

When Green Technology Works: Applying the Right Technology for your Business

Attendee Handbook 2011

Sydney – 9 August

Melbourne – 16 August

Adelaide – 18 August

August 2011

Enterprise Connect

Enterprise Connect is a \$50 million a year Australian Government initiative that provides support to eligible Australian small and medium sized businesses. Core services include a Business Review for eligible businesses at no charge to firms and grant assistance to implement recommendations flowing from the Business Review. For more information visit www.enterpriseconnect.gov.au or call the Hotline on 131 791.

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Agenda

Start Time	Activity	Delivered by	Deliverable
1:30	Welcome, Introduction & Overview	ACT	An understanding of the benefits of adopting cleantech solutions into their business in terms of both resource efficiency and adapting to the needs of their customers.
2:00	The Business Case for Sustainability	2XE	An understanding of how market, regulatory and society demands for sustainable practices is creating tangible business opportunities for improved operational efficiency and enhanced competitive advantage in their relevant industry sectors
2:30	Introduction to Resource Balance Assessment Tools	ACT	Practical tools to assist the companies to assess the benefits of cleantech solutions and decide what solutions are best for them and what the pay back periods will be.
3:00	Afternoon Tea and Facilitated Networking	2XE	An opportunity to discuss with other companies what solutions they have considered
3:30	Case Studies A variety of case studies presented both by the facilitators and the specific Case Study presenters for each event	Local Business	Real life examples and case studies of how other similar businesses have increased their resilience and improved profits through adopting cleantech solutions.
5:00	Future Engagement Options and Summary	ACT	Ways of connecting with potential solution providers and to gain further ongoing knowledge of potential solutions.
5:30	Networking Drinks with Facilitated Engagement with Cleantech Industry Solution Providers	ACT	An opportunity to network and engage with cleantech service providers to investigate options for their businesses
7:30	Event Finishes		

Speaker Profiles

Facilitators

John O'Brien, Managing Director Australian CleanTech

John has advised numerous organisations on how to improve profitability and efficiency through the use of cleantech solutions. He also provides advice to companies of growth strategies and operational efficiency. John's background as an engineer and operational manager supported by years of successful strategic consulting provides a wealth knowledge and experience.



John facilitates the Adelaide and Sydney Cleantech Networks and publishes both the Australian Cleantech Index and the annual Australian Cleantech Review. He also lectures in Leadership and Entrepreneurship at the University of Adelaide and is a member of the SA Premier's Climate Change Council. He is on the board of companies involved in wind farms, biosensors and plastics recycling in Quanzhou, China.

In 2009, he published a collection of essays titled *Opportunities Beyond Carbon (MUP)*, which seeks to refocus the climate debate towards its many opportunities.

He has engineering degrees from the University of Oxford and Trinity College, Dublin and an MBA from the University of Adelaide.

Australian CleanTech is an advisory firm to cleantech companies, investors and governments. It works across Australia, Malaysia, China and Korea.

Nick Palousis, Managing Director, 2XE

Nick's high-energy approach is fueled by a passion for proving that we can do well by doing good. A mechatronic engineer and mathematical scientist by background, Nick has spent almost a decade working with companies, governments, not-for-profits and entrepreneurs in Australia and around the world to define and realise the business case for sustainable practices.



Nick's current focus is in helping his clients grow, compete and succeed in the market through implementing sustainability as a business strategy. Working both at the corporate level and on major capital projects, Nick has worked with a variety of client projects in the Agribusiness, Automotive, Finance, Infrastructure, Insurance, Investment, Manufacturing, Oil & Gas, Property, State Government and Urban Development sectors.

Case Study Presenters

Sydney

- **David Fuller, Focus Press** has taken a 10 year journey to reduce its environmental impact and deliver improved financial performance. This has included a 75% reduction in water and the virtual elimination of waste. David will speak of this journey and the key people and technology related successes and hurdles.
- **David Rawlinson, Ontera Modular Carpets** has reduced power and water consumption by 40% over 5 years and reduced waste by 25%. This has been achieved through a mixture of behaviour change, process improvements, technology implementation, recycling and understanding life cycle analyses.



Adelaide

- **Russell Johnstone, Orlando Wines** on investing in renewable energy for the Jacob's Creek Visitors Centre and upgrading 'building management systems' to drive reduced energy consumption. Russell will talk about the challenge for manufacturing businesses to transition to more efficient production systems.
- **Jennifer Baile, CEO, Bowden Printing** on the company's sustainability journey and how, through adopting ISO14001 certification, it has decreased costs and increased profits and branding by reducing energy consumption, managing material usage and waste, eliminating chemical usage and recycling.
- **Marcus Keller, Zen Commercial** on effective ways of reducing electricity costs and some 'rules of thumb' on how to choose right renewable energy technology for your business.



