

# sustainability matters

Oct/Nov 2014 Vol.8 No.2

VITAL INFORMATION FOR INDUSTRY & GOVERNMENT



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meters

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analysis

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**W**hat a wonderful feeling it is to escape the office for a day and enjoy a wonderful lunch with someone special. Meanwhile, back at the office, the emails never stop.

It is claimed that a new scientific research paper is published nearly every 30 seconds, which equals more than a million annually. Of course these papers contain extremely valuable information, but it is impossible for the average researcher to read more than a small fraction of these papers each year.

The same is true for data. 'Big data' represents real opportunities for most industries to optimise their operations and predict future trends, but the challenge is finding the right technologies to process and analyse this large and complex information.

In this issue, we discuss how utility companies can adopt sound data-analytics strategy by embracing big data (page 27). We also take a look at emerging trends in online water technologies supplying this data (page 6).

In our leading-the-way opinion piece on page 4, the introduction of non-financial performance disclosure, which is being introduced by international stock exchange, is discussed. The article comments: "... it is becoming increasingly clear that sustainability should be an integral part of any company's core business strategy."

**Carolyn Jackson**

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# ASX sustainability risk and disclosure



*Kathryn Franklin is a director in the EY climate change and sustainability services team. EY assists many of Australia's largest companies to identify, mitigate and manage material economic, environmental and social risk. The team also works with companies to advise them on reporting these risks and engaging their stakeholders in this process. Prior to joining EY, Kathryn worked for sustainability advisory firm Net Balance, which was acquired by EY in September 2014.*

**W**ith more and more regulators around the world demanding companies disclose their key environmental, social and economic risks, it is becoming increasingly clear that sustainability should be an integral part of any company's core business strategy.

Non-financial performance disclosure is being introduced by international stock exchanges including South Africa, Hong Kong, Singapore, India, United Kingdom and Brazil, while US-based advocacy group CERES is pursuing a global initiative to encourage a mandatory sustainability reporting standard across all stock exchanges.

Reflecting this trend, earlier this year both the Australian Securities Exchange (ASX) and the European Parliament announced new requirements for disclosure of non-financial information.

The European Parliament released its directive in April requiring more than 6000 companies and groups across Europe to disclose "policies, risks and results as regards environmental matters, social and employee-related aspects, respect for human rights, anti-corruption and bribery issues, and diversity on boards of directors". The Council of the European Union (EU) is expected to adopt the directive in October 2014.

In Australia, the importance of identifying and disclosing sustainability risks has been underlined by changes to the ASX Corporate Governance Principles; specifically Recommendation 7.4, which requires "a listed entity [to] disclose whether it has any material exposure to economic, environmental and social sustainability risks and, if it does, how it manages or intends to manage those risks".

While most companies can articulate how they manage financial risk, the ASX now requires them to disclose their risk-management practices across the whole triple bottom line.

According to the ASX, the introduction of Recommendation 7.4 was a result of business failing to adequately understand and address risk in the past, which ultimately led to the global financial crisis.

Recommendation 7.4 defines material exposure as "a real possibility that

the risk in question could substantively impact the listed entity's ability to create or preserve value for security holders over the short, medium and long term". It requires companies to demonstrate that they understand their material exposure beyond financial risk to include social, economic and environmental risk. While some companies are experienced in sustainability materiality assessments, this will be new ground for many.

The way in which organisations meet this requirement has not been specified, although both the ASX and EU directive suggest they use international, European or national guidelines such as the United Nations Global Compact, ISO 26000 or the Global Reporting Initiative. The method of disclosure is also not prescriptive, with options including web-based reporting and sustainability reporting.

The changes to the ASX requirements highlight that economic, environmental and social sustainability issues have become an increasingly important issue for investors who want assurance that companies have strategies in place to identify and mitigate these risks.

And while investors are looking for greater transparency, this information is important to all stakeholders, with the ASX recognising that the way companies conduct their business impacts on a wide range of groups including employees, customers and governments as well as investors. The focus now will be on how companies choose to respond. While the principles and recommendations detail corporate governance practices and reporting requirements for companies listed on the ASX, they are not mandatory; boards who do not adopt the recommendations need only to explain why.

Also of interest will be the level of accountability and transparency companies apply to disclosure. While financial performance data is thoroughly audited prior to release, the same rigour is not always applied to sustainability information.

With the ASX changes coming into play from 1 July 2015, listed companies need to examine how they are identifying and managing their key sustainability risks and preparing for disclosure at the end of this financial year.

*Disclaimer: The views expressed in this article are the views of the author, not Ernst & Young. This article provides general information, does not constitute advice and should not be relied on as such. Professional advice should be sought prior to any action being taken in reliance on any of the information. Liability limited by a scheme approved under Professional Standards Legislation.*



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# Market trends in online water analysis

The growth in automation, communication and SCADA technologies has driven the market towards real-time information. For water analysis, this means online instruments rather than sampling and laboratory-based testing.

*Chris Hoey, Bürkert Fluid Control Systems*



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“

*If the industry moves from few measurement points to potentially many, in places where such measurements have not been taken before, the analysis instrument requirements will change significantly.*

”

There is nothing ground-breaking about online analysis, but this type of instrumentation has generally only been seen in larger facilities or water plants, mandated in wastewater or at key points in a water distribution network. Now the trend is to monitor many more points in networks or in point of use. This puts demand onto a different type of sensor technology, better suited to stand-alone installations and easier to maintain.

This is true not only in water distribution but also in industry. In this article, I will discuss the market drivers for municipal applications, as well as those for the food and beverage industry. While these are quite different processes with different challenges, you will learn that the applications for this newer breed of online analyser are very similar.

### Municipal applications

Everyone is talking ‘smart water networks’, which is not a surprise considering GWI (Global Water Intelligence) forecast that investments in this area are predicted to show an annual growth of 13.9%. It stated that there were three major drivers responsible for this growth:

- 1. Improving operational efficiency:** reducing energy costs and carbon footprint through optimisation.
- 2. Regulation:** through the adoption of key performance indicators, benchmarking initiatives and water quality standards.
- 3. The security of water supplies:** the in-depth data created by smart systems defines a detailed picture of the state of water networks.

It doesn't take a rocket scientist to look at the above list and conclude that distributed online analysis will be

instrumental in achieving each of these objectives. These smart networks will potentially have hundreds of analysis points, which will integrate directly into the distribution network metrics in the SCADA system. From this analysis, patterns will form on distributed water quality and key decisions will be driven from this information. The ability to benchmark quality standards at the user points and report on exception will deliver a faster response to problems, as well as serve to document the delivered water quality in the event of an issue. Lastly, security of water supplies will always be an issue, as every water network can be compromised at any point. Highly distributed analysis can offer early detection of an infiltration and enable a fast response to mitigate any risks.

### Industry applications - food and beverage

Like municipal applications, those for food and beverage (F&B) are also growing faster than ever before. GWI data suggests that the global water-technology market in this sector alone will reach US\$6 billion by 2020. This will be driven by the need for increased efficiencies and water re-use, corporate risk, safety and profitability.

Consider the number of processes where water is directly used in food processing, either as a cooking medium or an ingredient. Ensuring water quality will directly apply to corporate risk, safety and, in time, profitability.

In recent times the F&B industry has found itself in the news, where known and respected brands find themselves on ‘trial by social media’ due to a quality issue. This in itself will drive more stringent analysis to ensure such issues don't happen in the first place, or to document and prove the ingredient quality at that point in time.

Alternatively, let's consider product quality. If you are batching water to reconstitute a juice, for instance, not checking the result until you have batched 1000 L can prove very costly. Imagine that your water filtration failed in that period; now the entire batch is potentially ruined.

### What do these applications have in common?

If the industry moves from few measurement points to potentially many, in places where such measurements have not been taken before, the analysis instrument requirements will change significantly. I see three main drivers that will drive the future market:

- 1. Simplicity:** single, multipoint instruments able to operate off one measurement point and report the entire picture.
- 2. Maintenance:** there simply won't be the number of instrumentation technicians in the right areas to maintain all of these analysers, so different procedures will need to be put in place to maintain and calibrate these devices.
- 3. Connectivity:** single network interfaces direct to local or remote SCADA systems. Technologies like cloud-based data acquisition and direct email alarm functionality as standard.

In other words, the market is demanding simpler solutions that enable them to meet the regulatory and safety standards, but without the need for specialist technicians or chemists.

