor-safety obligations. For further information, visit www.testslip.com. Further details on slips and trips at the workplace are available as a fact sheet download from Safe Work Australia (www.swa.gov.au).

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Safety-approved headlamps

Pelican Products has introduced three safety-approved LED headlamps that provide tough, lightweight, safety-approved lighting options.

Based on the established models from its Pelican ProGear consumer line, each headlamp is IECEx approved for hazardous environments, available in either black or safety yellow and equipped with a wide range of features, allowing for multiple applications.

The Pelican 2745 LED headlamp has three LEDs with dual modes: high (33 lm/20 h) and low (17 lm/40 h).

The Pelican 2755 LED headlamp has a single, high-powered LED with multiple modes: high (72 lm/6 h), low (34 lm/15 h) and flashing. It also has a low-battery warning.

The Pelican 2765 LED headlamp has three LEDs with multiple modes: high (105 lm/4 h, 15 mins), low (65 lm/6 h, 15 mins) downcast (33 lm/9 h, 30 mins) and flashing. It also has a full-time battery level indicator. All three headlamps are engineered with a durable IPX4 water/weather-resistant polymer construction. They also pivot to a 45° angle to direct clean, brilliant light where it's needed. Each weighs in at around 100 g with three AAA batteries (included) and includes both a rubber strap (for helmets) and a cloth strap (comfortable for bare heads).

Pelican Products Australia Pty Ltd

www.pelicanaustralia.com



Inclinometers

Posital TILTIX inclinometers are available with a Modbus RTU interface. Modbus RTU protocols, which are openly published and royalty free, have emerged as a de-facto standard for simple, robust and cost-efficient data acquisition and control systems built around standard PLCs. Modbus RTU nodes can be connected together through RS485 serial connections with up to 32 devices connected to the bus.

The inclinometers offer a full 360° single-axis version or dual axis $\pm 180^\circ$, and a shock immunity of up to 100 g. Tough fibre-reinforced PBT and heavy-duty die-cast aluminium housings are available.

The inclinometers have programmable measurement resolution, zero setting and direction via an API.

The inclinometers with Modbus RTU interface are suitable for solar energy systems where it is necessary to monitor the spatial orientation of multiple collectors or reflectors. They can also be used in materials handling equipment or for many other applications where a practical, low-cost position control solution is required.

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Coriolis flow transmitter

Emerson Process Management has introduced the Micro Motion Model 5700 transmitter, a Coriolis flow transmitter designed to translate measurement data into meaningful insight and instruction. The Model 5700 is applicable for a broad range of applications, from liquid and gas custody transfer to simple process control.

The Model 5700 provides users access to detailed measurement history for troubleshooting or optimising the process. The graphical user interface was designed for intuitive operation, with simplified installation, configuration, maintenance and troubleshooting. The transmitter translates Coriolis measurement data into useful operating insight through robust, time-stamped history files for process and meter health data, and logs for configuration changes and alarms.

The Model 5700 digital signal processing architecture provides fast flow response time, making it optimal for custody transfer proving and short batching applications. The historian feature also improves Micro Motion Smart Meter Verification, which provides measurement of the full meter health without process interruption - improving measurement confidence and easing regulation compliance.

Compatible with new and previously installed Micro Motion ELITE Coriolis sensors, the Model 5700 has a field-mount design that is suitable with most hazardous area installation practices and with both integral and remote installation options. It currently includes options for analog, pulse, discrete and Modbus outputs and an analog or HART input. The Model 5700 and additional digital communication options will be available for other Micro Motion meters and platforms in the near future.

Emerson Process Management

www.emersonprocess.com.au



Programmable logic controller

Panasonic has released the FP7 series programmable logic controller - a fast, 32-bit processor platform with a large adjustable memory capacity for programs or data and a high-speed processor capable of 11 ns/step. It incorporates all the functionality and performance of a modular PLC in a compact format with a height of only 90 mm.

The product lends itself to larger machine or plant control where I/O counts are high and there is more process-oriented control taking place. With the 16-bit analog cards offering 25 μ s/channel conversion rates and an accuracy of 0.05%, precise control can be achieved. A powerful Ethernet communications option allows for field I/O or devices to be integrated via Modbus TCP/IP. Direct connection of 24 VDC to the processor eliminates the need for dedicated power supply units, and expansion units are clipped together without the need for a backplane.

The PLC programs can be password-protected and different security levels can be set. The CPU unit can store two programs so, in the event of a fault, no SD memory card is needed to return to a previously saved backup program. During development of a new program, or when updating a current one, program operation can be tested from the SD memory card without the need to download to PLC run memory.

The IEC61131-3 compliant programming software has been updated to FPLIN Pro 7 and is compatible with all Panasonic FP family PLCs.

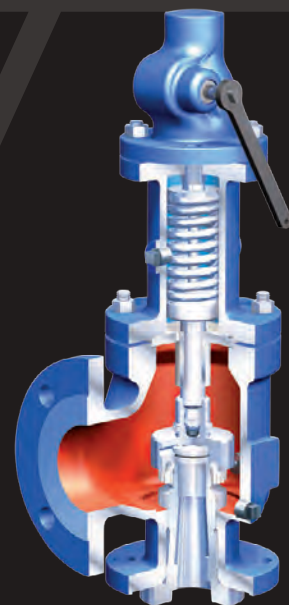
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Car batteries recycled into solar cells

Researchers from Massachusetts Institute of Technology (MIT) have developed a system which recycles materials from discarded car batteries into long-lasting perovskite solar panels, thus solving several environmental issues at once.

Perovskite is a compound which has rapidly progressed from initial experiments to a point where its efficiency is nearly competitive with that of other types of solar cells. Writing in the journal *Energy and Environment Science*, the researchers explained that organolead halide perovskite solar cells (PSCs) "show great promise as a new large-scale and cost-competitive photovoltaic technology ... However, the manufacture of PSCs raises environmental concerns regarding the over-production of raw lead ore, which has harmful health and ecological effects."

By using recycled lead from old car batteries, manufacturers could divert toxic material from landfills and re-use it in photovoltaic panels. This is particularly important as more efficient types of battery technology, such as lithium-ion batteries, take over the market.

"Once the battery technology evolves, over 200 million lead-acid batteries will potentially be retired in the United States, and that could cause a lot of environmental issues," said study co-author Professor Angela M Belcher. She added that 90% of the lead recovered from the recycling of old batteries is currently used to produce new batteries, but as the market for new lead-

acid batteries declines, this will potentially leave a large stockpile of lead with no obvious application.

In a perovskite solar panel, the lead-containing layer would be fully encapsulated by other materials, limiting the risk of lead contamination of the environment. As noted by co-author Po-Yen Chen, "The process to encapsulate them will be the same as for polymer cells today."

