

# IndustryIntelligence

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# Editorial, Circular Economy at Work

by: Rodin Genoff

It's the 'A' list of the who's who in the global corporate market place. Just to name a few: Bankers Trust, Renault, Unilever, Philips, Vestas, Vodafone and Cisco. So what have they all got in common?

They're all paid up members of the Ellen MacArthur Foundation (EMF), a not for profit located in the most unlikely head office - a 14th century sail loft on the Isle of Wight!

The EMF pioneered the term "circular economy", which is gaining intellectual and investor currency around the world.

It would be easy to describe the circular economy as the green economy 2.0, but this would be doing the circular economy a disservice. It's not simply an upgrade as 'green economy 2.0' would suggest, but rather a revolutionary new way of creating economic and innovative value whilst delivering a massive environmental dividend.

Think re-use, remanufacture, redesign, regeneration.

"maker cities  
that will drive  
the circular  
economy"

Our Guest Writer Adam Lusby, Founder, CE-optimal, UK, takes us through exactly what the circular economy is, and how this new value creation model is estimated by the EMF to be worth more than one trillion dollars. No wonder the 'A' listers are taking notice and the European Union has introduced the first draft circular economy guidelines. As Adam concludes, "implementing the circular economy model and its inherent characteristics will lead to valuable systemic benefits".

I then put the case for what I call "maker cities" that will drive the circular economy and transform the world as we know it. Let's face it, cities now define a nation's competitive advantage. Think global cities such as London, Paris, New York, and Hong Kong.

But don't get fooled by the media hype! In the 21st century, where would the US be without Seattle or Houston, Germany without Stuttgart or Munich, or Australia without its industrial heartlands in Sydney, Melbourne and Adelaide – or, indeed, the United Kingdom without its industrial cities like Manchester, Leeds and now the smart textile capital of Europe, Bradford.

I explain why it is that these "industrial" cities are our future makers, and how they connect talent and financial resources to drive innovation and create the bedrock of the circular economy's industries of the future.

"In the spotlight" for this issue of Industry Intelligence I interview Candice Quartermain, one of Australia's circular economy pioneers and founder

and CEO of Circular Economy Australia. She reveals that it's one thing to intellectually and financially understand the circular economy, it is another to get individuals and organisations to put this new thinking into practice. Candice explains how to engage individuals and organisations collaboratively, creatively and purposely, so we can put the circular economy to work.

In this issue we also have inspiring circular economy case studies. The first is on the textiles company Dutch aWEARness - think raw materials designed for reuse. The next is iFixit, an international, open-source, online repair manual for everything.

Finally, Michael Brischetto, CEO of the iconic Carrington Hotel in New South Wales Blue Mountains, takes us on a journey to show how he's making the transition from the green to the circular economy, from co-generation to becoming part of an organic food future. This is an illuminating article that shows us how to make the transition into circular economy thinking.

**"engage individuals and organisations collaboratively, creatively and purposely"**

Please, let's not forget that not everyone has the knowledge and knowhow to start circular. This is especially true of existing small companies – like Michael, they start with what they know. But with an open mind and open heart, matched by commercial

nous, Michael has built on his sustainability experience and jumped the bar into the world of the circular economy. And as he does, he's creating new jobs and markets for local organic farmers.

What a great lesson for small companies around the world that want to make a genuine contribution, that want to take the next step.

This is why the educative work conducted by the EMF and Circular Economy Australia is so important, and why circular economy experts like Adam Lusby are so vital in building local projects from the bottom up.

So please read on and enjoy this issue of Industry Intelligence.

Rodin Genoff.

# Circular What?

by: Adam Lusby

It is forecast that \$1 trillion can be generated in materials savings as we move to adopt a circular economy.