### What are the trends in online analysis?

The new technologies available are enabling sensor manufacturers to rethink the way they design their systems



## Water monitoring

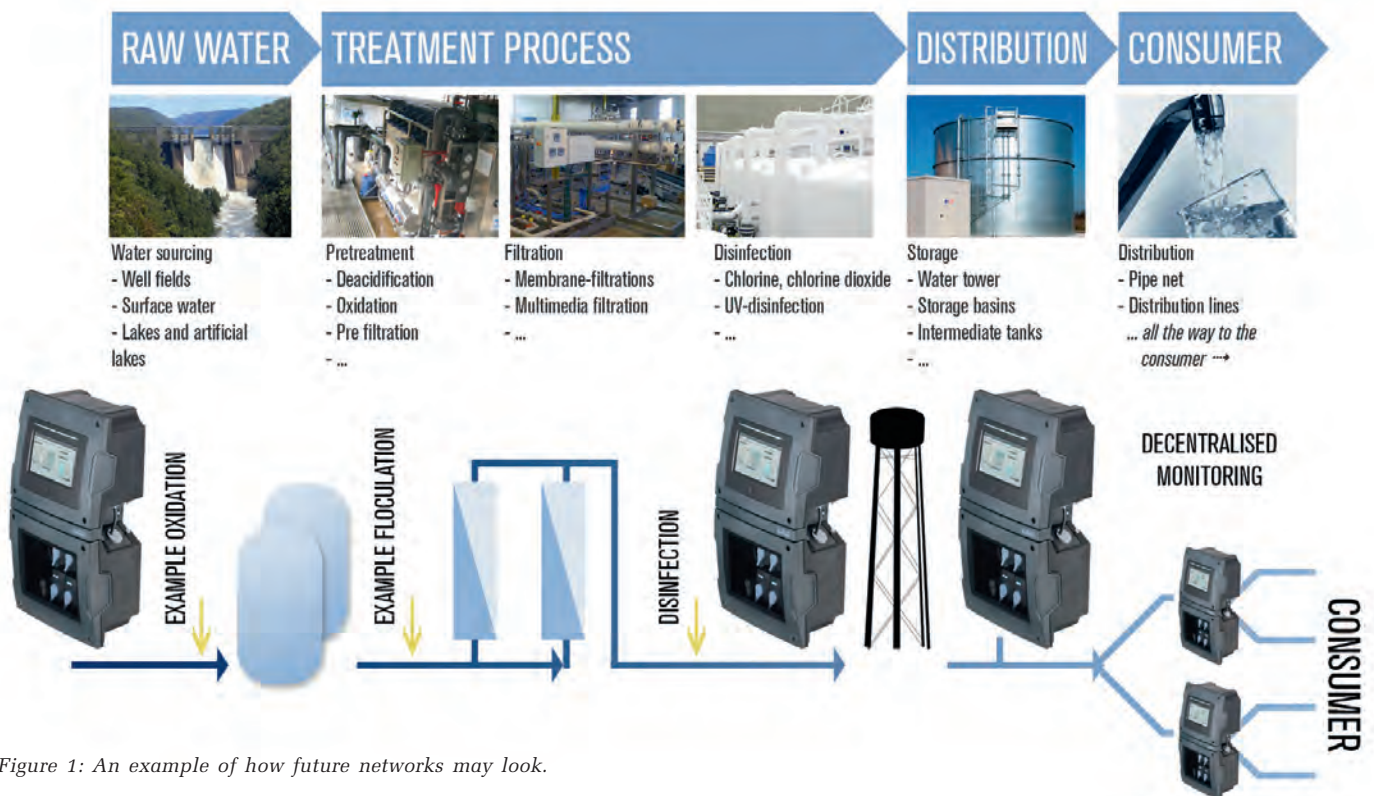


Figure 1: An example of how future networks may look.

in order to meet these changed market needs. These include, but are not limited to, three key areas: MEMS (microelectromechanical systems), optical sensing and biosensors. These new measurement methods are lower in cost, smaller and smarter than previous methods.

### Future tech and future work

Until recently, these online analysis technologies simply couldn't be reliably produced at a price-point that was acceptable to the market. But the cascading advances we've seen - sensor technologies, connectivity technologies and manufacturing technologies - combined with the changing face (and cost) of employment, have brought these 'wish-list' solutions to the fore. Manufacturers (including Bürkert) have invested in developing products that address all of these demands; we're now seeing the evolution of simple plug-and-play devices with intuitive programming, on-board network interfaces and built-in maintenance - all connected to the internet for secured global-access. These devices, unimaginable (in a cost-effective context) until only recently, are now here. Importantly, they will support instru-

mentation technicians and specialists to manage high-precision processes with unanticipated oversight, control and ease.

### Example solution to evolving market needs

Bürkert's market research led to the development of the 8905 online analysis laboratory or 'OALab.' The unit can be adapted with whatever modules a process may require, including both sensor modules and network or cloud-connectivity modules. This supports multicontact text message alarming, report emailing and real-time data logging and trending. These attributes were found through conversations with our market, as well as surveying available technologies. The sensor modules are designed around the market demand for simplicity of device and maintenance.

The expandable and interchangeable modules, which snap-lock fluidically and electronically (like an inkjet cartridge), register all system parameters continuously. Where instrument technicians are increasingly time-poor, tasks such as these can be given to other colleagues that do not have this specialist training.

Modules are swapped for maintenance and sent to a specialist supplier for calibration - again, allowing site instrument technicians to focus on pure process elements, rather than the relatively basic work of module swaps. Supporting new market expectations through product development has minimised callouts and allows instrument technicians and site operators to more effectively allocate their increasingly scarce technical resources.

### In conclusion

Application processes, regardless of industry, are often shadowed by the concept of Kaizen, meaning continuous improvement. Online analysis technologies fitting the 'future-tech' bill adhere to the Kaizen ethos, delivering both total internal flexibility and total process flexibility for the customer.

Instrumentation for water-quality analysis is a strong growth market - one that will demand constant improvement and evolution to support more and more complex measurements into the field. Successful technologies will need to support and even surpass market demands.

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# Where are all Australia's trees?

**A report from 2020Vision has analysed tree canopy cover in Australia's most urban, dense, local government areas (LGAs), revealing the complexities and barriers in addressing increased greenery. 2020Vision is a collaborative initiative to increase green space in urban areas by 20% by 2020.**

**A**s explained by Dr Anthony Kachenko of the National Urban Forest Alliance (NUFA), the report 'Where are all the trees?' is the first national analysis that "has tracked and measured the number of trees in Australia's most dense urban areas". Trees and urban green spaces are important, he said, because they "have the unique ability to improve our environment, save lives, mitigate the risks of climate change and provide significant cost savings across our economy".

"Extensive global research shows maintaining and increasing high-quality green space in cities has a wide range of improvements to our environment,

productivity and society," said Dr Kachenko, with benefits including "reduced pollution, improved air quality, decreased utility costs, more efficient water management, increased commercial productivity, better health and wellbeing outcomes and more cohesive community spaces".

The report, conducted by the UTS Institute for Sustainable Futures (ISF), utilised a software program called i-Tree Canopy to analyse the amount of tree canopy cover in 139 of Australia's most urban LGAs, which are home to 68% of our population. The highest ranking CBD councils were Hobart, Brisbane and Darwin with 59%, 49% and 28% of coverage respectively. Australia's two largest cities, Sydney and Melbourne, had only 15% and 13% canopy coverage each.

Beyond Australia's CBD council areas, the areas that demonstrated the highest amount of tree canopy cover were Cairns (79%), Launceston (55%) and Townsville (44%). Meanwhile, the Victorian council areas of Wyndham, Brimbank and Melton all saw the least amount of tree canopy cover (3%, 6% and 6%) in Australia's most dense council areas.

Dr Kachenko said the report is "likely to kick-start a range of conversations as to how we can continue to increase greenery in our urban areas", especially for those councils with lower amounts of tree canopy cover. For example, it found there are opportunities for councils to turn older industrial areas into community parklands or place green rooftops on buildings.

"The reality, for a number of these councils with the least amount of tree canopy cover, is there may already be strategies in place to develop and increase it, but the report and i-Tree Canopy software can be utilised for free by anyone wishing to understand tree canopy cover more deeply," he said.

"This report tells a story of hugely complex planning, geographical and climate-related factors that challenge councils, business and communities in this sector every day."

[2020vision.com.au](http://2020vision.com.au)



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### Yingli PV panels at Australia Post headquarters

Solar PV manufacturer Yingli Green Energy Australia, known as Yingli Solar, has supplied Australia Post with a 284 kWp solar PV system through provider Photon Energy Australia. The installation of the system at StarTrack House, Australia Post's NSW headquarters at Strawberry Hills in Sydney, was completed by Photon Energy over three months.

Having identified electricity usage as one of the key contributors towards its carbon footprint, Australia Post looked towards solar PV as a way of improving StarTrack House's 2.5 Stars NABERS energy rating to 5 Stars in the most cost-effective manner. Andrew Sellick, Australia Post's head of environmental sustainability, explained, "We're striving to become leaders in environmental sustainability, driving clean energy and efficiency initiatives across our 1200 facilities, and StarTrack House is a key example of this."

As there was limited roof space available for the installation of a solar PV system, Photon Energy used a two-pronged strategy to maximise yields. This involved taking an innovative approach to the engineering and design of the system, and using



Yingli Solar's high-efficiency PANDA modules.

"Yingli Solar's proprietary n-type silicon technology, known as PANDA, is ideal for maximising energy yield, especially for buildings wishing to push the envelope," said Daman Cole, managing director for Yingli Green Energy in Australia. The technology provides high energy outputs, especially in low light conditions such as mornings, evenings or cloudy days.

The 1051 Yingli PANDA panels installed on the building have an average cell efficiency of 19%. They are forecast to produce 370 MWh of electricity per annum - enough to reduce the carbon impact of the facility by around 325 tonnes and the electricity costs by over \$65,000 each year based on today's prices.

The initiative supports Australia Post's long-term 'Carbon Reduction Strategy', which aims to achieve a 25% reduction in 2000 level emissions by 2020.

*Yingli Green Energy Australia Pty Ltd*  
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### Turning liquid waste into energy with anaerobic digestion

Wastewater treatment plants, dairy farms, abattoirs and food processing plants have considerable liquid waste streams, often with a significant organic proportion. These businesses can considerably cut down on their electricity and heating costs by turning this waste into power.

Modern technology and equipment achieve better results than ever before. Hurl Nu-Way offers efficient solutions for turning liquid waste (sludge) into electricity by anaerobic digestion.