The researchers stated that perovskite films assembled from recycled battery materials "show the same material characteristics (ie, crystallinity, morphology, optical absorption and photoluminescence properties) and identical photovoltaic performance (ie, photovoltaic parameters and resistances of electron recombination)" as high-purity commercial reagents. When the panels are eventually retired, the lead can simply be recycled into new solar panels. As the perovskite photovoltaic material takes the form

of a thin film just half a micrometre thick, the lead from a single car battery could produce enough solar panels to provide power for 30 households. Additionally, said Professor Belcher, the production of perovskite solar cells "has the advantage of being a low-temperature process, and the number of steps is reduced" compared with the manufacture of conventional solar cells.

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Respirator

The Sundström SR200 full face respirator now features the air-deflecting, pre-filter holder that has given a fresh look to the company's half-mask respirators. The pre-filter holder is not the only thing that keeps full and half masks in the same practical system: the full mask uses the same range of filters as the half masks and can be connected to an external air supply using the same hose, regulator, attachment and connectors.

Various other spare parts and accessories are also shared between the different models, including exhalation valves, valve caps and the SmallTalk in-mask voice communication device. In addition, the same filters can be used with Sundström fan-powered respirators, forming a comprehensive but uncomplicated breathing protection program.

The SR200 full face respirator provides face, eye and breathing protection, offering a high protection level for demanding jobs. The mask has three inhalation valves and twin exhalation valves, which means low breathing resistance.

The extra-wide spherical visor gives a large and unobstructed field of vision. Mist and condensation are minimised through the airflow within the respirator.

Safety Equipment Australia Pty Ltd
www.theseagroup.com.au

High-concentration total solids sensor

The Cerlic CMC completes the sensing pathway of sludge/biosolids in water and wastewater treatment processes, measuring high concentration suspended solids of up to 300,000 mg/L (30% TS). The product's true-phase shift microwave technology ensures a smart, fast sensor capable of rapid corrections.



The device provides a continuous 4-20 mA (or HART) signal for both TS and sludge temperature. It has no moving parts and angled sensor surfaces within the pipe section, providing maintenance-free, self-cleaning operation. The unit offers a range of inline process connections, including insertion type and wafer flange for DN50-DN 300 pipework. It features a remote mounted weatherproof display with push-button programming and is immune to changes in sludge colour and consistency.

The sensor is designed specifically for use with challenging primary, dewatered and digested sludge/biosolids. It offers continuous process control to optimise dewatering and chemical dosing equipment, allowing the user to save on expensive chemicals. The sensor features easy, single-point calibration and holds its last 20 calibrations. It has a high allowance for conductivity to provide a wide range of sludge suitability. The product also has a long service life with low maintenance.

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FIRST-AID COMPLIANCE IN THE WORKPLACE

The importance of first aid in the workplace cannot be overstated. In the event of an accident or medical emergency, the application of first aid can mean the difference between life and death.

While almost everyone is aware of the importance of first aid and the necessity of first-aid training, the scope and breadth of work health and safety (WHS) regulations - and the variation in regulations between different states - can make it difficult for organisations to keep their first-aid procedures current and compliant.

How do you achieve first-aid compliance?

Organisations are required by law to have first-aid procedures in place. Released in 2012 was the First Aid in the Workplace Code of Practice, which sought to harmonise compliance under the federal *Work Health & Safety Act 2011*. To date, all states have adopted the code except WA and Victoria, though they are expected to adopt it in the future.

While these regulatory revisions have made it somewhat easier for organisations to achieve compliance and identify gaps in knowledge, many industries are still familiarising themselves with the changes and there can be some confusion about what requirements exactly have changed.

When regulatory changes are introduced, organisations often assume that compliance with old regulations means they are compliant with the new ones. However, codes and regulations are updated to reflect new understanding of risks and occupational safety, and any company that does not make the necessary updates to their procedures in accordance with new regulations is vulnerable to disciplinary action.

An effective way to determine if your workplace is compliant is to complete a workplace first-aid 'health check'. These are different to risk assessments and compliance audits, which are carried out by certified inspectors; rather, a health check helps an organisation self-identify areas where there is a potential gap in knowledge and the kind of training required.

First-aid training 10-point health check

In completing this health check, whether you are able to answer these questions at all is just as important as what the answer is. If you are unsure how to respond, it is likely there is a procedural or operational gap which needs to be addressed. Receiving the right advice will lead you to implement a solution to close the gap and often includes a mix of training, procedural updates and ongoing consultation in order to achieve and remain in compliance.

1. Under WHS legislation, is your organisation classified as a low, medium or high risk?
2. Does your first-aid room meet current standards?

3. Do you have a qualified first aider on site during all operating hours?
4. Do you have an analgesics register and are you aware of guidelines for administration?
5. Are you aware of the most common on-site injuries in your workplace?
6. Are there people who work at home or have company vehicles?
7. Do you have contractors/subcontractors/volunteers on site?
8. Do you know the minimum number of first-aid kits you are required to have at all sites?
9. Is first aid part of your induction process for contractors, visitors and staff?
10. Do you keep oxygen on site and, if so, is it clearly marked?

Selecting the right training provider

Training must be provided by a certified registered training organisation (RTO) to be considered compliant. Prospective providers should work with an organisation to identify their needs and tailor a program to their specific needs, risk level and organisational requirements.

First-aid training provider Red Cross has been operating in Australia since 1914. It provides consultancy and workplace reviews to assist organisations in identifying the risks present in their workplace, what needs to be done to meet first-aid compliance obligations and the training required for their specific workplace and the risks it presents. Its range of nationally recognised and compliant first-aid training packages and products can ensure your workplace receives good WHS support.

Its extensive experience and presence nationwide allows Red Cross to provide single-point account management for organisations with offices in different states that may be subject to region-specific solutions. A company can organise and commission training through one central point with full confidence that employees in each workplace will receive training and products to ensure legislated requirements are met.

Red Cross also offers blended learning options, where training can be delivered either on-site, off-site or in a blended e-learning format to facilitate learning and engagement with good outcomes for individuals and the business. In addition, specialist training in Occupational First Aid, Advanced First Aid and Remote First Aid is offered, along with Mental Health First Aid training, which can help managers reduce the severity of mental health issues for employees and provide appropriate support.

Red Cross
www.redcross.edu.au

Safety light curtains

The Telemecanique Preventa XUSL range of safety light curtains is compliant with safety standards type 2 and 4, as well as SIL2 and 3 allowing increased protection of floor personnel, machine operators and maintenance staff in and around machine hazards,

The optimised range allows plant floor personnel partial or full access into the zone for machine loading and unloading as well as maintenance operations. Embedded safety functions include automatic or manual start/restart and external device monitoring (for switching devices such as relays or contactors).