Melbourne

- **Dexter Clarke, Futuris Automotive** - a leading Australian manufacturer is reducing its carbon footprint and increasing profits. Futuris is actively changing the way they run their operations to use less energy and produce less waste. In addition, Futuris is adapting its existing resources to secure new cleantech revenues from products such as energy efficient consumer products and CPV solar systems.



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6	Opportunities Beyond Carbon – The Cleantech Opportunity	John O'Brien

Article 1 - Green Benefits for all Businesses

John O'Brien, Australian CleanTech

Many businesses might assume that sustainability, emissions and cleantech are issues for only big corporates and that they do not have time to worry about these 'nice-to-haves'. Small and Medium Enterprises (SMEs) are usually so focussed on ensuring sales, keeping costs down and chasing cash flows that, regardless of personal persuasions, keeping the company afloat rates a long way above saving the environment.

These views are exasperated by two types of media coverage of climate change: the no-hope horror stories inciting paralysing terror; and the 'happy ever after thanks to science' approach offering an effortless solution.

The continual coverage of melting ice sheets, sea level rises, droughts, severe storms and crop failures is essential in providing a context for debate on climate change. However, the tone is often so cataclysmic, so intent on relishing predictions of upcoming disasters, that many people are left with the defeatist attitude 'We have passed the tipping point rendering all action pointless'.

Stories of wonderful 'silver bullet' inventions that will 'solve' the climate change problem are equally as damaging. Tales of genetically modified carbon-munching trees, or dumping iron filings into the ocean allow the listeners to relax and dismiss cautionary news. To those accepting such stories, the problem appears insignificant in the face of man's scientific innovation.

However, if done well, 'green' activities can save money and increase sales for all companies. It does not need to be an extra task needing more management time but rather an excuse to review the business plan and position the company ahead of its competitors and ready for future growth.

There are many people offering to do 'emissions audits' and to provide carbon offsets, and these have their place. Much greater value can be secured however by a business assessing its strategies before adopting the quick fix (and extra costs) of carbon offsets. There are two key aspects of a business, whether it produces goods or services, that will drive the greatest increase in the bottom line.

Firstly, how can processes be changed to reduce waste and therefore increase efficiency? The waste may be measured in terms of input materials, consumables, utilities (power and water) and even human resources. The solutions might involve installing new equipment, streamlining approvals processes or recycling waste back into the start of the process. For all the inputs and outputs of a business, whatever it may produce, a balance can be drawn up to show what creates value and what creates waste. Waste streams can then either be reduced or beneficially used.

Waste is just a resource to which insufficient imagination has been applied. Once the waste streams are understood then some imagination and innovation can be applied to utilise and create value from some of these resources. These solutions often need external technical and business process advice to overcome the problem of managers 'not knowing what they don't know'.

Secondly, business must look outwards to see what changes are occurring to their business environment. Most importantly, an understanding of how its clients' needs are changing. Large corporates are starting to look at the supply chain emissions of multiple inputs, Governments want to be seen to be procuring sustainably, hotels are assessing the environmental footprint of their menus and householders are increasingly buying 'green'. If a company does not anticipate these changes, it will lose market share. If it continues to ignore them, it will go broke. By moving early, however, it is possible to gain customers and move ahead of competitors.

Over time, sustainability and climate change will change every aspect of how our communities work. This change presents huge opportunities for those willing to grab them. Opportunities to both improve their internal processes and to anticipate the changing needs of their customers. Those that do not evolve and are focussed only on the problems will find themselves left well behind. Which will you choose to be?

