

# Downernews

Downer News Issue 3 November-December 2015



**286 ideas**

# Future BOX



**5 finalists**



**479 users**

## Future Box winner on page 2



**9** Downer Awards



**10** Fuel for thought



**12** Reducing paper



## Future Box – What a great response!

The response to Future Box, Downer's inaugural innovation competition which ran from the beginning of September until the end of October, was outstanding.

We received **286 submissions** from across the Group, with each service line well represented.

When we launched the competition, we stressed that **Thought Leadership** is one of the four Pillars underpinning our business. **This recognises that we have many very smart people who strive to remain at the forefront of their industry by having the courage to challenge the status quo.**

Well, the Future Box competition certainly confirmed that we have a lot of innovative people with great ideas. The judging panel, made up of representatives from across the business, was very impressed by the breadth of the concepts put forward.

You can read about the five winning ideas in detail on the next few pages. Furthermore, you can find more information about them (including more photos and also videos) on the Downer intranet.

We have also featured some other excellent entries which didn't quite make the final five.

Interestingly, a number of themes emerged during the competition. These included the use of drones for better and safer inspections, the use of RFID technology to improve our management of assets, a range of ideas relating to traffic control at work sites and an altruistic focus on helping colleagues to be more active and healthy.

The most popular theme was the desire to reduce the use of paper in the workplace. As a result, we have taken the opportunity on page 12 to provide hints and tips to help everyone reduce the amount of paper we use at Downer – and therefore the amount of money we spend on paper.

Thank you to everyone who took the time and made the effort to contribute to Future Box. Every entry will receive a response and we will look to see which ideas can be taken further.

We can't wait to run this great competition again next year. ■

# Future Box winner

Growing congestion, rising vehicle running costs and proactive council investment in infrastructure has seen our city public transport users re-think how they move. People are expecting more and the demand for a connected city is no longer an aspiration but an expectation.

Recognising the opportunity to support local government with these challenges, a Downer-led consortium has developed the smart bus shelter concept. Formed through the technology eco-system of ng Connect the companies joined forces to develop an end-to-end infrastructure solution.

Working in collaboration with Alcatel-Lucent, Solta, Designbrand, Samsung, Schneider Electric and Chorus, Downer has taken a gear rack and integrated it into a modular bus shelter, whilst adding an interactive touch screen that surfaces a clever user interface (UI).

The UI brings the bus shelter to life for the public transport user, offering a journey planner, local news and weather, places of interest, ticketing, directed advertising and even a game. There is also the opportunity to advertise and to direct council material to specific locations.

The real value, however, is in the gear rack. By bringing fibre and power to the shelter and using smart metering we can offer valuable real estate to telcos wishing to locate 4 and 5G small cells. We can then use these shelters as smart city hubs and bring services to the community such as Wi-Fi, EV charging and iBeacon.

In a world that is increasingly connected, this innovation provides a compelling example of how street furniture and city infrastructure can become Smart City connectivity hubs. It opens up a unique opportunity to transform traditional cost demanding assets to valuable revenue generating assets.

In addition to a live prototype, the consortium has built a full-sized fibre-connected shelter inside the Chorus Co-Innovation Lab.

Visit <https://youtu.be/bU0fOs-56bw> to watch a short video about the Smart Shelter. ■