The range is compact at only 29 x 31.5 mm cross section, and is compliant with safety standards up to type 4, SIL3, PLe according to EN ISO 13849-1, IEC 61508, IEC 62061, IEC 61496-1 and IEC 61496-2.

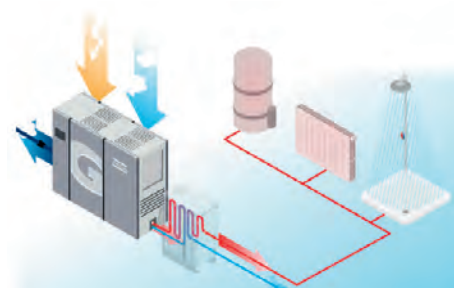
Schneider Electric Industry Business

www.schneider-electric.com



Energy recovery systems

The Atlas Copco ER range of energy recovery systems can recover up to 94% of the electrical energy used by an air or gas compressor. This means users are able to use their compressor energy more than once.



When users compress air, they generate a lot of heat. The major portion of this heat - up to 94% - remains in the compressed air and lubricating oil; the remaining 6% is lost to the environment through radiation losses. The design of Atlas Copco screw compressors, coupled with their ER energy recovery system, fully captures all the available heat generated during the compression process.

The recoverable heat can be used in a variety of ways to offset general industrial heating requirements. This recovered energy can be used to preheat water feed to boilers or steam generators; other applications include space heating and even the heating of water for washing hands and for showers. Recovered heat reduces the amount of energy required from traditional energy sources which, in turn, reduces CO₂ emissions. Atlas Copco screw compressors from 30 to 900 kW can be ordered with the option of a factory-fitted ER energy recovery system. Additionally, energy recovery systems can be retrofitted to the company's existing compressors and other brands of screw compressor in the 11 to 355 kW range. Atlas Copco compressors fitted with ER energy recovery systems are said to be twice as efficient.

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LEADING PROCESS CONTROL COMPANIES COMING TOGETHER FOR AOG 2015

The world's leading oil and gas industry process control specialists are coming together in Perth next year for the annual Australasian Oil & Gas Exhibition and Conference (AOG).

World-famous names in instrumentation and control, such as Endress+Hauser, Fastwave Communications, Krohne Oil & Gas, Pepperl+Fuchs, Prochem, Samson Controls, Yokogawa, Weidmüller and Weir Oil & Gas, will be displaying their latest technology breakthroughs at AOG 2015, which will be staged at the Perth Convention and Exhibition Centre over three days from 11-13 March.

Instrumentation, control and automation, as well as non-destructive testing and condition monitoring, will also feature in separate specialist zones at AOG 2015, with strong content support being provided by the Institute of Instrumentation Control and Automation (IICA) and the Australian Institute for Non Destructive Testing (AINDT).

A major stream on new trends in flow assurance will be held on day 1 of the conference. The day-long stream will include the following presentations:

- 'Designing Robust MEG Distribution Systems for Offshore Gas Condensate Developments', by Jeff Zhang and Paul Oakley from Wood Group Kenny.
- 'Reducing the Cost of Hydrate Management by Under-Dosing Thermodynamic Inhibitors', by Professor Eric May, Winthrop Professor from The University of Western Australia.
- 'Challenges in Offshore Methane Hydrate Production', by Tzuu Shing Ng, and Lars Noekleberg from OneSubsea.
- 'Subsea Processing Drivers, Technical Constraints and Production Recoverability for Longer and Deeper Gas Field Developments', by Terry Woods from INTECSEA.
- 'Dynamic Simulation of Subsea Multiphase Pumping System and its Implication to Optimize Full System Operability', by Dianita Sandy from FMC Technologies.
- 'Artificial Lift Selection in Deep-Water Oil Field in Western Australia', by Luca Letizia from OneSubsea and Tim Nallipogu from Woodside.

"We are really excited about our close working relationship with the IICA and the AINDT in establishing the Instrumentation Control and Automation Zone at AOG in 2015 and we are pleased to see so



many of the big names in that sector of the oil and gas industry participating in our exhibition and conference," AOG Event Director at Diversified Communications Bill Hare said.

"We are looking forward to a record-breaking event in 2015 and have added a number of new innovations to the AOG 2015 program as we look to help build capabilities for the future of the Australian oil and gas sector, through bringing together key thinkers and achievers from around the globe."

AOG 2015 will once again be a key event on the world oil and gas calendar, with a significant amount of individual global participation and major international pavilions on show in 2015. It has been bringing together global and local oil and gas industry leaders and providing a showcase for technical and technological breakthroughs in Perth for over 30 years.

As Australasia's largest oil and gas industry event, it is expected to attract over 600 exhibitors from more than 20 countries and to bring more than 15,000 visitors, exhibitors and delegates from around the world to the Perth Convention and Exhibition Centre from 11-13 March 2015. For more details on AOG 2015, visit the event website at <http://www.aogexpo.com.au/>.

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- Scales & level alarms.



Moulded cord sets

Belden has announced two M12 data cord sets from Lumberg Automation - BRSTS 8X-552/...M and RSTS 8X-478/...M. The cord sets are robustly designed to establish high-speed connections and optimise uptime for Industrial Ethernet applications across transportation, automotive and automation applications.



To accommodate growing network data demands in harsh industrial settings, the two M12 cord sets deliver reliable network functionality in environments that depend on electromagnetic compatibility (EMC). The extended data interface cables provide a transfer rate of up to 10 Gbps, allowing engineers, electricians, integrators and machine builders to establish reliable high-speed connections both on the network and in the field.

Based on the application needs, the two distinguished moulded M12 cord sets feature the following characteristics: the BRSTS 8X-552/...M is designed for use in transportation systems in rolling stocks and adheres to Europe's rigorous DIN EN requirements, while the RSTS 8X-478/...M meets the safety and quality standards for process automation, machine building and material handling applications and will carry UL's seal of quality in the future.

With an IP67 rating, the M12 cord sets enable reliable high-speed data transmission outside of cabinets, seamlessly integrating digital image processing devices to facility control processes. Both cord sets are available in the following configurations: M12, male, 8-pole, X-coded, 360° shielded, single- and double-ended cord sets, and operate at a temperature range from -40 to +85°C.

Belden Australia Pty Ltd
www.belden.com

Energy management system

The Enphase Energy Management System enables the large-scale implementation of solar power integrated with the grid. The system intelligently integrates the critical technologies needed to solve solar energy challenges at scale: smart-grid intelligence, communications, big data analytics and storage.