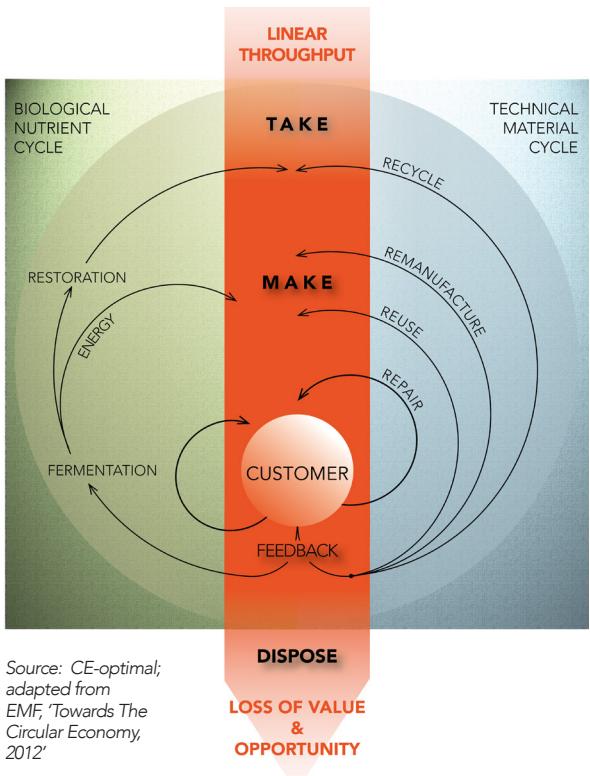
## So what is the circular economy?

As defined by the Ellen MacArthur Foundation, the circular economy is “an industrial economy that is restorative by design, and which mirrors nature in actively enhancing and optimising

the systems through which it operates. Capital assets (for example clean rivers or diverse ecosystems) are maintained and rebuilt, and the waste of one process is eliminated as it becomes the ‘food’ for another. Matter may be seen to cycle in distinct ‘flows’ - the biological, in which materials are designed to enter the biosphere safely, and the technical, in which materials are designed to circulate in high quality (form) without entering the biosphere. The purer these flows are and the higher the quality at which they cycle, the more value is retained by the economy.”

We can build a framework on this definition which allows for innovation in business models that spark the creation of a new generation of products and services.

This is in contrast to today's linear approach of **'take, make and dispose'**. The circular economy goes so much further than just dealing with waste as a solution. Instead it provides a framework which covers all economic processes from



Source: CE-optimal;  
adapted from  
EMF, 'Towards The  
Circular Economy,  
2012'

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design, investment and the application of new technology to the delivery of enhanced products and services.

### **So what does this mean for business?**

The answer is simple. New business and investment opportunities will create new value, new products and services, and transform the way we do business so that everything we do feeds the system for the future.

No wonder global companies from Philips to Unilever have joined the circular economy movement and, in the process, are redefining how their business models work. In fact companies such as IKEA are making bold statements about securing resources, working out their reverse logistics and closing the loop of materials use and re-use.

*“\$1 trillion can be generated in materials savings as we move to adopt a circular economy”*

But profound changes extend far beyond the big end of town. Many small emerging innovators are also finding ways to disrupt the linear approach of consumption. Emerging innovators like Bio-bean are applying new technology to capture and create value in once costly waste streams. Businesses that are first-movers in the circular economy have discovered that by applying the framework to business systems they are starting

to secure long-term control over resource flows. They are able to increase quality and reduce pollution by viewing material efficiency at the system level. This a big step forward from the traditional model of linear efficiency.

The wider benefits of introducing a circular economy are gaining momentum internationally. Regions and countries in the European Union from Belgium to Scotland are paying more attention to how they can capture and re-capture the value of resource flows. Cutting edge research like that undertaken by the Ellen MacArthur Foundation indicates that the knock-on effect from separating biological and technical flows, and moving to a circular economy will result in significant material efficiency, energy and water savings, and shared value creation. The application of such circular economy thinking across the economy is cumulative and underscores transformative and historic changes that will drive the next wave of industrial innovation.

# A New Era of Investment in Design and Construction

by: Adam Lusby

The circular economy offers a new business model and design criteria which allows for new investment to be applied to large scale infrastructure projects. We can learn a great deal from the businesses that are already pioneering in the circular economy's technical cycle (as I've described in my earlier article above). These innovators are embracing the idea of selling a service instead of the physical product. So let's together explore just how this one-degree mind-set change can dramatically alter how we view investment in construction projects.

A good example is the partnership between electrical giant Philips and emerging innovator TurnToo. TurnToo is a Netherlands based company which works to facilitate service contracts in the technical cycle of the circular economy. In this example, Philips agreed to supply the performance over its physical products, in this case 'light' or lux per hour, to TurnToo instead of selling the actual light bulb.

This made Philips responsible for the materiality, reliability, and efficiency, while retaining ownership of valuable physical resources.

*"This made Philips responsible for the materiality, reliability, and efficiency"*

Such initiatives are both exciting and innovative commercially because they create more touch points between the supplier and the customer, while supplying key product data feedback to improve service. For Philips this means strategic positioning in the market place of the future.