## The Smart Shelter

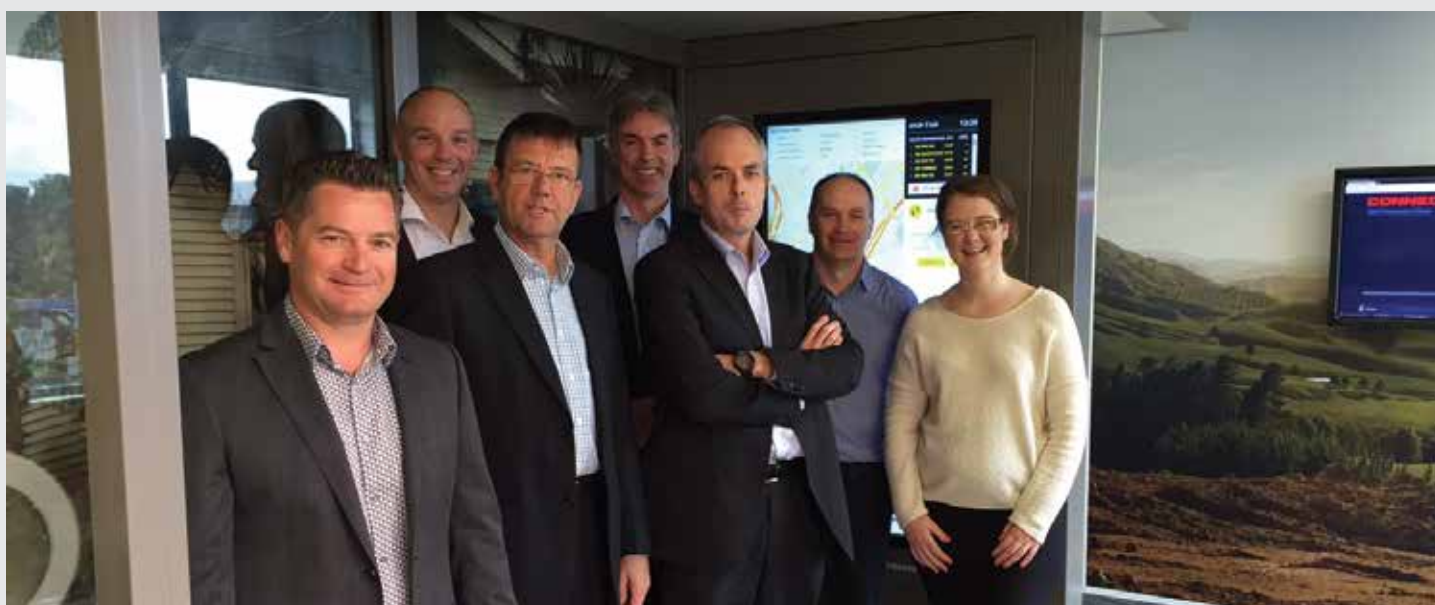
- Brings bus shelters to life for users of public transport and generates revenue through valuable “real estate” for telcos (e.g. to locate 4 and 5G cells), advertisers, local authorities etc
- An interactive smart screen offers a journey planner, local news and weather, places of interest, ticketing information, advertising opportunities, Wi-Fi, EV charging etc
- A full sized prototype has been developed in Auckland with Downer as the lead systems integrator and project manager working with Alcatel-Lucent, Chorus, Metshelter, Solta, Samsung
- Transforms old fashioned street furniture to a Smart City connectivity hub



# The Smart Shelter



Design drawing of the Smart Shelter.



The live prototype with representatives from the consortium. Pictured left to right: Mark Povey (Solta), Murray Robertson (Downer), Jurgen Brand (Designbrand/ Metshelter), Shaun Graham (Alcatel-Lucent), Paul Philip-Wright (Alcatel-Lucent), Alan Murch (Alcatel-Lucent), Roselle O'Brien (Downer).

# Future Box



## Turning a short term WorkSafe improvement notice into a safe and permanent solution

### EWP Cross Arm Lifting Solution

David Burbidge, Site Manager –  
Keysborough, Infrastructure Services

David's innovation ensures that cross arms are kept safely secured when they are being lifted into place. Not only is his innovation easy to install and cost effective, recent trials have demonstrated results in the field. It is now being used across one of our major contracts.

- Downer was issued with a WorkSafe improvement notice after a cross arm resting on an Elevated Work Platform (EWP) basket fell from height, glancing the helmet of an employee (thankfully no one was injured)
- A number of temporary solutions were put in place to mitigate the risk – many required a larger team
- A number of prototypes were tested
- The initiative is easy to install, fits all EWP makes and models with a HV liner, has been load tested and manufactured to meet Australian and New Zealand safety standards
- Costs just \$110 per unit and can be installed in under five minutes by two people.

**“Our engineering solution is a permanent fix that sees the cross arm constantly secured to the lifting basket from the ground to when it is secured at height with king bolts. Trials on the United Energy contract have been very successful and all EWPs on the contract have been installed with the set up.”**

# finalists

## A simple solution for a simple cut

### Rubber belt cutter

Chris Marsh, Production Supervisor – Metro, Infrastructure Services

Chris proactively looked for an easier, safer, more cost effective and resource efficient way of cutting a rubber conveyer belt when the Stanley knife became a Restricted Item in Downer. Well done Chris for not being satisfied with the current outcome and challenging the status quo with his innovation!