With the seamless integration of solar generation, storage, cloud-connected communications and load management on a unified, futureproof platform, installers and distributors can manage the design, installation and management of solar arrays. Utilities are meanwhile provided with a high level of visibility, insight and control over the energy grid. The system shares information - and, in some cases, control functions - with utilities over the cloud.

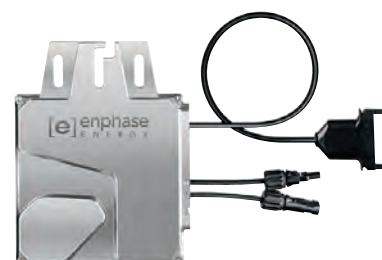
Generating solar energy that is smart-grid ready enables maximum penetration of distributed solar on the grid. Designed to meet current and future requirements, the product's fully bi-directional, software-defined microinverter supports reactive power control and other advanced grid functionalities. Enphase S-Series microinverters are easy to install and smart-grid ready.

The Enphase AC Battery is an energy storage solution with a modular, plug-and-play storage device fully integrated into the system. Based on a distributed architecture, the battery is safe, easy to install and designed for residential and commercial applications. The modular battery provides system owners with the ability to store solar energy for future or night-time use.

Envoy-S expands from energy monitoring into full revenue-grade metering of solar production, metering of home consumption and storage management. Ruggedly constructed and suitable for installation in outdoor enclosures, it offers a range of networking connectivity options. In addition to ethernet, integrated Wi-Fi not only allows for easy connection to broadband systems but also functions simultaneously as an access point for integration with Enphase's mobile application and other home automation solutions.

The Enlighten software platform enables users to monitor system performance from any PC, tablet or smartphone. The software also monitors and optimises the use of all energy sources - solar, stored and grid - providing remote visibility and control to every installation. It alerts system owners to performance issues, proactively supports operations and maintenance activities for installers, and helps utilities optimise and manage the grid.

Enphase Energy
www.enphase.com/au



Position switches

Suitable for a wide variety of applications across all forms of plant manufacturing, Schmersal PS116 position switches are compact and claimed to be very robust and extremely versatile.

With a symmetrical design, a variety of contact configurations and a large selection of repositional actuators, the PS116 is designed to offer flexible and reliable solutions for many applications.

The PS116 dimensions allow installation in confined spaces to monitor the position or presence of moving parts, workpieces or conveyed materials. The symmetrical construction of the housing and the possibility to rotate the actuating element in 45° steps makes it useable for both left- and right-handed switches. This also applies for cable and connector versions.

All switches have positive opening NC contacts, making them suitable for use in safety circuits up to PL e (ISO 13849-1) and CAT 4 (AS 4024.1).

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



Flowmeter for water, wastewater and utility applications

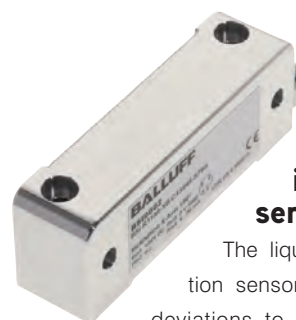
Emerson Process Management has introduced the Rosemount 8750W magnetic flowmeter for water, wastewater and utility applications. The robust, easy-to-use flowmeter is designed to help utility operators reduce life-cycle costs and unplanned shutdowns. It offers diagnostics that help users take advantage of improved installation, maintenance and process management practices, by allowing meter verification, monitoring of stability in noisy applications, and ground and wiring fault detection.

The Smart Meter Verification diagnostic available with the product allows users to verify calibration without shutting down the process and without the need for complicated external equipment, reducing the time and cost associated with meter verification procedures. The diagnostic proves the health of the magnetic flowmeter system as required by regulatory agencies and also provides the necessary documentation required by environmental agencies for regulated flow measurements. The diagnostic also provides the documentation needed for critical applications like effluent flows. To simplify use, all diagnostic information can be quickly accessed through the easy-to-use local operator interface (LOI), the 475 field communicator or AMS suite predictive maintenance software.



The fully welded construction of the sensor with isolated terminal blocks and hermetically sealed coil compartment make the product dependable for utility and water applications. In addition, the dual compartment transmitter housing and self-draining conduits keep the electronics isolated from moisture and contamination.

Emerson Process Management
www.emersonprocess.com.au



Liquid-based inclination sensors

The liquid-based BSI inclination sensors from Balluff detect deviations to the horizontal on an axis over a full 360°, contact free, with a high accuracy of 0.1°, a resolution of 0.01° and a temperature drift of 0.01%/10 K.

The inclination sensors feature a compact and robust metal housing with an enclosure rating of IP67 and can be easily installed in systems with limited space. With an expanded temperature range of -40 to + 85°C, the sensors can be used in outdoor applications.

The inclination sensors are based on a capacitive measuring principle and are equipped with a liquid-based measuring cell. These consist of four capacitors filled with a liquid dielectric. Depending on the inclination of the sensor, the 'horizon' of this medium covers the capacitors differently, causing the capacitance - as measure for the inclination angle - to change. The analog output signal from 4-20 mA analog output signal is scaled linearly over the angular range of 360°C.

Balluff Pty Ltd
www.balluff.com.au

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TIME RIPE TO CAPITALISE ON ENERGY-EFFICIENCY INITIATIVES

The repeal of the carbon tax has left many businesses pondering what impact its removal will have on energy markets in Australia. As Phil Harrington, Carbon & Energy Business Unit Manager at pitt&sherry explains, the potential effect of the tax's removal should not be exaggerated and businesses should instead focus on energy-efficiency initiatives and fuel choices in their control.

According to Harrington, the opportunity for Australian businesses to invest in energy-efficiency initiatives to save on costs has never been better.

As electricity prices level out after unprecedented rises, gas heads towards a well-documented price hike and energy-efficient alternatives become more valuable, Harrington believes energy management 'rules of thumb' which have guided businesses over the past decade should be re-evaluated.

With electricity prices in Australia more than doubling in recent years, Harrington says there has been a perception amongst the business community that the short-lived carbon tax was a major reason behind the increases following the levy's introduction in July 2012.

"Something many businesses don't understand is that the carbon price actually had a very trivial role to play in electricity's price lift," explains Harrington. "It was mostly driven by over-investment in electricity networks to meet demand that never materialised. So taking the carbon price away changes nothing fundamental."

And the fundamentals are that the business case for investment in energy-efficiency initiatives has actually never looked better than it does today.

"This is primarily because the cost of electricity has risen to be so high that the value of saving electricity is also extremely high as a result ... and now gas is on a similar path."

Emerging energy market

Analysis by pitt&sherry has found that electricity prices will likely remain stable, or even decline slightly, in the coming years. In contrast, gas prices are expected to rise significantly as the majority of Australia's booming liquefied natural gas (LNG) production heads for the highly profitable export market.