If we take these insights and apply them to large projects, the model becomes even more compelling. TurnToo has taken this a step further and added two key developments:

- Requiring a material passport to track materiality within the project giving us a way to manage material flows within the economy.
- By using projected future value of resources within the project, a 'material bank' can be created for value extraction.

By leveraging this thinking, it can be proposed that long-term investment will have strong returns with attractive hedging due to securing the future resources that any infrastructure project is built from. The projects will also benefit from the fact that a more pure (less impurities) material flow creates a higher value. Thus directly driving material quality up. And ultimately contributing to superior returns on investment.

So, what would a technical performance building encompass?

There are a number of projects where the construction companies build to a traditional lease model. However, without realising the value which

can be captured through design for assembly and disassembly and the materials used for construction, the model can only deliver so much profit over time. This is due to requirements of upfront resource costs, maintenance, refit and demolition.

On the other hand under, using a performance model, a construction

company can hold on to the value of the materials and by selling the performance of office space down to 'lux per hour', it can create new long-term revenue streams.

In the future, some of the major infrastructure projects, such as city blocks or entire city projects, may well be more easily achieved by leveraging a 'material bank' for investment. The possible performance a building or neighbourhood might achieve under a circular economy model is wide ranging from energy generation to food production.

These projects will also be maintained more easily and disassembled and cycled with retained value. This makes our current linear model look somewhat obsolete in light of the new circular model which offers an attractive prospect for any developer looking to upgrade their business model.

A Restorative Future: Future buildings and neighbourhoods have the potential to never again become rundown. Instead generating restorative value for local citizens, business and the community at large – financially, socially, and environmentally - by design and nature.



Source: WOHA Architects 2011 [www.woha.net](http://www.woha.net)

# CaseStudies

## Dutch aWEARness

Textile company Dutch aWEARness works within a closed production chain - starting with a raw material that is designed for reuse. In the end of the use phase of the garment, we recycle the work wear or fashion product to a new material which is suitable for a new product on the same level.

What we have learnt in this process, is that the circular economy is not only about materials or products, but most importantly,

*"because working in the circular economy is a mix of partnerships, management and innovation"*



Image: Dutch aWEARnees

it is about organizing your chain, managing your chain and creating the right business models. This way of working and thinking is a big inspiration, because working in the circular economy is a mix of partnerships, management and innovation. Only 20% is about the product, 80% is about the process. The circular economy challenges us to think outside the box and work with new innovations. We have redefined the cultural industries thanks to the development of a circular economy.

# CaseStudies

iFixit

iFixit is an international, open-source, online repair manual for everything. Our mission is to provide people with the knowledge to make their things work for as long as possible.

When recyclers shred phones and computers that could be repaired or reused, they are shredding the embodied energy and materials, as well. Repair is the most resource-efficient way to leverage the products we already own, so iFixit is working to train up an army of mechanics and technicians to invigorate local repair economies.

*"iFixit is working to train up an army of mechanics and technicians"*

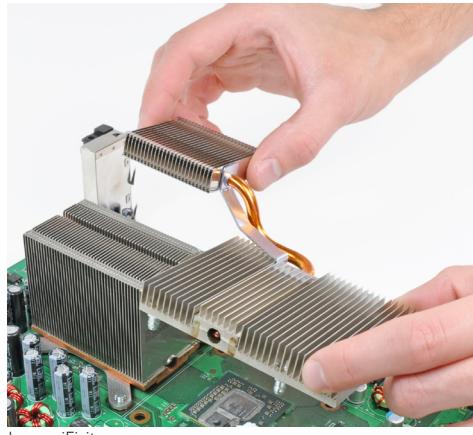


Image: iFixit

The iFixit community is diverse—and rapidly growing. In 2013, we taught repair to over 40 million people from almost every country in the world. People all over the world are providing a continuous stream of information. They are writing step-by-step repair manuals, participating in forums, and telling their repair stories. And since this platform is strongly collaborative, there are thousands of crowd-sourced repair guides with new ones published every single day. This massive, free resource has helped people fix everything from cellphones to game consoles, toys to musical instruments—because fixers, hackers, and makers everywhere finally have a global platform to share their knowledge.