Thickened sludge is heated either with a heat exchanger or directly in the anaerobic digester. With the help of a sludge pump, the sludge is kept circulating for maintaining the optimum temperature. Sludge is renewed either constantly at small rates or in a batch process; then, after a specified retention time, the digestate goes into the storage.

Sliding vane compressors are used in the best-practice mixing methods for continuous unconfined gas mixing of the sludge. In these methods, 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.

Unlike with Lance styles of gas injection, no dead spots within the tank are present, resulting in no sedimentation build-up and no pipe blockage. This method is said to offer the most reliable and efficient mixing, warranting high yields of biogas and pacification of volatile organic compounds.

Generated biogas is transferred to the storage, which is kept pressurised with help of air blowers. Typically, the excess

gas can be flared. A better solution is to utilise it for heat and power generation. In this scenario, biogas is sent to a combined heat and power unit (CHP) via the gas boosters.

The CHP engine converts gas into heat and electricity, which can be used on-site to cover the company's demand or even sold to the grid, depending on the size of the unit and the quantity of biogas produced. An integrated boiler/burner system is typically supplied as an auxiliary heating system for backup purposes.

Hurl Nu-Way offers quality equipment (with reference sites utilising this equipment throughout the world), allowing the turning of waste into power and reducing emissions of landfill gas into atmosphere, all with fast return on investment.

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## Mattresses floated at local sewage treatment plant

Queensland Urban Utilities has launched a new trial which uses floating wetlands to purify wastewater at the Forest Hill Sewage Treatment Plant, near Laidley. The project involves growing wetlands on specially engineered plastic mattresses, which are then floated on purpose-built lagoons.

Queensland Urban Utilities spokesperson Michelle Cull said it was a natural, cost-effective and energy-efficient solution to purifying wastewater.

“The roots of the plants dangle beneath the mattress drawing out nutrients such as carbon, nitrogen and phosphorus,” she said.

“The floating wetland is like nature’s kidney, cleansing the water by trapping sediment and removing toxins.

“It’s a great example of green engineering and also has the potential



Michelle Cull and Mike Oakey from Queensland Urban Utilities.

to reduce operational costs at the plant.”

This is Queensland Urban Utilities’ second trial of the floating wetlands, after a nest of turtles destroyed the pilot program last year.

“Hungry Brisbane short-necked turtles feasted on the roots hanging underwater, killing the plants,” Cull

said. “This time around, we have installed nets and meshing to protect the floating wetland, without removing the turtles from their home.

“So far it seems to be working - the plants are thriving and early water-quality test results are promising.”

The trial will run until the end of the year and, if successful, could be rolled out at similar regional sewage treatment plants.

“Queensland Urban Utilities is committed to finding innovative, natural solutions to wastewater treatment,” Cull said.

“We want to cater for growing populations while not only protecting the environment, but using its natural ability to our advantage.”

Queensland Urban Utilities  
www.urbanutilities.com.au

## Voltage power optimisation for Kiama Council

Kiama Municipal Council in NSW has developed a sustainability theme called ‘Kiamasphere’, which aims to bring together all of its projects across the council that relate to environmental management and sustainability. One of the measures implemented was voltage power optimisation (VPO).

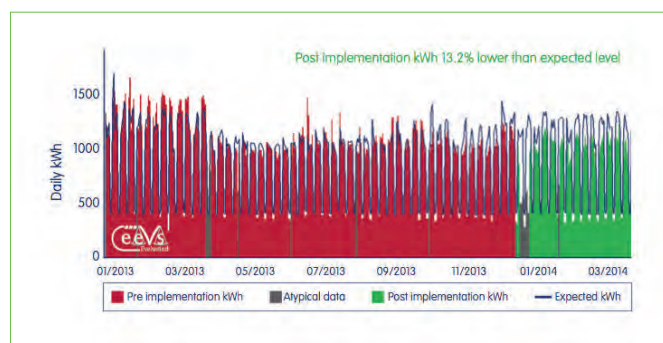
Solar panels have been introduced at the council administration building, which are expected to produce an estimated 15,060 kWh of electricity per annum - approximately 5% of the building’s energy. The council has also introduced power factor correction technology, which reduces demand.

Having started generating energy at the administrative building, the council was also keen to reduce the overall energy consumption. The council reviewed various technologies and chose Forum Group’s powerPerfactor VPO for the following reasons:

- Other technologies including lighting upgrades would incur significant disruption. VPO was seen as non-disruptive to everyday council life.
- Other technologies including lighting are continually developing and the council was not sure when the best time to implement them would be, as they quickly become out of date and prices are likely to come down in the coming years.
- Upgrading the HVAC was seen as problematic and cost-prohibitive.

- The site had an existing overvoltage issue which was impacting on the life span and operability of electrical equipment, and the VPO could deal with this issue for the entire site.

Forum Group specified a 210 kVA fixed unit with a 10% optimisation. This was subsequently installed at the council’s administration building on 19 December 2013.



Independent post-installation analysis indicates that electrical energy consumption following the VPO installation is 13.2% lower than the pre-VPO installation levels once temperature variations have been taken into account. This equates to annual savings of 43,936 kWh, 39 tonnes of CO<sub>2</sub> and \$7302.

“In my experience, there is lot of marketing and claims attached to many energy-efficiency products,” noted Byron Robinson, environment and sustainability officer at Kiama Municipal Council. “In researching the technology, we found that many of Forum’s powerPerfactor claims were backed up by real-world examples.”

“The independently verified savings have exceeded the guaranteed savings, and the council is delighted with the results from this project.”

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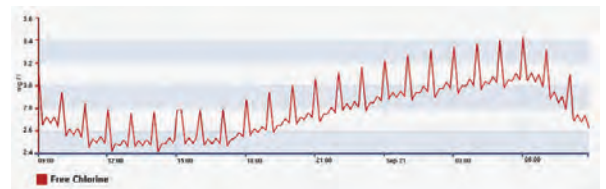
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### Rotork provides accurate pressure control for Sydney Water network

Rotork Australia's CVA electric control valve actuators are enabling Sydney Water to control the pressure in the city's water supply network with greatly increased response and accuracy. The actuators were supplied to NetWorks Alliance, a collaboration formed by Sydney Water to deliver a program aimed at reducing leaks and main breaks from the city's 21,000 km water supply network.

Water authorities need to control the supply pressure in their potable water pipeline networks throughout the day in response to user demand. Pipeline pressure also needs to be controlled to reduce network water leaks and to mitigate pipe bursts and consequential expensive repairs. To perform this vital function on the Sydney water supply network, Rotork supplied more than 150 CVL500 linear control valve actuators with adaptation for fitting to pilot valves.

Typically, spring pressure in a pilot valve is modulated over a short 1-4 mm



stroke; this controls the output of the pilot valve, which in turn controls the pipeline pressure. Network pressure can range from 15 to over 90 m head. The Rotork CVL500 actuator enables accurate control of the network in increments of 0.4 m of head pressure. For the Sydney Water network, this is an improvement on the previous coarse control resolution of up to 7 m head.

Using a PID control loop, the actuator provides repeatable and reliable ongoing pressure control. It can operate in a flooded pit, as the enclosure is IP68 rated, while only low power 24 VDC or 240 V mains is needed. The product uses Bluetooth to enable remote configuration and monitoring from outside the pit or confined space. With the manual override control, the actuator allows operation with or without power by electrical and mechanical engineers as well as site operators.

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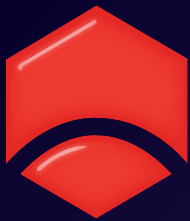
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**In theory, wave technology that captures power from the oceans has significant potential. It has been said it could possibly one day power the world without causing pollution. However, despite being under serious development for well over 10 years with millions of R&D dollars spent so far across the globe, it might be up to another 10 years before it is in widespread use as a commercially viable alternative to other renewables such as wind.**

## Next wave of the future

**S**o what has been the challenge for the development of wave technology and what's on the horizon for the future? *Sustainability Matters* talks to Edoardo Sommacal, Project Manager, Carnegie Wave Energy (CWE), to find out more about his company's latest project and developments for the future of wave technology.

Named after a Greek sea goddess, the CETO technology developed by CWE harnesses the enormous renewable energy present in our ocean's waves and converts it into zero-emission electricity and zero-emission desalinated water. Using a system of buoys that are fully submerged and permanently anchored to the sea floor, the current version CETO 5 has a rated capacity of approximately 240 kW per buoy.

"We believe there is a huge potential for capturing the energy in the oceans," says Sommacal. "It can provide a continual source of energy and is not as seasonal as other renewable energy such as solar and wind. Our technology also has the added advantage that it has no visual pollution as the buoys sit under the water surface."