According to Harrington, the changing market has created an energy environment where businesses would benefit from assessing a range of energy-efficiency technologies now available.

"How energy markets have worked over the past five to 10 years is now pretty much out the window. Some ideas you hear are that gas is cheap, renewables are expensive and energy efficiency has a long payback. That's all been turned on its head in recent years. Businesses should rethink their energy strategies and redo their calculations based on a different pricing outlook and new policy environment. Business will need to make an informed and fresh decision about what's optimal for them in the new energy environment," says Harrington.



© iStockphoto.com/Ms Light Box

Businesses that have converted their major energy source to gas over the past decade have some particularly interesting decisions to make, adds Harrington.

"Do these companies stick with gas and risk seeing their advantage being taken away by rising prices?" he questions.

"These companies have the option to convert back to electricity or turn to another energy source, particularly renewables. There is also the option to improve the efficiency of their gas use to avoid another costly fuel change."

Different strategies

For businesses investigating a conversion to a different energy source, Harrington says the costs of energy-efficient technologies, including renewables like solar, are continuing to fall.

The key is for businesses to have different strategies they can consider or implement for their main energy source, he adds. Pitt&sherry has been involved on a number of projects where different energy-efficiency strategies have been explored from an economic and environmental perspective.

According to Harrington, the key element of assessing each strategy is whether or not they will offset the impact of higher electricity and gas prices on their business.

"A prominent strategy currently being widely considered is solar energy, which has already been hugely popular in residential settings and is now increasing in use in the commercial and industrial sectors. A key driver for solar is that the cost of photovoltaic (PV) panels has fallen by about 90% since 2007," says Harrington. "The focus now is

on understanding how to size systems, relative to your load-shape and the structure of your pricing, to get the maximum value."

Another energy strategy being explored as an alternative to electricity or gas is the use of biomass or biofuels – an option which is particularly useful in regional areas where feed stocks are readily available.

Harrington believes there is a good opportunity for manufacturers in particular to investigate biomass or biofuels as part of their energy strategy, from both an economic and environmental standpoint.

"Using these fuels will have very little impact on the operations of a manufacturer," says Harrington. "At best, the manufacturer might need to tweak their boilers to make this change. In addition, these are renewable fuels and would contribute to a significant reduction in the carbon footprint of the operation. We are currently completing a study on the economics of this option, and of course it does depend on where you are, how much steam you need and local resources – but we expect very good return on investment as gas prices rise.

"Cogeneration and trigeneration are options that work in the right application, despite some narrowing of the 'spark spread' between gas and electricity. The key is good systems design – balancing electrical and heating/cooling loads, and understanding the opportunities to change your demand profile for energy services to reduce both consumption and cost."

pitt&sherry investigates efficiency potential

pitt&sherry has worked with a variety of stakeholders and businesses from different industry sectors around Australia to assess their energy usage and help deliver the most efficient strategy moving forward.

The company has carved out a niche in the buildings energy-efficiency market over recent years, including a key project preparing the foundation report for the City of Sydney's Energy Efficiency Master Plan.

By accessing Sydney's 3D database on its building stock and its own, and partner Exergy Australia's deep knowledge of building energy use, pitt&sherry created a rich model of energy use and greenhouse gas emissions associated with the city's building stock.

According to Harrington, "Using this model we were able to demonstrate to the city, and key stakeholders, that absolute emissions savings of 40% or more could be cost effective, despite continued growth of the city's footprint. These emission-saving investments have a negative abatement cost, saving businesses and the community hundreds of millions of dollars in energy costs, as well as making a substantial contribution to slashing emissions in Australia's largest city."

In the transport sector, pitt&sherry evaluated an in-service trial of double-decker buses in Sydney to assess the on-road performance of the vehicles in terms of fuel efficiency, emissions, passenger loading and costs compared with conventional bus configurations running on city-bound and suburban routes with three bus operators.

The double-decker trial is an extension to the projects pitt&sherry has coordinated for NSW Roads and Maritime Services (RMS) over several years through the Green Truck Partnership (GTP) program. The GTP trials function as an independent assessment of fuels and technologies that can reduce emissions and operating costs for truck operators.

One trial in 2012 assessed the performance of a hybrid electric vehicle compared with a conventional diesel vehicle. This trial demonstrated a 21% saving in fuel costs, and the same figure for greenhouse gas emissions.

"What these projects have revealed is clear evidence that the economics for investing in energy-efficiency initiatives are extremely attractive due to Australia's evolving energy market," concludes Harrington.

Pitt & Sherry
www.pittsh.com.au



Titanium pressure transmitters and pressure sensors

Keller offers titanium versions of its products for use in heavily corrosive media. The company has developed an implantable sensor made of titanium, offering a host of advantages for applications under special conditions.

If a sensor is made of steel, it can only be exposed to temperatures up to a maximum of 60°C. At higher temperatures, the heat-induced expansion of the oil causes so much deformation of the steel diaphragm that it no longer returns to its original position. By contrast, the titanium diaphragm shows no deformation up to 120°C, which also makes stability errors less likely than in products with steel diaphragms. This is because the modulus of elasticity is only half as high.

At Keller, titanium is used to manufacture high-quality transmitters that meet demanding stability requirements. Components made of titanium will not corrode even in salt water or chlorinated water, making it suitable for process measurement technology applications involving wastewater that may be contaminated with unknown corrosive substances. Titanium housing also makes it possible to carry out hydrostatic level measurements effectively in brackish water or even iron chloride.

KELLER AG für Druckmesstechnik

www.keller-druck.com

Servo drives with integrated safety

The Kinetix 5500 servo drive with integrated safety builds on the foundation of the recently released Kinetix 5500 servo drive. End users gain the benefit of improved personnel safety and increased machine uptime in the manufacturing facility.

The EtherNet/IP network allows safety signals to travel via the same wires and IP addresses used for control and motion. This eliminates the need for a hardwired safety system. Reducing overall system wiring saves time and money in installation and removes potential points of failure, resulting in less troubleshooting and downtime.

Machine and equipment builders can more quickly install the drive and provide customers with greater ease of use via the Logix Designer development environment and Allen Bradley GuardLogix safety controllers. In addition to motion and control parameters, end users now can configure the safety system within the Logix Designer software. They can unlatch the safe torque off function, program an unlimited number of setpoints, change safety zoning and re-use code to maintain system validation from within a single software application.

End users also gain improved diagnostics information through the drive's integration with the GuardLogix safety controller. Details on safety-related faults, such as safe torque off requests, are shown on the drive's LCD display. This information can also be pulled into existing information databases and reporting solutions already in use to deliver actionable safety information to users when and where they need it.

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Respirator kits for asbestos fibres and dust protection

3M has released four convenient respiratory and body protection kits designed to manage varying levels of exposure to asbestos fibres and dust.