# Maker City - Putting the Circular Economy to Work

by: Rodin Genoff

## **Introduction: Smart Cities; Maker Cities**

Increasingly cities are defining a nation's competitive advantage. So it's not surprising to see cities in head to head competition. London, New York, Hong Kong and Singapore fight it out for the future of global financial markets. Paris, Venice, Barcelona and Prague compete over the tourist dollar, while Copenhagen, Oslo, Stockholm and Helsinki quietly shout out their claim to being the smartest and most innovative in the world.

Not so glamourous but equally important are our industrial cities, our maker cities!

Think Aalborg in Northern Denmark with global expertise and reach in renewable energy, electronics and intelligent engineering. Or Graz in Austria, home to one the world's leading cleantech clusters. And, of course, the engineering and design heartland of the UK anchored by a deep history of design and ingenuity in Liverpool, Manchester, Leeds, Coventry, and Bradford.

These "industrial" cities are our future makers. They connect talent and financial resources to drive innovation and create the industries of the future.

In the 21st century where would the US be without Seattle or Houston; Germany without Stuttgart or Munich; or Australia without its industrial heartlands of Melbourne and Adelaide?

These are smart cities getting smarter.

## **Industrial Cities Clustering Opportunity, Talent and Knowhow**

Think smart grid! Now ask the question: "Who puts the smart into the grid"?

Think cleantech! Now ask the question: "Who puts the tech into the clean"?

The "smart" and the "tech" are all about intelligent engineering, software, systems integration, industrial design and now a new generation of artificial intelligence, automation, robotics and 3D printing capabilities.

Welcome to intelligent industrial cities, maker cities, where

these core 21st century capacities and capabilities are found in abundance. No country can do without them, nor the intelligent companies that call such cities home.

### **Industrial Cities are Smart and Connected**

Don't be fooled, industrial cities have dense networks of interconnected small to medium sized enterprises (SMEs). And the best of the best SMEs ultimately go on to become micro multinationals.



Image: City of Aalborg

Smart and highly innovative, they provide the hands-on experience and specialist knowledge that the big companies need. It is this interdependence that provides the spark to ignite new ideas, create new goods and services, that are absolutely pivotal to technology transfer and diffusion, and strengthening the city's industrial fabric.

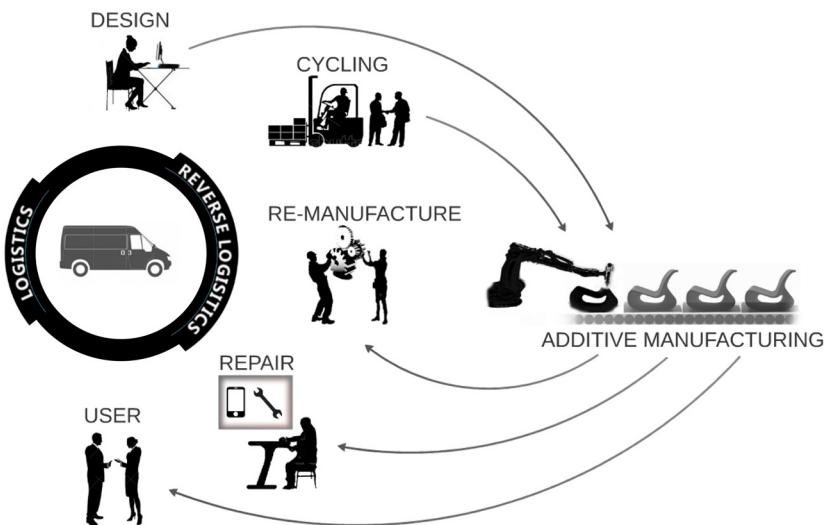
It is no accident that countries with vital industrial cities, such as Sweden and Denmark, outperform their peers. No wonder these countries run current account surpluses of 7 per cent and 5 per cent respectively, compared to Australia with persistent current account deficits running at a long-term average of between 3 per cent and 4 per cent - despite being the largest

exporter of coal and iron ore in the world.

This makes cities like Melbourne, Adelaide and Sydney absolutely essential in ensuring Australia doesn't fall behind the rest of the world as the doomed love affair with Australian coal ultimately ends.

### New Economy Meets Circular Economy

The new economy can best be described as an open source, anywhere, anytime: faster, cheaper and extremely disruptive. James Moody describes this in his book as The Sixth Wave - a new world that is intelligent, instrumented and interconnected; one where the memory on its ubiquitous silicon chip doubles



every 18 months and is driving the pace of innovation to new and dizzying heights.