- Stanley knives are a Restricted Item in Downer
- Therefore rubber conveyer belts are often cut with power and battery operated tools such as jigsaws
- Other tools available in the market are either bulky and/or expensive
- Inspired by emergency safety belt cutter
- The prototype rubber conveyer belt cutter weighs just 260 grams and is both safe and cost effective
- Makes clean cuts
- No other similar product on the market.

**“Looking at how emergency safety belt cutters work inspired my innovation. It’s safer to use than a Stanley knife, and just as easy.”**



## New thinking for helicopter stringing

### “Threading the needle”

Wun Kie Wong, Senior Project Manager, Infrastructure Services

Wun Kie’s helicopter “needle and pick” idea is a safer and more cost effective way to string high voltage cables when the cables need to be threaded through tower steelwork.

This innovative method eliminates the need for two people to be on an Elevated Work Platform (EWP) at each suspension tower when carrying out this work.

- This initiative can eliminate the need for up to six people (riggers) and three EWPs when helicopter stringing high voltage cables
- The riggers and EWPs are currently used to help secure and pass cables through to the other side of the steelwork tower and the helicopter then pulls the cables through to the next tower
- Wun Kie’s “needle and pick” method allows the helicopter to attach the needle to one side of the tower and pick it up on the other side without the need for riggers on EWPs
- This process has been tested successfully on the 330kV Bulga Transmission Lines deviation
- This innovation introduces a safer and more cost effective method of delivering this work.

**“Our customers Transgrid and Glencore have been impressed with the innovation. When you think of the kilometres of stringing needed, this equates to considerable cost saving and improved safety outcomes.”**





# Future Box finalists (continued)

## Wins for the environment and bottom line

### Air Filter Dry Cleaning Method

Kellie Hunt (Environmental Advisor), Richard Tunncliff (Senior Maintenance Supervisor), Adrian Ribaldone (Maintenance Superintendent), Mining

The Boggabri Mining team identified primary air filters as a large contributor to general waste and also the increasing costs associated with off-site waste disposal. This innovative air filter dry cleaning method demonstrates how thinking outside the box can have benefits to both the environment and the bottom line. We look forward to seeing how this initiative can be rolled out to other sites.

- Air filters are a large contributor to site waste and there are significant costs associated with off-site waste disposal
- Air filters do not respond well to liquids, chemicals and solvents when 'washed', however research showed that a dry-cleaning method works well
- The new process diverts air filters from the general waste stream and uses a more sustainable and efficient option for the re-use and purchase of primary air filters
- Implemented at Boggabri, the innovation has seen a 81% reduction in waste filter volumes and \$140,000 savings since August 2014.

**“This project has not only seen benefits from the reduction of our waste management costs, but we have also saved money from the supply of dry-cleaned filters rather than the supply of new filters in our servicing works. It’s a great result for the Boggabri site, doing something we do everyday in a slightly different way.”**



# Future Box

## Some other great ideas

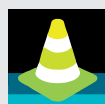


### Cable drum holder

**Jay Strachan,**  
*Supervisor, EC&M*

The challenge we faced was how to transport over 3,000 cable drums around the Wheatstone Project safely.

The original process was to lift the drums on to the back of trucks and then place gluts either side of the drums to stop movement and tie the drums down. However, the drums were able to work loose of the gluts and there were also working at heights issues. My idea was to design a holder that we could load the drums on to and tie them down before lifting on to a truck. Once placed on the truck, we can tie them down and secure safely without the need to work at heights. This is a better and safer way to control the drums from moving during transport.



### Traffic control

**Craig Smith,**  
*Road Services*

At our depots we use a great deal of traffic control for almost every construction and maintenance project. Downer is currently hiring approved traffic control companies at a large ongoing cost to the business. This is revenue that is flowing straight out of the Downer door. There is potential here, through collaboration, to engage Downer owned traffic control and keep the revenue within the larger Downer entity. This would work for many areas across Downer and I believe it would have a massive dollar value impact to the bottom line. It would also improve efficiency through liaising directly with the traffic control personnel and pre-planning start and finish times. Furthermore, the safety culture would benefit because Downer employees are all subject to the same OHS&E training as well as the constant safety and Cardinal Rule reinforcement. Having an in-house traffic control resource would provide a valuable service to both internal and external customers.