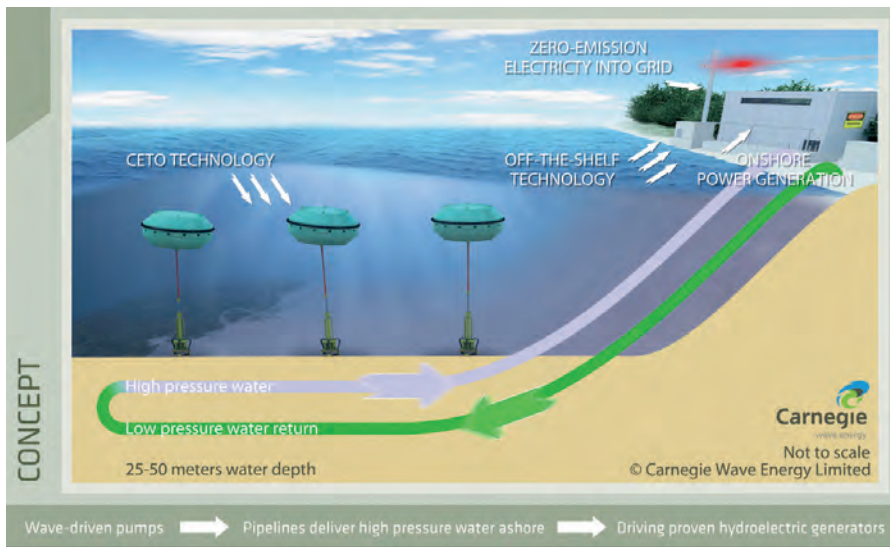
Sommacal agrees that wave technology still requires some development but believes that in 10 years or maybe sooner, CWE's new wave power technology (CETO 6), which has a target power capacity of 1 MW per buoy, has the potential to be a widespread competitive source of energy.

"In the past, the challenge with offshore wave technology has been finding a size of project that is cost effective and competitive in terms of power with other technology. "Because the nature of offshore developments is expensive, our focus has been trying to minimise the offshore activities, such as the number of divers and construction of pipelines, in order to keep the cost down."

So far, CWE and its partners have spent \$100 million on the development of the CETO technology. In its most successful achievements to date, the first commercial demonstration of the technology is set to commence. CWE will be using three CETO 5 buoyant actuators to supply power and water to the Australian Department of Defence for use at HMAS Stirling, Australia's largest naval base, located on Garden Island in Western Australia.







"This project came on the back of a 12-month feasibility study," says Sommecal. "Garden Island, WA, was selected as an ideal spot to do the commercial demonstration as it is a safe location with waves not as big as further offshore sites."

Unlike other wave energy devices, the CETO system will operate underwater close to the surface, where there is high kinetic energy in the waves and the CETO units are invisible from the shore. Attached to seabed pump units, the buoys move with the motion of the passing waves and drive the pumps. The pumps pressurise fluid which is then used to drive hydro-turbines, generating zero-emission electricity; as well as being fed into a reverse osmosis desalination plant.

"Desalination consumes a lot of power," says Sommecal. "Therefore, the aim of the Garden Island demonstration project is to show how CETO can fit well with off-the-shelf desalination technology to reduce the power consumption with zero greenhouse gas emissions."

"The desalination system has already been pre-commissioned but is not yet using the wave hydraulic energy. We are waiting till the end of winter for the deployment of the first CETO buoy and to run the system through the hydraulic circuit. Additionally, once all the water quality approvals have been received, the water will be delivered to Department of Defence potable water infrastructure on Garden Island."

The buoys float and are deployed by towing them offshore. Divers are then used to secure them to the seabed. Sommecal says the CETO 6 unit will be easier to deploy and will require fewer divers, saving time and costs on installation.

Timely access to capital can be one of the biggest challenges for technology development companies. However, Carnegie Wave Energy has recently received a large amount of investment to pursue its latest version of the technology - the CETO 6. Its \$6 million capital raising measure in April was oversubscribed and reportedly generated more than \$9 million through shares and private placements.



A further \$11 million in funding will be provided by the Australian Renewable Energy Agency's (ARENA) Emerging Renewables Program. In addition, the company is receiving a five-year, \$20 million loan facility from the Clean Energy Finance Corporation.

The CETO 6 technology will have an increased generation capacity as the buoys are larger and can be placed further offshore in deeper water. Each unit has a target power capacity of 1 MW, four times that of the current CETO 5 generation.

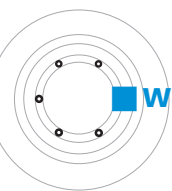
"Currently, the CETO 5 requires a pipeline to deliver energy to shore," says Sommecal. "The downside of this is you have to be closer to the shore because the pipeline CAPEX is high."

"CETO 6 will have all the hydraulic and power generation system inside the buoy so it can be deployed further offshore where more energy can be captured. It will also use oil and gas-style cable connection and avoid deploying pipeline. By using technology that is already available, the costs are minimised further."

"Also, the efficiency of the wave energy can be improved by 'tuning' the buoy to the prevailing swell conditions at any time. Additionally, an array of buoys can be installed on-site to accommodate prevailing swell direction, similar to how the turbines are oriented on a wind farm."

Sommecal admits that the buoys are large and the new version will be even bigger, but they will be hidden under the water. "Wherever a buoy is installed, navigation will be limited," he says. "But it will be simply marked on the map, straightforward, the same as mooring limitations for pipelines."

The technology has potential and is certainly receiving a significant amount of interest from investors. Being able to supply both power and water with no emissions and no visual pollution makes this wave technology particularly suited to remote island locations.



## water monitoring products

### CTD level data loggers



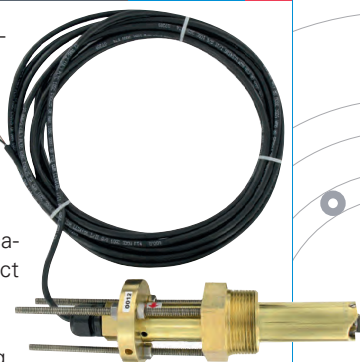
With the CTD (conductivity, temperature, depth) versions of the high-precision DCX level data loggers for depths of up to 200 m, Keller offers an integrated pressure measurement solution for water management. The data logger for long-term monitoring stores over 50,000 time-stamped level measurements, as well as the associated conductivity and temperature readings. The multipurpose probes have a

diameter of 22 mm, making them suitable for all sounding tubes with a nominal diameter of 1" or greater. The company supplies conductivity probes combined with level probes based on pressure sensors. The integrated measuring systems are suitable for checking the ingress of seawater, slurry or fertiliser into groundwater, rivers and lakes, or for performing observation tasks relating to building projects or localised water pollution. The Series DCX-22 CTD level probes with integrated data logger are available with a robust 316L stainless steel housing or other materials, if necessary, for enhanced chemical compatibility.

**KELLER AG für Druckmesstechnik**  
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### Paddlewheel flow sensor

The Series PFT is a paddlewheel flow sensor used to monitor liquid flow rates in pipes from 1½ to 40" with just one size-adjustable sensor. Multiple wetted material choices offer application versatility. The product is suitable for monitoring water flow rates in irrigation systems and building automation cooling systems.



The device uses inductive sensing to sense the blades of the impeller as they rotate. The sensor technology does not use magnets, allowing low flow rate monitoring and no concerns with magnetic material in the flow. Two output choices are available: pulse or 4 to 20 mA. Paddlewheel, shaft and bearings are easily field replaceable. The sensor is weatherproof and submersible rated for irrigation applications; it is also suitable for groundwater remediation, cooling systems, pump protection, leak detection and filtration systems.

**Dwyer Instruments (Aust) Pty Ltd**  
[www.dwyer-inst.com.au](http://www.dwyer-inst.com.au)

### Water-quality monitor

The Chloroclam water-quality monitor accesses the water main via the hydrant point or service pit, to continually monitor and report chlorine residual data from the water distribution network enabling proactive management.

Simply attach the adaptor to the hydrant and the system will provide data to the user via the GPRS network. Using high-accuracy, industry-standard sensing, the design has been optimised to ensure minimal water flows through the system to waste.

The monitor uses industry-standard, high-accuracy membrane sensing which does not require the addition of any reagents. The sensor is housed in an innovative cartridge system allowing the user to easily maintain the sensor, including the replacement of membrane and electrolyte solution. The monitor will also record/transmit pressure and flow data if a transducer is connected. To accurately monitor chlorine residuals, a controlled flow is maintained across the membrane with water going to waste. Remote communications are integrated within the water-quality monitor. Automatic data upload via the GPRS network is carried out multiple times per day, potentially allowing real-time data acquisition and analysis. The user can access the data via a web-based system to view and retrieve information as and when required. Alarms can be set via the web-based system to inform the user about out-of-range events. The dimensions are 150 x 164 mm.



**Evoqua Water Technologies Pty Ltd**  
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### On-site water biomass testing

Poor control of biofilms can create a range of problems in various industries such as drinking water, wastewater and water for power generation. Many of the problems occur due to corrosion, odours, clogged valves and filters, and reduced cooling efficiencies.

Control of biofilms with biocides is difficult and expensive. Underuse can lead to the problems caused by biofilm formation, and overuse can be costly and create other problems with corrosion or excessive wastewater generation. To achieve optimum results, sampling and testing must be undertaken to determine when action is required. However, traditional methods can take days to return results.

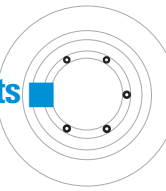
The portable biomass field tester from Promicol can help to provide a solution to biofilm control problems in minutes, without the need for laboratory facilities. Based on ATP bioluminescence, the system can provide a rapid indication of total and viable biomass, which indicates the risk of biofilm formation.

The field tester includes a luminometer, shaker and power supply. It fits into a compact, easily transportable case. Extra kits to replace reagents and plasticware are also available.

The tester can provide results on-site and in real time so that biocide usage can be optimised for improved control of biofilms.

**Australasian Medical & Scientific Ltd**  
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## Colorimetric analysing system for ammonium

Combining high precision with easy operation and maintenance, the Endress+Hauser Liquiline System CA80AM colorimetric analysing system for ammonium and its sample preparations are suitable for all critical control points of water and wastewater treatment.