This new economy is also powering the new world of the circular economy described by Adam Lusby in Chapter One above: reuse, re-manufacture and redesign, where there is no waste and our ultimate aim is to regenerate.

A profound economic revolution is taking place beneath our feet.

Early adopters are at the helm of creating new social and economic value. The procrastinators will be left out in the cold

Image: CE-optimal

mulling over lost opportunity.

We have seen how cities like Aalborg in Denmark and Gratz in Austria have put to work their rich manufacturing and engineering traditions and, in the process, capture some of the smartest, most lucrative and fastest growing markets in the world.

Think distributed renewable energy, waste and water infrastructure, and smart materials and buildings technology, that together anchor and, indeed, activate the circular economy. But as Lusby above shows, that's only the tip of the iceberg!

### **Circular Economy, Exponential Opportunity**

Re-use, re-manufacture, re-design and re-invention (and let's not forget ourselves) are all at the very heart of how the circular economy works - and opportunities abound.

Think aging infrastructure, resource depletion and aging population contributing to rising costs in all advanced economies.

So what will it be? Managing risk or managing opportunity that comes with uncertainty?

This marks a new era of exponential opportunity.

*"And here you'll find SMEs at the centre of the economy: spinning off and commercialising new ideas"*

So what will it be? Managing risk or managing opportunity that comes with uncertainty? This marks a new era of exponential opportunity.

Thomas Friedman famously declared the World is Flat in the anywhere, anytime economy. But global cities guru Richard Florida responded "the world is spiky", with intelligent industries and talent clustered in smart cities. And here you'll find SMEs at the centre of the economy spinning off and commercialising new ideas, providing valuable expertise and industry specific solutions, often solutions that are too expensive for larger companies to have in-house. Anyway, that was the old economy!

In the "new" "circular economy" we are increasingly seeing networks of companies operating like mini film or architecture studios that bring together smart constellations of talent and know how, and then let this intelligence explode onto the market place to create new products and services. These are high energy and intensely smart spaces.

## Get Smart

Smart governments and industry associations need a new armoury of policy and programs to accelerate value creating connections between these companies.

Think UK with its open source and tax friendly Patent Box legislation, a real boon to SMEs. Or Scandinavian cluster programs bringing SMEs together into collaborative activities - from joining up to attend industry expos to supporting match-making between SMEs. What programs like these have in common is linking SMEs with new opportunities, and providing over the horizon industry intelligence to marshal the resources and intelligence of entire industries to create the industries of the future.



Image: SAHMRI Building, Adelaide, Rodin Genoff

Smart policy is also about building a city's knowledge infrastructure that can map its industry clusters, know who is doing what and how, and creating safe spaces where companies come together to collaborate and share knowhow and knowledge.

Think Denmark's Cleantech Cluster, and Australia's Water Industry Alliance in Adelaide or the University of Technology Sydney's creative industries precinct in downtown Ultimo.

Start-ups and open source platforms, from crowd financing to co-creation – absolutely.

But remember, SMEs already have a track record and can scale fast and globally. Nor should we forget that, as Nigel

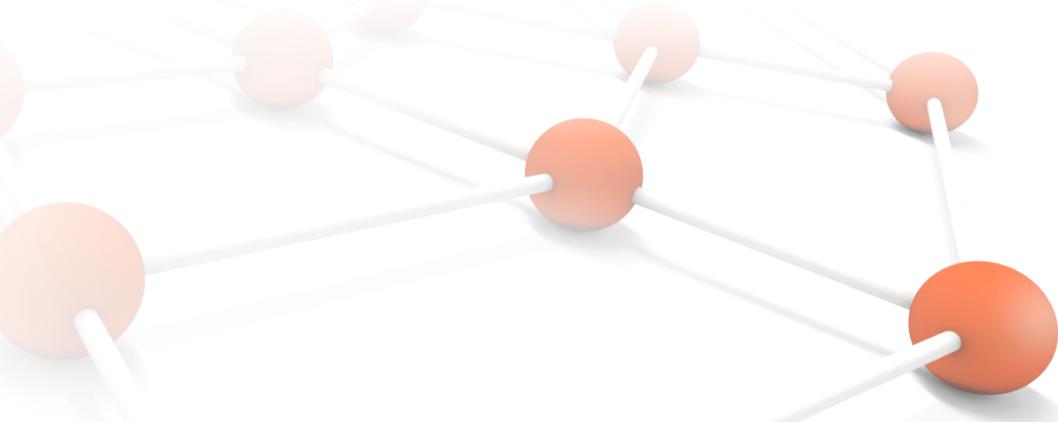
Lake reminds us in his book *The Long Term Starts Tomorrow*: "Revolutionary growth is not the preserve of start-ups. Apple was 20 years old and at a corporate's death door in 1997" before Steve Jobs launched the company's range of new products, leading over the next 15 years into a \$600 billion company.