### Waste, recycling and energy opportunities

**Heather Bone, General Manager**  
*Otreecycle, Mining*

Downer already has access to a lot of waste products as part of our other contracts. The Federal Government has released its draft methodology under the Emissions Reduction Fund for the diversion of waste from landfill and grants are available with organisations such as ARENA for waste to energy projects. The waste collected could be sent to a Downer owned and operated facility that turns the waste into many different higher value things – such as organics to compost for sale back to councils or the public, plastics and ANFO bags through small scale pyrolysis to make fuel, or waste oil could be used in our bitumen plants. Sufficient volumes of waste collected could be used for small scale gasification projects viable to produce power to run Downer's regional operations. A new Downer Waste Management Division could be established to assess a range of opportunities in this area.





# Future Box Some other great ideas (cont.)



## Gyroscopes in asphalt pavers

**Kirsty Reaks,  
Road Services**

If gyroscopes could be constructed into our pavers this would lead to a better finished product. Yes, we currently use lasers to align and shuttle buggies to mitigate the movement from trucks, but to stop the little dips and movements of a traditional mill and fill job we could use gyroscopes to stabilise the overall movement of the paver. When smaller pavers are used, just 20mm of dropped hot or warm mix on the ground can cause the screen at the rear to dip then bounce up as the paver moves forward. Some of this movement can be compensated through skill, but this is more effective on larger pavers because the smaller ones sometimes move too fast for even the best level hand. This issue may require the operator to stop the paving, remove the truck, run the remaining material out, lift up, reverse, get the truck back against the bin and start that area of the job again. This can be extremely time-consuming and frustrating. We should investigate how we can build a prototype paver with a gyroscope.



## Synergies between Power and Communications

**Scott Parkinson, Operations  
Delivery Manager, Utilities**

With replacement of power poles, a joint user agreement exists between Electrical Network Owners and the various telecommunications carriers. When poles are replaced, third parties are engaged to remove and reattach communications assets from the poles, and reterminating if applicable. If our electrical people were trained in remove/reattach functions, it would give us a competitive advantage because using existing personnel and plant eliminates a lot of non-productive time and travel. It would also provide a better financial outcome for communications businesses. From a safety perspective, the benefit is that we would not have to integrate third parties on to our sites. Strategically, it would establish Downer as a truly turnkey supplier of services and it should broaden our customer base.



## Battery Banker Locomotive

**Frank Szanto, Freight Design  
Authority, Rail**

We should develop a Li-ion battery package which replaces the diesel engine in our existing locomotives. The battery locomotive then replaces one of the three or four locomotives on a typical coal or iron ore train. The battery locomotive uses “renewable energy”. It charges the batteries going downhill and only applies traction on the uphill grades. Hence the term “banker” – a banker loco gives the train a push going uphill. The key selling points for our customers are fuel savings of 15 to 25%, reduced emissions and reduced maintenance. ■







# Recent awards for innovation

## Pilbara Clearwater Alliance wins AWA (WA) Infrastructure Project Innovation Award

**Pilbara Clearwater Alliance, a partnership between Downer and Water Corporation, has been awarded the Australian Water Association (WA) Infrastructure Innovation Award, which recognises significant and innovative infrastructure projects and initiatives within the water industry.**

The project involved the upgrade of the Karratha and South Hedland Waste Water Treatment Plants (WWTPs) and associated infrastructure to provide an advanced water recycling facility at both sites. The upgraded facilities have enhanced not just the quality but the reliability of recycled water and secured a safe and reliable alternative water source for the townships of Karratha Port Hedland and South Hedland in Western Australia.

“The Pilbara Clearwater Alliance has demonstrated innovation that sets it apart from common practice, in particular the use of ultrafiltration membranes that produce consistent, high quality water with lower operational costs for many years to come,” said Trevor Cohen, Executive Director, Downer Utilities.

**“To be recognised for innovation by our industry body is testament to the determination of those involved in the project and the pedigree of innovation that Downer and Water Corporation have jointly delivered.”**

The Pilbara Clearwater Alliance, a partnership between Water Corporation and Downer, operate and maintain both the Karratha and South Hedland WWTPs.

This project has involved a number of Water teams across our design, construction, commissioning and operations areas since the project commenced in 2012 – well done to all involved.