The two negative pressure Asbestos/Dust Respirator kits provide a choice of either a 3M full- or half-face re-usable respirator and appropriate filters. The half-face kit also includes a pair of 3M safety glasses. The positive pressure kits allow a choice between either a ready-to-use face- or belt-mounted full-face respirator system. Both kits also include a 3M disposable coverall.

3M Personal Safety

www.3M.com/au/PPESafety

Recycling stations

The National Park range of public recycling stations has been specifically designed to provide users with the flexibility to design their own bins. The final design is completely customised, yet features best-practice waste diversion and high-quality manufacturing. The Media Panel option features a curved cover and recycling lid. The option enables users to feature posters of local events, promotions or even paid advertising, which are protected with a steel frame and tough polycarbonate panel.

Users can build their own bin on the company's website using a simple interactive tool.

Source Separation Systems Pty Ltd

www.sourceseparationsystems.com.au



Consistent notification with Quint UPS-IQ

The new data cables from Phoenix Contact optimally integrate the Quint UPS-IQ unit (UPS) into the application. You can therefore benefit from all the advantages of IQ technology, charging state, remaining runtime, remaining life expectancy of the power storage device and be kept informed of the state of your UPS solution – at higher-level controllers via Ethernet or directly in control solutions from Phoenix Contact. Consistent notification with Quint UPS-IQ.

www.phoenixcontact.com.au or call 1300 786 411

Volatile organic compound monitor



Suitable for those in the oil and gas, industrial safety, air-quality, hazmat and military sectors, the ppbRAE 3000 is a volatile organic compound (VOC) monitor with data logging functionality. The monitor is available to rent from TechRentals.

RAE Systems' VOC monitor uses a photo-ionisation detector (PID) with a 10.6 eV UV-discharge lamp. The monitor also comes with integrated correction factors for 220 compounds, and humidity compensation with integral humidity and temperature sensors. The device features a range from 1 to 10,000 ppm, a 3 s response time, and sensor and lamp auto cleaning. It is also waterproof to IP67.

TechRentals

www.techrentals.com.au

Vision system

The NI CVS-1459RT is a small, rugged vision system with a quad-core Intel Atom processor and two dedicated USB 3.0 ports for USB3 Vision cameras.

The NI CVS-1459RT is programmed with either LabVIEW system design software or Vision Builder for Automated Inspection (AI). Engineers have the option of using LabVIEW FPGA to further customise the FPGA-enabled I/O and tightly synchronise vision inspection results with other parts of industrial systems, such as encoders and proximity sensors.

The NI CVS-1459RT is based on the LabVIEW reconfigurable I/O (RIO) architecture, an integral part of the NI graphical system design platform. A modern approach to designing, prototyping and deploying embedded monitoring and control systems, graphical system design combines the open LabVIEW programming environment with commercial off-the-shelf hardware to simplify development so engineers can combine vision tools, I/O, industrial communication, data logging and HMI's into a single environment.

National Instruments Australia

www.ni.com/oceania



CASE STUDY

New polymer improves solar cell efficiency

A US research collaboration has developed a new polymer which, when used added to a solar cell, improves the efficiency of that cell. The study has been published in the journal *Nature Photonics*.

The group comprised researchers from the University of Chicago, the university's Institute for Molecular Engineering and Argonne National Laboratory, led by Professor Luping Yu. According to lead author Luyao Lu, "Polymer solar cells have great potential to provide low-cost, lightweight and flexible electronic devices to harvest solar energy" - but researchers are still struggling to efficiently generate electrical power with these materials.

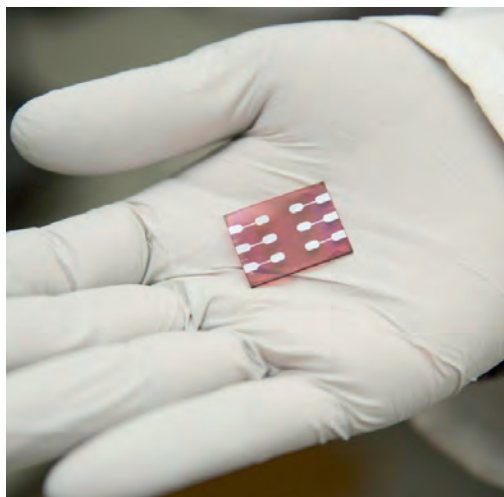
The active regions of polymer solar cells are composed of a mixture of polymers that give and receive electrons to generate electrical current when exposed to light. Lu explained that the polymer acts as the electron donor, while fullerene, a small carbon molecule, is the electron acceptor, which allows charge separation.

The group developed a new polymer, called PID2, which was found

to improve the efficiency of electrical power generation by 15% when added to a standard polymer-fullerene mixture. This resulted in an overall efficiency of 8.22% - the highest ever for solar cells made up of two types of polymers with fullerene.

Not only did the third polymer increase the absorption of light in the device, but the PID2 additionally enabled electrical charges to

be transported more easily between polymers and throughout the cell. The difference between electron energy levels for a standard polymer-fullerene cell is large enough that electron transfer between them is difficult, but PID2 has energy levels in between them and acts as an intermediary in the process.



This solar cell consists of a new polymer, called PID2, which was developed in the laboratory of Luping Yu. Photo by Andrew Nelles.

"It's like a step," said Yu. "When it's too high, it's hard to climb up, but if you put in the middle another step then you can easily walk up."

Yu and his group were also able to study the changes in structure of the polymer blend when PID2 was added and show that these changes likewise improved the ability of charges to move throughout the cell. The structure was revealed through X-ray scattering studies performed by Wei Chen of Argonne National Laboratory and the Institute for Molecular Engineering.

The addition of PID2 caused the polymer blend to form fibres, which improve the mobility of electrons throughout the material. The fibres serve as a pathway to allow electrons to travel to the electrodes on the sides of

the solar cell. As explained by Yu, "It's like you're generating a street and somebody that's travelling along the street can find a way to go from this end to another."

The group is now working to push efficiencies towards 10% - a benchmark necessary for polymer solar cells to be viable for commercial application.

New waterproof coating keeps boxes recyclable

Researchers from Queensland University of Technology (QUT) - Albert Tietz and Adjunct Associate Professor Les Edye - have developed a lignin-based waterproof coating to replace the traditional wax coating used on cardboard boxes.

Professor Edye explained that lignin is a naturally occurring by-product from pulped wood and grasses. Using lignin extracted from a commercially grown and processed grass, he said the researchers created a sustainable, waterproof coating.

"Traditional wax coatings are made from petrochemicals and, once it's on the paper or cardboard, that paper or cardboard can no longer be recycled," Professor Edye said, noting that around 400,000 tonnes of wax-coated cardboard are added to Australian landfill every year.