Smart spaces, smart cities bring together entrepreneurs and SMEs to leverage off each other and provide incentives to venture capitalists to accelerate investment and product design opportunities, resulting in dense business and collaborative networks getting even denser and, yes, "spikier".

Don't forget, local SMEs and entrepreneurs have a crucial role in strengthening the community's social fabric by supporting local schools, sports clubs and industry associations. SME profits from the time and money they've spent globally are ultimately re-invested locally, while the global connections they've made spark exponential opportunity for the cities and communities in which they belong.

And don't get fooled by big city hype!

Maker cities rule in the new economy...and smart SMEs are their vanguard.



# SPOTLIGHT

## Circular Change - A world of Possibility and Collaboration.

Rodin Genoff interviews Candice Quartermain, CEO and founder of Circular Economy Australia and one of Australia's circular economy pioneers.

**Rodin:** "Candice, what makes you so passionate about the circular economy?"

**Candice:** "My philosophy is to connect the world's resources through the application of a regenerative model. This is all about designing waste out of the system, systems thinking, creating diversity, using renewable sources and in the process generating a continual flow of value."



Image: Candice Quartermain - Founder and CEO, Circular Economy Australia

"I'm driven by the circular economy's core principles, which are inspired by methodologies like biomimicry, cradle to cradle, industrial ecology and collaborative consumption, and distilling them down into an easy to follow framework that lets you design an approach that can be applied in a practical way."

**Rodin:** "You're one of Australia's circular economy pioneers. What sort of work has your company undertaken over the past four years to lift circular economy awareness across Australia?"

**Candice:** "We've been offering services that focus primarily on facilitating upfront circular economy education. Circular Economy Australia has worked with schools, community organisations and businesses to help people really understand what a circular economy vision looks like.

"We introduce them to a suite of tools to explore new ways of accessing the very resources they require to thrive into the future - from clean air, water and soil to local sources of food. And, most importantly, how to regenerate.

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*"Our job is to help people imagine a future they genuinely want to be part of."*

"Our job is to help people imagine a future they genuinely want to be part of."

**Rodin:** "Looks to me that the crux of Circular Economy Australia's work goes to the heart of changing behaviour and how to get people collaborating together to drive real change."

**Candice:** "Absolutely! By adopting an ethos of creative curiosity we continually spark connections by rethinking what is possible. "Our focus is on harnessing collaboration. Collaboration not only fuels development and momentum through shared ownership, it also instils a sense of confidence that encourages more of this behaviour.

"We fundamentally want to enrich individuals as they work together to solve common problems or come up with smart solutions that benefit everyone."

**Rodin:** "What is the role of new technology in creating these smart solutions in the circular economy?"

**Candice:** "As the reach and pace of the Internet continues to accelerate, the circular economy world is being shaped by new technological advances.

"The speed at which we operate, and the pressure that is now being put on organisations and business to be socially and environmentally relevant, is creating demand for a new generation of products and services that are regenerative. And profitable to boot."

**Rodin:** "And what does the future hold for you?"

**Candice:** "Enormous possibilities. To say I'm excited is an understatement. With the likes of the Ellen MacArthur Foundation in the UK and the amazing work being done by Australia's Rachel Botsman on collaborative consumption, circular economy thinking and practice is not only going to grow stronger and deeper, it's in incredibly safe hands."

# SME Takes Steps Towards Circularity

by: Michael Brischetto



*Michael Brischetto, (pictured left) CEO of the iconic Carrington Hotel in the Blue Mountains of New South Wales, takes us on a journey to show how he's making the transition from the green to circular economy, from co-generation to becoming part of an organic food future. This is a great article that shows us how to transition into circular economy thinking. Please read on, Rodin*

The Carrington Hotel, located in the Blue Mountains, is an Australian tourism icon with a strong history in innovation. Opened in 1883, The Carrington became a playground for the rich, famous and royal and remains a sought after destination for accommodation and events.