Pictured (left to right) Chris Yeats (Downer); Daniel Ralston (Downer); Sharon McNeil (Downer); Robert Martinovic (Downer); Mark Donoghue (Water Corporation) and Rino Trolio (Water Corporation) with their Infrastructure Innovation Award.

## Collaboration and innovation key to winning Tomago award

**Tomago Aluminium has announced Downer as the Tier 1 Services Supplier for 2015.**

Recognising excellence in the delivery of services across a range of criteria including safety, value add, innovation and teamwork, the award is based on an annual survey of key Tomago stakeholders at the Aluminium Smelter in Newcastle.

One of eight nominees in the Tier 1 category, Downer has been onsite for over 20 years, and this year marks the second time Downer has won the award.

Over the years, strong relationships have formed resulting in high levels of trust between Downer and Tomago.

“For us to keep the operations going, we can’t do it alone and with Downer we’re all in it together. We don’t have any weak links in the team and always try to have open communications to ensure that we get the results,” said Tomago’s Procurement Manager, Tony Camps.

“Despite the diversity of the Downer team with respect to service offering and age groups, they are always on time, looking for ways to do the job better and are totally professional,” said Mr Camps.

One of the things he believes sets Downer apart is that Downer doesn’t do the same things over and over.

**“They look for better ways and openly discuss ideas in shared forums on all sorts of topics from safety to clever thinking so that they can deliver ongoing improvements,” he said.**

Tomago Aluminium is one of Australia’s leading aluminium smelters and employs around 1,200 people. With production of more than half a million tonnes of aluminium each year, Tomago relies on Downer to deliver major maintenance projects, services and sustaining capital works. The Downer team comprises electrical and mechanical specialists located onsite and supported offsite by engineering, manufacturing, data and communications, administration and safety specialists from within Downer. ■



The Tomago team.



# The energised future of the world's highways

“We spend so much time and money on the technology of cars, yet the highway has not changed for the last 100 years.”<sup>1</sup>

## Solar-powered and self-lighting highways with induction lanes that charge electric cars as they drive – the future of asphalt highways is here.

Our technology is advancing at a rapid pace, and ideas such as storing solar energy in pavement (and using it to melt off snow and ice when the temperature drops) are fast being developed.

### Capturing heat

British firm ICAX has developed a way to transfer the heat energy captured by sunlit roads into thermal banks by installing a network of fluid-filled pipes under the road. The asphalt's heat is transferred to the fluid, which is then pumped into tubes buried under insulating earth. The dirt retards the heat loss; providing a reservoir of heat that can be extracted by buildings equipped with heat pumps during times of cold weather. ICAX calls this concept Interseasonal Heat Transfer (IHT).

Beyond providing buildings with low cost heating, IHT can be used to rewarm roads during winter, by pumping the thermal banked fluid back into the under-road pipes. The released heat can melt snow and ice on an ongoing basis, keeping roads clear even during snow storms. This concept is already

in use at Heathrow Airport, to keep the tarmac clear of ice and snow all year round. It is a powerful demonstration of how much can be done with asphalt paved surfaces when a creative engineering approach is applied.

Conversely, traditional asphalt has a very low albedo, the property of reflecting solar radiation, absorbing more than 95% of the sunlight that hits it. This warms the asphalt, which in turn warms the air at ground level, causing an increase in temperature of urban areas – known as the ‘heat island’ effect. Downer has been using a concrete-asphalt composite to create roads that are more reflective to sunlight, to reduce the impact of the ‘heat-island’ impact of roads.

### Energy-generating roads

Harnessing vibrational energy (created by cars and trucks as they drive over paved roads) to generate electricity is not only possible, it has already been proven. A 2011 pilot study into road vibration energy generation by Holland's University of Twente used piezoelectric road materials to convert vibrations into measurable power. Basically, the ongoing compression and decompression of piezoelectric crystals in the road material generates electricity.

The University of Twente study, which used a piezoelectric embedded strip across the N34 provincial motorway near Hardenberg, showed that enough energy could be generated to power wireless motion detectors to trigger stoplights.