The online system uses the indophenol blue method (the standard colorimetric measuring principle) which provides precise ammonium measurements. Compared to laboratory measurements, the system can deliver values faster which enables a quick reaction to varying ammonium loads at the inlet and finetuning of the blower systems in the aeration basin. In the outlet, the analysing system helps to achieve regulation-compliant ammonium values and to provide the required documentation to water authorities.

As a member of the company's Liquiline platform, Liquiline System shares the platform's user-friendly operation. The platform concept makes it possible to upgrade the analyser to a measuring station simply by connecting Memosens sensors. Memosens technology also enables plug and play and allows full control of the sample preparations by the analyser, speeding up commissioning and operation.

The system's sample preparations are suitable for all critical control points of ammonium and the system is adapted to the rough conditions of an inlet. Its automatic back-flush function with cleaning solution and air cleaning prevent blocking of the ceramic filter. The system is the standard solution for the aeration basin or the outlet that can be flexibly adapted to any wastewater treatment plant. Cost-efficient sample preparation in the outlet or in pressurised pipes is done by the system that reflects process changes promptly and shortens the response time of downstream measuring devices.

The system is designed with precise dispensers for reagent dosing and an intelligent cooling system. This ensures reduced consumption and a reagent lifetime of up to three months. Automatic cleaning and calibration functions ensure that the analyser and its sample preparation work reliably and without manual intervention over a long period of time. If disturbances should occur, advanced diagnostics with remote access help plant managers to analyse them quickly. Required maintenance measures can be carried out easily without any tools. This can reduce maintenance costs and increase process uptime.

**Endress+Hauser Australia Pty Ltd**  
[www.au.endress.com](http://www.au.endress.com)



## pH and conductivity meters



Metrohm has available the 912 Conductometer, the 913 pH Meter and the 914 pH/Conductometer. The meters are robust and easy to use.

The meters are both precision instruments for the laboratory and companions for mobile use in the field. During field use, the meters are powered by batteries. Afterwards, they can be recharged, even on the road on the cigarette lighter with the use of an adapter.

The 914 pH/Conductometer offers parallel measurement of pH and conductivity, while the 913 pH Meter features parallel recording of two pH values. Both versions indicate the temperature(s) of the sample(s). The 912 Conductometer measures the conductivity, salinity and temperature of the sample.

Ergonomic design ensures the meters fit comfortably in one hand. Each key on the clearly organised user interface comes with a secure pressure point. Hence, the meters can be operated intuitively with one's left or right thumb while the other hand remains free to hold the electrode(s) in the medium in which the measurement is done.

All three versions meet the requirements of IP67. In the office, the meter is simply plugged into the USB port of the PC and the collected data is exported straight to the LIMS or Excel or can be managed in tiBase, the Metrohm titration software.

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## Nanomaterials could make tyres more sustainable

According to a report by the Organisation for Economic Cooperation and Development (OECD), the use of new nanomaterials in tyre production could help foster the sustainability of the tyre industry and reduce the environmental impact of vehicles - so long as the potential environmental, health and safety risks of the technology are managed carefully.

The report 'Nanotechnology and Tyres: Greening Industry and Transport' highlights the potential of new nanomaterials while analysing the challenges for their safe and sustainable introduction in the tyre industry. The report was originally proposed and supported by the Business and Industry Advisory Committee to the OECD (BIAC) through the Tire Industry Project (TIP) of the World Business Council for Sustainable Development (WBCSD).

New nanomaterials offer avenues for future innovation which could contribute to the sustainability and resource efficiency of the tyre industry and of the transport sector. They have the potential to decrease tyre rolling resistance (improving fuel consumption and CO<sub>2</sub> emissions) and lower wear resistance (increasing tyre lifetime) while maintaining wet grip and existing safety levels.

Yet there is need for a supporting framework and relevant tools to guide decision-making in assessing the economic, social and

ecological impacts of the introduction of new nanomaterials in tyre production. In particular, the development of industry-specific guidance to assess the environmental, health and safety risks at various stages of products' development is critical.

The report provides a risk management framework to enable site-specific or company-specific assessments and the development of risk-management strategies for using nanomaterials as additives in tyres. It also provides insights into the status of nanotechnology innovation and the drivers of innovation in the tyre industry; the economic and social costs as well as benefits of using nanotechnology in tyres; the safe use of new nanomaterials at all stages of their life cycles; the identification of the tools and frameworks supporting decision-making at various stages of product development; and

the facilitation of outreach and knowledge transfer on the safe use of new nanomaterials.

The report calls for policy action to support research and the commercialisation of nanotechnology research results for fostering responsible innovation in the tyre sector. It also emphasises the importance of collaboration between governments and industry to address the specific challenges raised by the introduction of new nanomaterials in different industry sectors.



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## Continental developing tyres from dandelions

Tyre manufacturer Continental is working with the Fraunhofer Institute for Molecular Biology and Applied Ecology (IME) with the objective of using latex from the roots of the dandelion as a commercially viable substitute for natural latex from rainforest plantations.

David O'Donnell, head of global research and development for passenger car and light truck tyres for Continental, noted that the notion of obtaining latex from dandelions has been around for a long time.

"We have been working on this very intensively for the past four years, and two-and-a-half years ago we entered into a joint development project with the Fraunhofer Institute with the aim of cultivating suitable plants," he said.

"The outcome is a dandelion-based rubber that is comparable in quality and functionality with the product of the rubber tree."

The collaborators are working with Russian dandelions, which are said to be very rubber-rich and do not need a



tropical climate, in contrast to regular rubber trees. The undemanding plant can be cultivated in a number of temperate regions, on what is known as 'marginal land' that was previously unusable in terms of agriculture. This means it could be cultivated right next to tyre plants.

"Dandelion rubber will shorten transport routes to our production sites and enable the growing global demand for rubber to be met without sacrificing more precious areas of rainforest," said Dr Andreas Topp, vice president material and process development and industrialisation tyres at Continental. "Both these factors will have a sustainably positive effect on the world's carbon footprint and on biodiversity."

Earlier this year, the project won the Automobility category at the GreenTec Awards, presented at the environmental technology trade fair IFAT. It is one of several recent sustainability initiatives to have undergone development at Continental, alongside the re-use of waste rubber and a new tyre for hybrid vehicles.

"While we don't want to set a date, the main obstacles have already been overcome," said O'Donnell. "We think that in three or four years, a substantial number of our initial 'dandelion tyres' will be involved in road testing."



## A solar concentrator you can see through

Researchers from Michigan State University (MSU) have developed a solar concentrator which, when placed over a window, creates solar energy while allowing people to actually see through the window. The device - a transparent luminescent solar concentrator (TLSC) - can potentially be used on any object that has a clear surface.

Research into the production of energy from solar cells placed around luminescent plastic-like materials is not new; however, energy production has so far been inefficient and the materials have been highly coloured. According to Richard Lunt, an assistant professor at MSU's College of Engineering, "No one wants to sit behind coloured glass."

"We take an approach where we actually make the luminescent active layer itself transparent," said Lunt, whose team developed small organic molecules which absorb specific non-visible wavelengths of sunlight. He stated, "We can tune these materials to pick up just the ultraviolet and the near infrared wavelengths that then 'glow' at another wavelength in the infrared."

The 'glowing' infrared light is guided to the edge of the plastic, where it is converted to electricity by thin strips of photovoltaic solar cells. Lunt explained, "Because the materials do not absorb or emit

light in the visible spectrum, they look exceptionally transparent to the human eye." The research was featured in the journal *Advanced Optical Materials*. Currently, the concentrator has demonstrated solar conversion efficiency close to 1%. Lunt said the researchers aim to reach efficiencies beyond 5% when fully optimised. The best coloured LSC has an efficiency of around 7%.

The technology has already demonstrated the flexibility to be scaled to commercial or industrial applications with an

affordable cost. Lunt suggested, "It can be used on tall buildings with lots of windows or any kind of mobile device that demands high aesthetic quality, like a phone or e-reader."

"Ultimately, we want to make solar-harvesting surfaces that you do not even know are there."

[www.msu.edu](http://www.msu.edu)



MSU doctoral student Yimu Zhao holds up a transparent luminescent solar concentrator module. Photo by Yimu Zhao.

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## Identifying polymers enables rapid separation of plastics

Researchers from Ludwig-Maximilians-Universität München (LMU) have developed a process which will greatly simplify the process of sorting plastics in recycling plants. Their method, published in the journal *Green and Sustainable Chemistry*, enables the automated identification of polymers.

The technique takes advantage of the polymer-specific nature of the intrinsic fluorescence induced by photoexcitation. As explained by team leader Professor Heinz Langhals, "Plastics emit fluorescent light when exposed to a brief flash of light, and the emission decays with time in a distinctive pattern. Thus, their fluorescence lifetimes are highly characteristic for the different types of polymers, and can serve as an identifying fingerprint."

As the plastic particles fluoresce, photoelectric sensors measure the intensity of the light emitted in response to the inducing photoexcitation to determine the dynamics of its decay. Because the different polymer materials used in the manufacture of plastics display specific fluorescence lifetimes, the form of the decay curve can be used to identify their chemical nature.

The use of fluorescence lifetime measurements permits the identification and sorting of up to 1.5 tonnes of plastic per hour, greatly increasing efficiency. Professor Langhals said, "With this process, errors in measurement are practically ruled out; for any given material, one will always obtain the same value for the fluorescence half-life, just as in the case of radioactive

decay." Unlike metals, the quality of which often suffer during the recycling process itself, recycled plastics can be processed quite efficiently. Professor Langhals said, "Polymers represent an interesting basis for the sustainable cycling of technological materials. The crucial requirement is that the recycled material

should be chemically pure. In that case, bottles made of PET, for example, can be relatively easily turned into synthetic fibre for use in waterproof windcheaters."