The hotel's landmark chimney, which dominates the township of Katoomba's skyline, is a reminder of the hotel's legacy of technological innovation. In 1913, the hotel's owners built an on-site power station that included a coal fired steam generator. This facility not only provided heating for the hotel, it provided electricity for the entire population of the upper Blue Mountains. With the ability to provide two sources of energy output, The Carrington Hotel can be credited with establishing one of the earliest co-generation plants in Australia. The plant and equipment was sold to the local Council in 1936.

## **Inspired by The Carrington's history of innovation and being part of the green economy**

In 2013, The Carrington Hotel reclaimed its status as an industry innovator with the design and installation of a state of the art co-generation plant. Unlike the coal steam engine of the early 1900s, the new plant runs on natural gas and produces up to 110kW of electricity, which is sufficient to service the whole hotel.

The project initially started as a solar installation to combat escalating electricity prices, but after detailed investigations it became clear that the return on investment and reduction in energy consumption would make a solar project unviable. Further research into co-generation initiatives within Australia failed to meet either the budget constraints or specific needs of the unique hotel environment.

In 2011 the current owners of The Carrington Hotel visited Chengdu, China, to meet with engineers from MiraclePower, a small start-up company specialising in co-generation. Shortly after, Miracle Power was given the contract to design and build its first plant for export to Australia. local team was assembled to undertake the installation and

commissioning of the new system. Led by a local systems engineer, Charles Butcher, the team included local plumbers, electricians and mechanics. It was a real collaborative effort. Commissioning included major upgrades and retrofitting to the hotel's heating system and insulation, producing significant savings.

Nine ageing Raypak boilers were replaced with insulated storage tanks and a ring main that runs the length of the property. Hydronic heaters were fitted with thermostats with automatic shut off technology.

The project is on track to provide a return on investment within seven years and the anticipated life cycle of most of the infrastructure is well over 30 years.

### **Microbrewery, intelligent circular economy thinking supporting paddock to plate, and its organic!**

The hotel is now examining ways of maximising the use of the plant and has incorporated the system into the design of a new microbrewery that

will open in 2015, taking us to the next level of how we can contribute positively to the environment.

The new microbrewery has been designed and built to minimise energy and water consumption. Rainwater is harvested from the roof of the brewery and stored in 10,000 litre underground tanks. This water is used in to clean the brew house and run the natural gas steam boiler. A condenser is fitted to the

**"Microbrewery,  
intelligent circular  
economy thinking  
supporting paddock  
to plate, and its  
organic!"**

brewery kettle that will recycle waste heat and steam back into the system, increasing efficiency by 10%.

The brewery's electricity is supplied by the hotel's co-generation plant, along with heat to maintain a large, insulated storage tank with 2,000 litres of water ready for the next batch.

All of the brewery's organic waste will be reused or repurposed. Spent grain will be sent to local farmers to be used as feed and compost. The produce from these local organic farms will then be featured on the menu in the brewery's restaurant. Spent hops will be composted onsite and used in the hotel's gardens while spent yeast will be washed and cleaned and reused in future batches.

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

# In this issue of **IndustryIntelligence**



Rodin Genoff, Managing Director, Rodin Genoff & Associates is an internationally recognised cluster expert. His results include creating smart global collaborations that lead to new employment, investment and business opportunities across industries such as engineering, cleantech and creative industries. Author of several books, results of his work have been widely reported in the financial press in Denmark and Australia.



Candice Quartermain, CEO and founder of Circular Economy Australia, has been presenting, educating and facilitating on Circular Economy for over four years. Her passion for connecting people and drive for good business practice is the force excelling Circular Economy Australia into the valued network it is today.



Adam Lusby is founder of CE-optimal and specialises in restorative solutions from a systems perspective. Adam is trained as an architect. His work on cities focuses on comparing the metaphors of the 'machine city' and the 'city as a metabolism' to reveal new insights that allow us to better manage and organise our cities.

With special thanks to: iFixit, Dutch aWEARness, and the Carrington Hotel

Rodin Genoff & Associates works internationally in Europe, Asia, Australia, New Zealand, South Africa, North America and the Middle East. We provide the following services: Creating Business Networks and Joint Venture Programme; Cluster + Business Opportunity Mapping; Cluster Training Programmes; Over the Horizon and Strategic Planning Workshops