### Solar

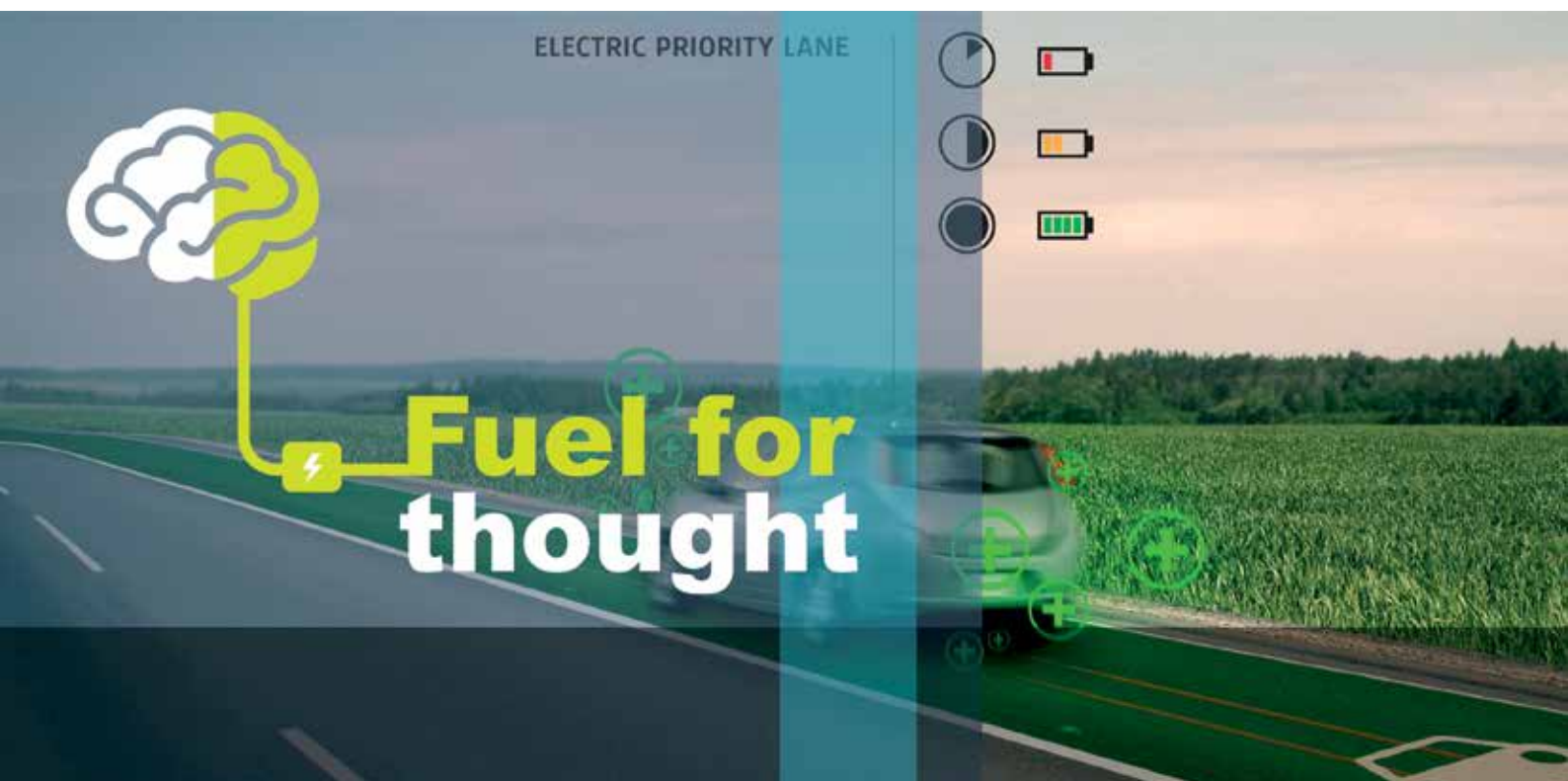
Colas, a world leader in transport infrastructure, recently unveiled Wattway – the Solar Road.

Wattway is a photovoltaic road surfacing concept, the first of its kind in the world. Its panels are comprised of photovoltaic cells embedded in a multilayer substrate. The cells collect solar energy via a very thin film of polycrystalline silicon that enables the production of electricity.

On the underside of the panels, there is a connection to a lateral module containing the electrical safety components. The panels can be used on any road around the world, and are able to bear all types of vehicle traffic, including trucks.

The Wattway process uses existing infrastructure, meaning there is no need to deconstruct then rebuild. The extra thin panels (which are only a few millimetres) are extremely sturdy and skid-resistant, and are installed directly on the pavement, without any additional civil engineering work.