The vast majority of technical polymers are processed as thermoplastics, ie, they are melted at high temperature and the finished article is produced by injecting the molten material into an appropriate mould. Reheating of recycled plastic can, however, lead to deleterious alterations in its properties of the material unless the sorted material is of high purity.

Polymers tend to be immiscible, as they are chemically incompatible with one another. Remelting of polymer mixtures therefore often leads to partitioning of the different polymers into distinct domains separated by grain boundaries, which compromises the quality of the final product. For this reason, high-quality plastics are always manufactured exclusively from pristine precursors, as opposed to recycled material; but the method developed by the LMU team could change this.

"The waste problem can only be solved by chemical means, and our process can make a significant contribution to environmental protection, because it makes automated sorting feasible," said Professor Langhals.



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## Replicating photosynthesis to produce sustainable fuel

Researchers from The Australian National University (ANU) have successfully replicated one of the crucial steps in photosynthesis, opening the way for biological systems powered by sunlight which could manufacture hydrogen as a fuel. Their research has been published in the journal *BBA Bioenergetics*.

Hydrogen offers potential as a zero-carbon replacement for petroleum products and is already used for launching spacecraft. However, until recently, the way that plants produce hydrogen by splitting water has been poorly understood.

The team modified a ubiquitous protein, ferritin, which is present in almost all living organisms. Ferritin's usual role is to store iron, but the team removed the iron and replaced it with manganese to closely resemble the water splitting site in photosynthesis.

The protein also binds a haem group, which the researchers replaced with a light-sensitive pigment, zinc chlorin. When exposed to light, the modified protein displayed the electrical



Dr Kastoori Hingorani and Professor Ron Pace.  
Image: Stuart Hay, ANU.

heartbeat (charge transfer) that is the key to photosynthesis.

Dr Kastoori Hingorani, from the ARC Centre of Excellence for Translational Photosynthesis in the ANU Research School of Biology, noted that as the system uses a naturally occurring protein, and does not need batteries or expensive metals, it could be affordable in developing countries. Co-researcher Professor Ron Pace added that the research marks "the first time we have replicated the primary capture of energy from sunlight" and could be

the beginning of "a whole suite of possibilities, such as creating a highly efficient fuel or ... trapping atmospheric carbon".

Manufacturing hydrogen fuel from artificial photosynthesis could transform the economy, said Professor Pace, who noted, "That carbon-free cycle is essentially indefinitely sustainable.

"Sunlight is extraordinarily abundant, water is everywhere ... And at the end of the usage cycle it goes back to water," he said.

[www.anu.edu.au](http://www.anu.edu.au)

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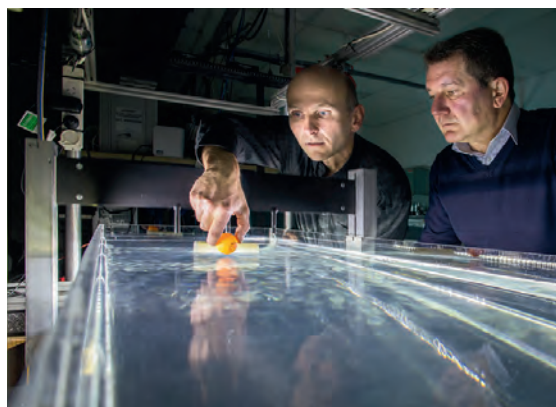
## Water tractor beam could contain oil spills

Physicists from The Australian National University (ANU) have created a tractor beam on water, which they can use to manipulate floating objects at will.

The team found that they can control water flow patterns with simple wave generators. Using a ping pong ball in a wave tank, the group worked out the size and frequency of the waves required to move the ball in whichever direction they want.

"Above a certain height, these complex three-dimensional waves generate flow patterns on the surface of the water," explained group leader Professor Michael Shats. The technique gives scientists a way of controlling things adrift on water in a way they have never had before, resembling sci-fi tractor beams that draw in objects. Dr Horst Punzmann, who led the project, said, "We have managed to manipulate floating objects to move towards the wave, to move in the direction of the wave or to keep them stationary." Writing in the journal *Nature Physics*, the researchers noted, "The ability to send a wave to fetch an object from a distance would find a broad range of applications." Professor Shats stated that the technique could be used to collect floating objects or boats - or even to contain oil spills.

It also suggests "new ideas about how rips on the beach can occur in the presence of strong, very steep waves", he said. The team also experimented with different shaped plungers to generate different swirling flow patterns, with Professor Shats noting, "It's not just a tractor beam we can generate - we can generate, and we can engineer, surface flows of practically any shape. These could be vortices, these could be outward and inward jets - it's a variety of different flow configurations."



Dr Horst Punzmann and Professor Michael Shats test their wave-generated tractor beam. Photo by Stuart Hay.

## Oil and water separation, coating technology

University of South Australia (UniSA) commercialisation company Itek Ventures has entered into an exclusive licence agreement with Hyflux International, a wholly owned subsidiary of water solutions company Hyflux, to apply and eventually commercialise its coating technology in the global water treatment market.

The coating technology transforms a standard stainless steel or plastic mesh into a highly effective separator of fluids. For a liquid containing both oil and water components, a mixture which is typically found in many contaminated water treatment situations, the water passes easily through the mesh while preventing the progress of the oil component.

"This technology can be used to separate oil and water at very low pressures," said Professor Dayang Wang, one of the inventors of the technology.

"The mesh filters are produced through an easily accessible coating process, which allows large-scale production. Hyflux intends to further develop this coating technology, integrate it with its water treatment membrane manufacturing processes and market the end products globally.

Itek CEO Dr Stephen Rodda said the effectiveness of the technology has attracted the attention of several global water businesses. The company is also seeking industry partners to apply the underlying technology to oil spill remediation, so it could ultimately be used in situations such as the 2010 BP oil spill disaster in the Gulf of Mexico.



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# Bridging the gap between distributors and customer

*Matt Gleeson, Oracle Utilities Regional Vice President at Oracle APAC*

**Recent developments in the utilities industry have made one thing very clear: for energy companies, doing business the way they have until now no longer represents a sustainable course of action.**

**W**ith the federal government's proposed changes to the carbon tax set to lower electricity and gas bills (or, at least, create consumer expectations that it will) and new entrants to the market such as in-home renewables and localised generation facilities growing in popularity, distributors will have to expand their services to accommodate these shifts in the energy landscape.

The key to creating a successful future plan for utility companies lies in their adoption of a sound data-analytics strategy. Energy distributors have been benefiting from data analysis to manage their networks for years, but with the roll-out of smart meters, and the advance of the consumerist world of social networks demanding instant information gratification, a utility that embraces big data will position themselves to implement change and innovation like never before.

Smart meters will provide utility companies with a deeper vision and understanding of customer consumption patterns that will, in turn, bring them closer to the people and businesses they serve. Equally importantly, it will allow asset planning on an unprecedented level of intimate understanding of the demands by region, consumer type and even per individual property. As a result, they will be better positioned to help customers moderate

their usage, as well as their bills, while providing a more reliable network grid through asset planning and proactive maintenance. The result is both consumers and distributors are blessed with the opportunity to lower their costs.

## **Engagement is the name of the game for retailers and distributors**

In the age of social media, when a conversation between one utility provider and one customer can evolve into a group discussion with thousands of people in an instant, setting a new standard for customer satisfaction and engagement will be critical for energy companies as they look to strengthen ties with the people they serve. The recent repeal of the carbon tax means energy companies no longer need to factor the costs of carbon emissions into their business-making decisions, but rather encourage more sustainable energy use among their customers.

With natural disasters and weather unpredictability having a major impact on the annual costs of sustaining a reliable power supply to consumers, the ability to take data from a vast number of sources and perform advanced analysis to anticipate and respond to emergencies will feed positively into how utilities survive in the social-media age of brand appreciation or annihilation. On a day-to-day basis, the analysis of smart-meter data will play a major role in helping distributors to strengthen the customer relationship, not only by promoting more intelligent energy use but also by enabling them to resolve service issues more proactively.

Impending changes to the carbon tax are set to reduce retail electricity prices by \$200 per year, benefiting cost-conscious and sustainability minded customers when it comes to their energy use. As smart meters hit each property around the country, customers will expect their energy companies to provide them more granular information on their consumption habits so they can determine the cost of what they consume and how they may curb their lifestyles to keep their costs down.

The collection and conversion of smart-meter data into actionable insights



© iStockphoto.com/snow

## Energy efficiency

for customers will provide the impetus people may need to make small changes in behaviour - replacing ineffective hot water systems, reducing their air-conditioning/heating demands by a few degrees, insulating walls, buying smart appliances - all of which can translate into significant reductions in their long-term energy expenses.

### Avoiding peak costs on peak days

Improving customer engagement and promoting more sustainable energy use can also help utilities lower their operating costs on peak consumption days.

At varying times, generators and network operators build up significant amounts of excess generation and distribution capacity just to accommodate the levels of energy use reached on a few peak-consumption days and hours.

Building peaking plants or purchasing additional power on the open market can help utilities satisfy the needs of their customers during peak periods, but these measures are expensive to implement in

the current market. These costs ultimately find their way back to the customer in the form of higher energy bills.

The advent of photovoltaic home generation units on a wider consumer market level also adds the complication of having more generated load than there are consumers requiring it. This is placing additional demands on the network grid and causing distribution companies a whole new lot of load-balancing and demand-planning headaches.