"We've proven that our lignin coating is cost comparable, is 100% recyclable, provides a high level of waterproofing and strengthens the boxes to a higher degree than wax - not bad for a product made from a renewable resource."



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QUT's innovation arm - qutbluebox - has been working closely with the researchers for two years, providing more than \$250,000 in proof-of-concept funding to develop and scale the coating for industry. The organisation has secured a further \$200,000 from private equity firm Black Sheep Capital to optimise the coating's formula and fund industrial-scale trials, according to its CEO, Michael Finney. "We've already successfully coated the lignin-based formulation on food packaging and prefabricated honeycomb walls used in the construction industry," Finney said. "We're now trialling it on fruit boxes for the banana industry."

"Critically, the Black Sheep investment will help us fast-track the waterproof coating's industrial-scale trialling." If the current trial is successful, the researchers anticipate the product will be on the market in mid-2015. Black Sheep Capital Director Daniel Gavel said the coating could be applied "across several marketing sectors - from paper and cardboard to building materials" and the company is confident the product will "deliver a high-value solution to the marketplace".



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IBM advises City of Ballarat on waste management

The City of Ballarat has received pro bono consulting on waste management after winning a US\$500,000 grant from the IBM Smarter Cities Challenge. The city was one of only two Australian cities, and 16 worldwide, to be awarded the grant in 2014.

The City had access to five of IBM's top experts, who spent three weeks immersing themselves in Ballarat to analyse and advise on its waste management strategy. The team interviewed dozens of local officials and community stakeholders on the issue of how Ballarat can realise its vision of becoming a leader in the use of strategies to manage residential and industrial waste more effectively.

"Waste management is a key priority for the City and we want to lead the way in developing best practice approaches that can be shared with other councils and communities," said Mayor John Philips. "We want to empower our community to take action now to ensure our waste management capabilities are both more efficient and more sustainable, as well as explore how we can get more economic value from waste as a resource stream."

IBM's seven key recommendations are as follows:

1. Use a waste management decision framework to prioritise investment decisions, taking into consideration financial, community and environmental goals.
2. Utilise modern sorting methods to enhance resource recovery and reduce waste to landfill.
3. Explore waste to energy options that maximise landfill diversion.
4. Work with the state government to improve the attractiveness of waste to energy investments.
5. Establish a 'Clean Ballarat' community advisory group.
6. Develop an integrated communications plan emphasising landfill costs and lifespan concerns, and prepare the community for any waste management policy.



© iStockphoto.com/Christopher Steer

7. Employ a digital waste information system to increase understanding and support waste management process optimisation.

"Ballarat has already invested significantly in waste management and there is depth of knowledge, expertise and systems in place," said Miranda Scarff, corporate citizenship manager, IBM Australia. "By bringing the best minds in Ballarat together with IBM's experts, better ways to manage local waste resources, reduce reliance on landfill and support economic growth can be uncovered."

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Safety barrier system

Ironman Hybrid is a concrete balasted steel temporary barrier system that requires no anchoring. The design has been tested to NCHRP350 TL-3 (100 km/h) and the results show that it has similar

deflection performance to concrete systems, but with the durability and portability of steel. The barrier system has been assessed and accepted by the Austroads Safety Barrier Assessment Panel (ASBAP) as well as each of the state-based road authorities. The system has demonstrated good impact vehicle stability during testing at different speeds and impact angles.

Economical and simple to deploy, it has individual sections that easily connect together and up to 100 m of barrier can be easily transported to site on the back of a semitrailer.

The system is claimed to be environmentally friendly and efficient in that after most impacts the barrier can be easily repaired, and it has an estimated working life of more than 15 years.

Saferoads Pty Ltd

www.saferoads.com.au

Eye wash

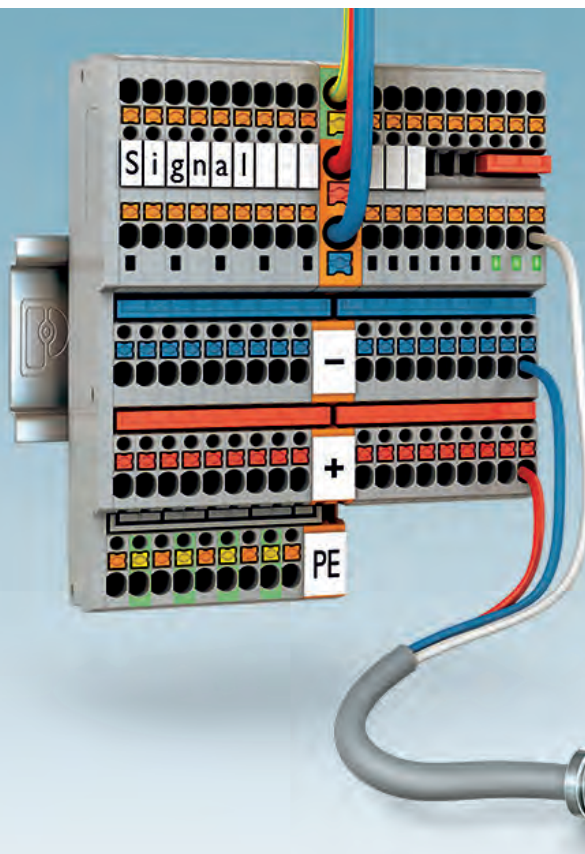
LabFriend has a range of shapes and sizes of eye wash stations, as well as refill bottles, for the initial first aid treatment for many hazardous contaminants. The range of safety showers, eye/face wash units and multispray platform showers is designed for personal safety, particularly in applications such as mining, petroleum and oil refineries, chemical manufacturing and handling, as well as laboratories and hospitals.

Portable solutions that fit easily into a pocket or bag are also available, including bottles with one or two eye funnels for parallel treatment of both eyes.

In addition to eye wash stations, LabFriend also has a range of emergency safety showers, eye washes and decontamination equipment.

LabFriend

www.labfriend.com.au



Sensor/actuator terminal blocks with push-in connection

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www.phoenixcontact.com.au
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**PHOENIX
CONTACT**

Traffic-cone LED Light

The VisionSafe traffic-cone LED light is a portable hazard warning light that can be used in conjunction with the traffic cones to make them more visible. Operating on three C batteries, the compact unit delivers a bright light from a 1 W LED which is amplified by a cone-shaped reflector in the lens.

The light is available in a manual on/off version or with a day/night function which allows the unit to automatically activate in low-light situations. The light comes with a selection of flash patterns built in and a variety of colours to suit a number of user applications.

Other features include: operating temperature range from -20 to 80°C; the ability to be hung from a lanyard with a convenient hanging hole; and epoxy potting for good water resistance.