<sup>1</sup> Daan Roosegaarde, Artist & Innovator, Studio Roosegaarde.



This unparalleled cutting-edge technique is a major breakthrough, as it provides the road with a new function: producing clean, renewable energy locally, in addition to a road's conventional use as a vector for mobility.

Wattway is able to provide power to street lights, signs, tramways, as well as housing, offices, etc.

20m<sup>2</sup> of Wattway can supply enough electricity to power a single home (not including heating). With a one kilometre long section of Wattway panels, it is possible to power the street lights for a town of 5,000 inhabitants (ADEME).

### Downer's opportunity

A road that can produce electricity is a connected road. Roads of the future will be intelligent and able to communicate thanks to widespread development in sensors making it possible to provide real-time information on traffic, to manage traffic dynamically, and to roll out automatic diagnosing programs in the pavement itself. As a proven expert in road construction and science, we are ideally placed to capitalise on these advances, and to marry them with the many improvements in asphalt paving that we've already pioneered. ■

## Did you know?

**Artist and Innovator Daan Roosegaarde and Dutch construction firm Heijmans have banded together to create the 'Smart Highway' a series of projects where the road – not the car – does more than just sit there.**

Their "Glowing Lines" concept employs light-emitting marker lines that are recharged by the sun during the day, and emit light for up to 10 hours at night. As of April 2014, two 500 meter long stretches of the N329 provincial highway near Oss, Holland, have been equipped with Glowing Lines.

Roosegaarde has a lot of other exciting highway ideas that he and Heijmans are developing into working prototypes. For instance, the Electric Priority will recharge the batteries of electric cars driving on it, by transferring energy wirelessly to the car through magnetic currents. (Magnetic 'transmitter coils' within the roadway will induce power generation in a magnetic 'receiver coil' inside vehicle car, which will transfer this power back to the car's battery.)

Meanwhile, temperature-sensitive 'dynamic paint' can be used to make illuminated warnings visible only when relevant. For example, when the outside temperature gets close to a freezing point on a bridge, a dynamic paint warning about potential slippery conditions can appear.

Roosegaarde's ideas for Smart Highways don't end there. They include addressable 'Dynamic Lines', which can be remotely triggered to show either solid or dotted lines depending on the amount of road traffic – and interactive street lamps that only come on when cars approach – and can flash when cars are going too fast. As for all that wind generated by passing cars, Roosegaarde envisions using that moving air to spin small wind turbines along the curb; creating the power to illuminate the shoulders at the same time.



# Saving trees and money by using less paper

The most popular theme in this year's Future Box competition was the desire to reduce our use of paper and introduce new ways of working that minimised or avoided the use of paper altogether.

The consistent message was that this would be good for the environment, reduce our carbon footprint and also reduce the amount of money we spend on paper and printing.

A number of submissions suggested that paper-based manuals, forms, reports, purchase orders and similar documents should be replaced with electronic versions or apps wherever possible. This would not only reduce substantially the amount of paper used, it would mean documents were more quickly and easily updated.

Digital documents and apps are being used at Downer and we will investigate the new suggestions received through Future Box to see what further changes are possible.

At a more fundamental level, many people stressed that we should "pdf more and print less". This applies to a range of activities across the Group. Others urged the introduction of passwords at photocopiers to avoid the wastage involved when documents are sent to the printer but not collected.

Future Box confirmed there is a high level of interest in reducing our use of paper and we hope the tips on the right of this page will help you to be smarter about printing and contribute to a more efficient business. ■



## Use less paper

1. Avoid printing wherever possible – for example, distribute documents digitally and let those who want a print version decide whether or not to print it for themselves;
2. If you do print, make sure your default setting is to print double-sided; and
3. Avoid colour printing wherever possible:
  - colour printing costs TEN TIMES more than black and white printing (0.6c per page compared with 0.06c per page)
  - if 6,000 office-based staff members printed 10 fewer pages in colour every week, that would save Downer \$3,000 a week or \$14,400 a year

Also, if you notice an unused printer, please report it to your IT representative so it can be returned. Downer pays the lease cost for a printer whether it is used or not.

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Send your suggestions to: [Corporate.Affairs@downergroup.com](mailto:Corporate.Affairs@downergroup.com)