The answer for energy companies lies once again in boosting customer engagement to drive more sustainable energy use. At the core of this endeavour lays data analytics and strong engagement strategies, with utilities making the most of this technology to uncover new insights about how people consume that they can instantly share with their customers. Energy companies can establish more meaningful and actionable conversations with the people they serve, which can in turn encourage both parties to work together towards driving down consump-

tion at peak times, keeping energy costs to a minimum.

### An open exchange benefits all

The dual factors of consumer cogeneration and the delivery of smart metering to the domestic market base are bringing customer engagement to the forefront of utilities' business strategy, making it a major priority alongside demand response efforts and crucial network-management efforts.

With modern big-data appliances now offering energy companies such an in-depth view of peoples' energy-usage patterns, a dynamic information exchange between distributors and their customers will be central to driving more informed, sustainable consumption and a more robust network. As engagement between all parties increases, energy companies will be able to optimise their networks while keeping their operating expenses in-check. For their part, customers stand to benefit from an increasingly efficient and economical energy supply.



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FLUID CONTROL SYSTEMS





### Digital pressure peak gauge

KELLER has released the LEO 1, a microprocessor-controlled digital pressure peak gauge which polls the value for the pressure variable in a process 5000 times each second. This results in detection of short pressure peaks, usually caused by fast-switching hydraulic valves and pump units, and means action can be taken to prevent damage.

The user-friendly, two-key operating system provides access to the entire range of functions. The stored max/min can be erased and reset to zero, or the device can be switched to continuous mode. The device switches off automatically about 15 min after the last key is pressed, extending the battery life where continuous operation is not required.

After switching over to continuous operation, the battery has sufficient capacity for up to 1400 h in manometer mode and up to 180 h in peak value mode.

The dual digital display updates twice every second, showing the measured value and the minimum or maximum value attained. In the compensated temperature range from 0 to 50°C, typical overall accuracy is 0.2%FS. In addition, the product has a zero tare feature that allows the user to set the zero at any pressure, so the manometer will then always show deviations from the zero tare value as the actual value.

With just two keys, the user can parameterise all the functions on the peak value manometer. These include a choice of five different units of measurement and neutralisation of the stored extreme values at the start of an observation period. The product is available in IP65-rated housing with four practice-based measurement ranges.

**KELLER AG für Druckmesstechnik**

[www.keller-druck.com](http://www.keller-druck.com)

### Bin covers

Source Separation Systems' 240 L MGB bin covers are 100% Australian certified compostable. Made of third-grade non-eating corn and sourced from international regions with high rainfall to minimise irrigation, the Compost-A-Pak bin covers are a sustainable option both in terms of manufacturing and at end of life when composted. The range is available in Australian standard waste colours for landfill, recycling and organic waste. Each cover comes with both text and graphic information about the waste stream to make it as easy as possible to recycle correctly. The company can even custom-print logos and recycling messages.



**Source Separation Systems Pty Ltd**

[www.sourceseparationsystems.com.au](http://www.sourceseparationsystems.com.au)

### Portable spectrophotometer

The Hach DR1900 is a light and compact portable spectrophotometer that has been designed for accurate field testing. The rugged unit is suitable for dusty and wet conditions and accepts a wide range of vial sizes.

It has a large, clear screen and a simple user interface that makes testing easier even in the most demanding conditions.

With over 220 of the most commonly tested preprogrammed methods already built in to the system, users can also use the easy-to-use interface to create their own methods.

Tests are performed with a wavelength range of 340 to 800 nm. Easy to hold and operate, the unit provides a valuable tool for field technicians.

**Hach Pacific Pty Ltd**

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### Material handler

Liebherr has released its LH series materials handling equipment. The larger LH material handlers are equipped with the company's Energy Recovery System, which is a self-contained gas cylinder acting as a third cylinder, recovering energy when the boom moves down and realising the energy when the boom needs to move up.

The system is claimed to offer an increase in performance whilst reducing fuel consumption by up to 30%. The hydraulic operator's cab elevation provides the operator with a good overview of any situation and ensures a high level of safety for everyone working in the vicinity of the machine.

**Liebherr**

[www.liebherr.com.au](http://www.liebherr.com.au)



### Frontal diaphragm pressure transmitter

The Trafag 8473 series frontal diaphragm pressure transmitter is an industrial-quality pressure transmitter that features thick-film-on-ceramic sensor technology. With measurement ranges from -1...+0 to 0...+40 bar and accuracy  $\pm 0.3\%$  FS typical NLH @ 25°C (BSL through 0), the instrument has standard outputs of 4-20 mA and 0-10 VDC and other options available.

The media temperature range is from -25 to +125°C and the the body and wetted parts are constructed of stainless steel. 316LW stainless steel and titanium is also available.

Other features include: G 3/4" (M) process connection, EN175301-803-A 90° electrical connector standard to IP65 with M12 and flying lead optional.

**Dart Instruments**

[www.dartinstruments.com.au](http://www.dartinstruments.com.au)

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### Masterclass Snapshot: Stakeholder Engagement - The Absolute Essentials

**Wednesday 29th October - from 12(noon) - 4pm**

In land and groundwater remediation, organisations can face difficulties explaining complex technical information, gaining input and feedback from people who don't trust them, and explaining future outcomes. This hands-on workshop will explore how current day engagement practices are being affected by social and digital media. This includes:

- Managing issues that "go viral"
- Working with socially-connected groups
- Using the latest technology to explain and visualise complex information simply
- Identifying the best ways to engage communities in a genuine and transparent manner

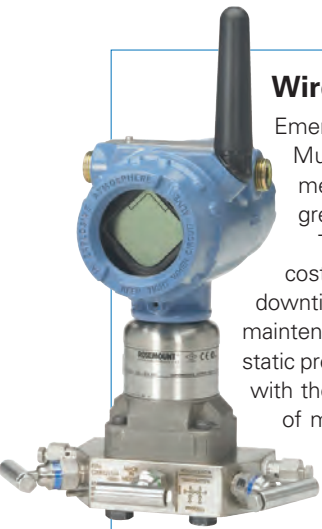
**The Masterclass will be presented by Amanda Newberry & Michelle Blicavs, IAP2**



Amanda Newberry is a licensed trainer for the International Association of Public Participation (IAP2) and managing director of Articulous Communications. She trains in the IAP2 Certificate in Public Participation, and IAP2's Emotion and Outrage in Public Participation, which provides training in how to work with communities in a state of outrage.

For more information please go to  
**[www.ecoforum.com.au](http://www.ecoforum.com.au)**





### Wireless pressure transmitter

Emerson Process Management has introduced the Rosemount 3051S MultiVariable wireless pressure transmitter, designed to directly measure two process variables in one installation so users can gain greater insight into their process without increasing installation costs.

The more devices there are in a facility, the greater the required cost and time investments for installation, scheduled maintenance and downtime. The transmitter thus allows users to simplify installation and maintenance routines. Because the transmitter measures differential and static pressure, users can reduce pipe penetrations and impulse piping along with their associated costs. The transmitter is claimed to deliver a decade of maintenance-free performance with a 10-year stability specification.

**Emerson Process Management**

[www.emersonprocess.com.au](http://www.emersonprocess.com.au)

### Carbon dioxide transmitter

Dwyer Instruments has released the Series CDTA carbon dioxide, humidity and temperature detector. The product combines carbon dioxide, humidity, temperature, occupancy override and temperature setpoint measurements in one compact device.

Field-selectable BACnet or Modbus communications transmits the measurements to the building controller and allows for the transmitters to be daisy-chained with other communicating sensors. Combination sensors reduce installation and wiring cost, along with requiring less I/O on the controller to save additional hardware costs. Carbon dioxide measurements are taken using the company's single-beam, dual-wavelength non-dispersive infrared (NDIR) sensor. Humidity measurements are measured using a capacitive polymer sensor and the temperature is recorded by a solid-state band gap sensor. Local configuration of the temperature setpoint and override can be done using the buttons on the side of the detector and the optional integral or remote LCD.



**Dwyer Instruments (Aust) Pty Ltd**

[www.dwyer-inst.com.au](http://www.dwyer-inst.com.au)



### Safety sensor

The RSS260 safety sensor combines the detection principle of RFID technology and a high switching distance in a compact design. The various actuators allow optimal integration of the safety sensors in the surrounding architecture of removable, hinged and sliding covers and doors.

All variants offer a high level of tamper resistance as the RFID-based sensor technology permits individual actuator coding.

In the basic version, the sensor accepts any suitable RSS260 family target. A second version for increased tamper resistance only responds to an individually assigned target - the teaching process can be repeated any number of times. There is a third version available for the highest level of tamper resistance, which only accepts the target presented at initial powerup.

In addition to the standard actuator, which is suitable for assembly on the normal aluminium profile systems, additional actuator designs can be selected. There is a compact rectangular target and a flat, elongated actuator, which is suitable for design-oriented machines and plants, as well as for being mounted on polycarbonate safety gates. Another beneficial feature includes the ability to connect up to 31 of the sensors in series and evaluate them with a single safety module without compromising the safety level and the diagnostic capability. This also applies when combining the product with other Schmersal electronic safety switching devices, such as the solenoid interlocking AZM300 and light curtains such as the SLC440.

**Control Logic Pty Ltd**

[www.control-logic.com.au](http://www.control-logic.com.au)



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# Resource centre

Legislation, governance, programs and industry links to help guide your sustainability development.