Vision Safe (PPE)

www.visionsafe.com.au

Linear DC servomotors

Faulhaber has extended its linear DC servomotor range with versions aimed at facilitating product integration inside an application.

The Series LM 1247 and LM 2070 servomotors integrate an axial type connection to satisfy constrained space requirements in applications where performance and size cannot be compromised. The axial coupling also improves the mechanical robustness of the connection to electronic controllers.

The LM 1247 and LM 2070 respectively provide a peak force of up to 27.6 N and 10.7 N. They are available with different stroke lengths ranging from 20-120 mm for the LM 1247 and up to 220 mm for the LM 2070.

These linear servomotors integrate analog Hall sensors or sin/cos type sensors to match positioning needs without requiring an external encoder.

The LM 2070 can be coupled to MCLM 3003 or MCLM 3006 drive electronics while the miniature MCLM 3002 controller is a suitable companion for the LM 1247. Motion controllers are available with serial or CAN interface.

The linear DC servomotor range also includes the compact LM 0830 measuring 8 x 12 x 30 mm and weighing 17 g. The easy-to-use Motion Manager software, for use with the analog Hall sensor version, is included.

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SAFETY A PRIORITY

TOTAL FACILITIES 2015

Health and safety is top of mind for most professionals concerned with facilities management. Although successful compliance with new and updated regulations and codes is an ongoing and necessary challenge, it's easy to become overwhelmed by Australia's stringent health and safety standards. But with ongoing education and training, facilities management professionals can stay on top of this important aspect of their role.

The annual Total Facilities presents a prime opportunity for professionals to enhance their knowledge of new and emerging technologies and solutions, as well as developments within the industry.

Brett Judd, Diversified Communications exhibition director, said Total Facilities offered education and professional development opportunities for professionals concerned with facilities management practices such as fire safety and OHS.

"We recognise that maintaining safety compliance is critical in any building and this year's event will feature the latest services and solutions that assist in protecting a building's valuable assets," Judd said.

The event will cover:

- essential services,
- exit and emergency lighting,
- fire and safety prevention,
- fire protection systems,
- materials handling,
- OHS,
- risk management,
- safety products, and
- signage.

As part of its education program, the event will host both local and international industry speakers who will deliver practical information and case studies for running more sustainable buildings and facilities. The exhibition will also feature more than 200 product suppliers and service providers showcasing the latest solutions relevant to the industry.

SAI Global will be exhibiting its range of online training solutions available to safety advisors and auditors. The training courses take individuals through how to understand, implement, audit, improve and maintain a health and safety management system.

Victorian building compliance management team Essential Safety Solutions will also be exhibiting. The company delivers end-to-end solutions for a range of industries and covers building maintenance, including fire alarm system maintenance, checking portable fire extinguishers and inspecting building elements such as balustrades and artificial lighting systems.

The Total Facilities 2015 event is being held at Sydney Exhibition Centre, Glebe Island, from Wednesday 25 to Thursday 26 March. For further information about the event, visit www.totalfacilities.com.au.

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Tackling the growth of e-waste, one Sydney Harbour Bridge at a time ...

Did you know that by 2017, the global amount of electronic waste (e-waste) produced is predicted to reach 65.4 million tonnes, which is almost 20% of the weight of the entire population on earth - or about 1200 Sydney Harbour Bridges!

Recent forecasts also predict that the weight of televisions and computers reaching their end-of-life in Australia is projected to grow to 181,000 tonnes by 2027-28. These numbers are extremely disconcerting, especially considering the high level of renewable resources that are lost when product is not properly recycled, and potentially toxic materials ending up in landfill. In tackling this issue, there is a joint responsibility for all of us: governments, the technology industry and end users - both consumer and corporates. As consumers we're increasingly focused on being more eco-friendly, and making informed and environmentally responsible decisions when shopping. We're very good at recycling materials like paper, cardboard and glass, and many of us love using recycled goods, paying close attention to labels that claim 'free-range' and 'organic'. And we're extremely cautious about any harmful chemicals we may be exposing our families to.

But when it comes to e-waste - why are some of us so quick to turn a blind eye? These statistics are alarming but a good 'warning sign' for Australian consumers and businesses to take notice, and start acting responsibly.

Recycling also plays a big role in Australia's future industrial and environmental development. The recycling of e-waste is a critical component of our transition towards reducing Australia's reliance on non-renewable materials. Waste avoidance, sustainable design and manufacture, and recycling need to be considered holistically - so that Australia can reduce its reliance on non-renewable resources and 'below-the-ground' mining, and sustainably manage resources that are consumed.

TechCollect is a free national recycling service for computers, computer accessories and televisions, established by Australia and New Zealand Recycling Platform (ANZRP), in response to the federal government's National Television and Computer Recycling Scheme (NTRCS). As the only not-for-profit industry-for-industry e-waste recycling service approved under the NTRCS, we are funded - and represented on our board - by some of the world's biggest technology brands, who through our program play their key role in responsible recycling. It's not an easy feat, but at TechCollect, we are working to drive awareness around the growing industry of e-waste, we are passionate about educating Australians about the importance of recycling responsibly and we are working closely with communities across Australia to help reduce our impact on the environment as citizens.

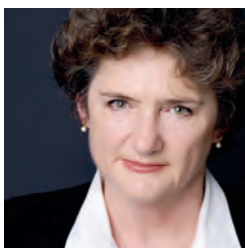
We've recently completed our second full year of operations, in which we met our regulatory targets and maintained our status as the largest of the Co-regulatory Arrangements (CAs) under the NTRCS. In addition, we're the only approved e-waste recycling service to consistently achieve a recovery rate of at least 90% since the scheme's launch. The scheme continues to evolve, with the Hon Greg Hunt, Minister for the Environment, recently announcing a review into the operational aspects of the NTRCS.

TechCollect welcomes this very timely review and believes that it is in the best interests of the scheme. We will participate in the review and share our expertise and experience about its implementation and areas of enquiry, while acknowledging that, through the NTRCS, industry is fully meeting its obligations under the regulations.

We also share the regulator's view that greater responsibility needs to be taken by individual states for managing their share of e-waste recycling, and we strongly believe the scheme must be driven by fair and transparent partnerships that are beneficial to all parties, from liable parties and CAs to collection partners and recyclers.

Our love of technology should not come at any cost, and as consumers, we must start to take greater responsibility for our consumption of devices.

For further information, visit www.techcollect.com.au.



Carmel Dollisson is Chief Executive Officer, Australia and New Zealand Recycling Platform Limited (ANZRP), which operates TechCollect, a free television and computer recycling program. NZRP is an approved Co-regulatory Arrangement under the Federal Government's National Television and Computer Recycling Scheme (NTRCS).



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