## Convention 2014 to include climate change conference

**Engineers Australia is bringing Convention 2014 - said to be the largest engineering event ever held in the Southern Hemisphere - to Melbourne from 24-28 November.**

Engineers Australia CEO Stephen Durkin said the five-day program will tackle key issues and topics impacting engineers, including energy generation, transport and infrastructure, innovation and sustainability. It will deliver a range of technical conferences and seminars, more than a dozen workshops, symposiums and forums and site tours.

Of the event's six conferences, the Practical Responses to Climate Change Conference (PRCC, 25-27 November) will attract those with an interest in sustainability. It will provide an opportunity for engineers, policymakers, scientists, planners, academics, other professionals and interested members of the public to present, discuss and debate the

latest research and practice relating to mitigation of, and adaptation to, climate change.

The convention will see high-profile national and international speakers come together with delegates from around Australia and the world. A series of plenary lectures, contributed papers and posters will ensure a vibrant and interesting program. Half-day workshops will enable attendees to debate key issues, learn new techniques and plan for new directions for practical responses to climate change.

To register for the event, visit [www.convention2014.org.au](http://www.convention2014.org.au) or <http://convention2014.org.au/prcc>. Discount registrations are available to members of Engineers Australia.



## Eco Expo Asia 2014

**Eco Expo Asia, the region's international trade exhibition for green business, serves as a trading platform enabling quality buyers from Asia to connect with green enterprises and government officials.**

Organised by Messe Frankfurt (HK) and the Hong Kong Trade Development Council, with co-organisation by the Environment Bureau of the Government of Hong Kong Special Administrative Region (HKSAR), the 2014 show will run from 29 October 1-November at AsiaWorld-Expo, Hong Kong. This year will mark the debut of 'theme days', with a line-up of daily special events to highlight the most challenging environmental issues across Asia. The themes are Global Green Initiatives; Waste Management & Recycling; Green Building, Energy Efficiency & Energy; and Green Living (Public Day). The show also attracts a number of exhibitors who will present their latest solutions and products. Noted exhibitors confirmed for 2014 include China Energy Conservation and Environmental Protection (HK); Eurolite Group; Milan Ecowood; Horimasa International; and Green Dynamic Electric Vehicle.

When: 29 October-1 November 2014

Where: AsiaWorld-Expo, Hong Kong

Who: Messe Frankfurt (HK), the Hong Kong Trade Development Council and HKSAR

Website: [www.ecoexpoasia.com](http://www.ecoexpoasia.com)

Contact: [ecoexpo@hongkong.messefrankfurt.com](mailto:ecoexpo@hongkong.messefrankfurt.com) or [exhibitions@hktdc.org](mailto:exhibitions@hktdc.org)



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Larry Jackson, Managing Director at Paper Force, an Australian operated and managed business partner of Asia Pulp and Paper (APP).

# Sustainable packaging trends

**A**s consumers in many markets have increased access to information through technology, we believe there is, and will continue to be, a growing demand for sustainably sourced packaging.

This has contributed to consumers heightening their focus on business environmental practices, signalling their demand for sustainable packaging (the global market for which is projected to hit \$244 billion by 2018) as well as broader corporate transparency and accountability. In fact, nearly 70% of Australian consumers perceive products as over-packaged, according to research conducted by Datamonitor.

It's become clear that retailers and manufacturers across many industries - from food and beverage and pharmaceutical to consumer products - are seeking to innovate while incorporating associated sustainability implications.

There are four rising trends in sustainable packaging:

## 1. Traceability

With the scale and unconnected nature of the global economy increasing every year, products and their packaging can be derived from ever-more distant and varied sources. Yet all the consumer needs to know is that it comes from an ethical and sustainable source.

This is driving a level of transparency that requires companies to work with suppliers who have an environmental management system and are engaged in broader sustainability strategies or programs.

## 2. Labelling

Consumers are insisting on clearer labelling with regard to sustainability. They want recycling labels that provide clear instructions and labels that provide easy-to-understand information about how to manage various packaging components at end of life. A simple QR code, supported by internet and mobile app communications, will help consumers get better information faster. Additionally, it provides channels for brands to better engage their consumers.

There are various initiatives underway to reform recycling labelling, such as the

Australian Packaging Covenant's Sustainable Packaging Guidelines, a nationwide labelling initiative to reduce confusion and misinformation about recycling by creating universal on-package labelling, referring to AS/NZS ISO 14021:2000 guidelines.

## 3. Re-usability

Traditionally, re-usable packaging was limited to manufacturer and retailer use of re-usable pallets, racks, bulk containers and the like. While this contributed to a more-efficient and less-wasteful supply chain, similar approaches didn't broadly extend to the consumer level.

More recently, re-usable packaging for items such as retail food products is attracting consumer interest. For example, JOCO, a glass coffee-cup manufacturer, designs its products to have an element of re-use. Its packaging comes with a couple of suggestions aimed at preventing consumers from throwing it away, such as using as a pencil holder or a drinks bottle holder for your bike.

Customers appreciate this secondary use, engendering positive brand associations from a cleverly sustainable purchase decision.

## 4. Responsibly grown

Today, companies must consider materials derived from renewable resources, be it recycled material or plantation-grown fibre, such as quick-growing trees in equatorial climates, waste wheat chaff or other materials. For example, there is increasing demand for paper and board packaging made from virgin fibre sustainably sourced from renewable plantations.

Other advantages of paper and board are that it is generally light in weight, can be recycled and once exhausted it can fully biodegrade. Even carton, traditionally more difficult to recycle due to laminate layers, is experiencing a boom as new recycling capabilities and technology emerges.

As consumers, NGOs and other third-party stakeholders demand greater levels of transparency and accountability from companies, particularly in the sustainability space, heightened expectations will continue to scrutinise the manufacturing and production of packaging materials.

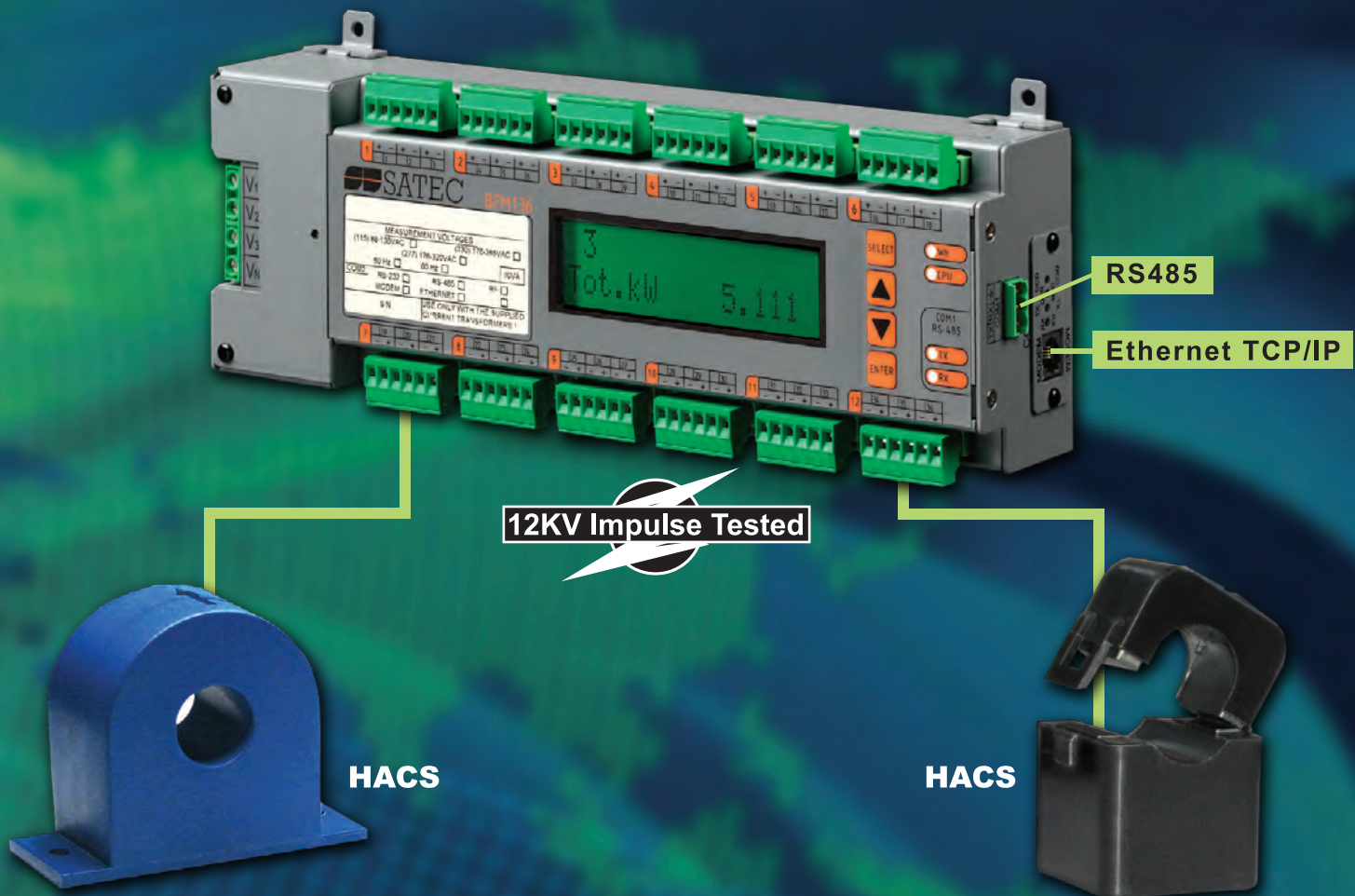
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