This article was first published in Environmental Management News in July 2009

Article 2 - Financial Case around Sustainability

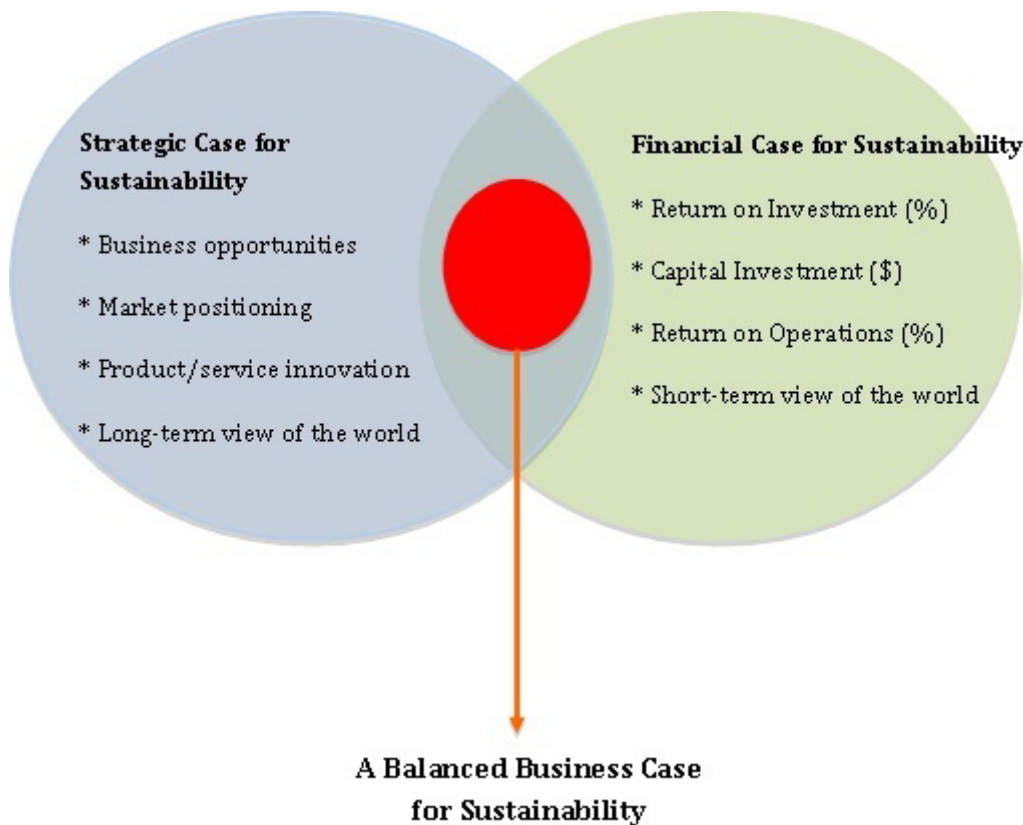
Nick Palousis, 2XE

While SMEs recognise the numerous benefits that can be gained through adopting sustainable practices, one of the biggest hurdles to converting this interest into action involves dealing with the short-term financial pressures of both running and growing a business. At any one time, SMEs may be facing one or more of the following financial challenges:

- Managing cash flow
- Increasing revenues
- Creating a point of difference in the market
- Reducing costs/overheads
- Managing demand/growth spurts
- Avoiding liabilities and compliance issues
- Improving staff morale and productivity
- Obtaining financial capital to invest in growth
- Increasing the value of the business to sell it.

These financial issues are a hard reality for most SMEs and can affect the decision process on implementing sustainable business practices very difficult, despite the powerful business opportunities that they may present. For example, funding the development of a new 'eco-friendly' product range may create opportunities to access new markets and offer longer-term revenue growth options; but the upfront cost may be too prohibitive for an SME to handle in the short-term. Yet still, without innovation and trying to access new markets, SMEs may ultimately find themselves squeezed out of their market from fresh competition. It's a classic 'Catch 22' situation – do we make long-term decisions that run the risk of impacting short-term business performance, or do we focus only on the short-term and put the business at risk of survival in the long-term?

To overcome this stalemate and have the best of both worlds, businesses need to bring together both the 'strategic case' and 'financial case' to assess the viability of any sustainability 'go/no-go' decision (Figure 1). By doing this, an SME can use a balanced 'business case for sustainability' that enables them to make sound decisions on funding initiatives that are both financially viable in the short-term and beneficial for the business in the long-term.



The ‘Strategic Case’ assesses the sustainability initiative for its ability to help the business realise business opportunities and benefits based on its current position in the market – it could be cost savings from resource efficiency, increased sales through branding/marketing opportunities, innovations in products/services etc. (For more information on strategic drivers for sustainable business, refer to the Business Sustainability Alliance’s Good Business Guide. The Strategic Case tests the extent of the ‘business opportunity’ that is created by the sustainability initiative.

The ‘Financial Case’ tests the financial rigour and profitability of the business opportunity that has been identified in the Strategic Case. There are a number metrics that can be used to create a sound financial case for any business decision – one of the most common every-day metrics is the Return On Investment (ROI) formula:

$$ROI(\%) = \frac{InvestmentGain - InvestmentCost}{InvestmentCost} \times 100$$

ROI can be used to assess the profitability of sustainable business practices, however the ‘Investment Gain’ (Return) and ‘Investment Cost’ (Investment) elements of the equation need to be further elaborated in order to make a fully informed decision on whether a proposed initiative (e.g. a new energy-efficient technology or cleantech product commercialisation) is good for the business. This is because implementing sustainable business practices usually yields multiple benefits/gains to the business; some of which aren’t usually anticipated and picked up by typical ROI analyses that only measure one type of ‘return’ and ‘investment’. For example, implementing energy efficiency improvements in a manufacturing business may

yield annual cost savings, but additionally the result may be further used to market the company's sustainability credentials (provided the market puts a value on this) to increase revenue and reduce risk exposure to future energy cost hikes due to projected price increases. The 'Investment Gain' can therefore be more than just dollars saved – it's potential dollars earned through marketing and future costs avoided through reducing risk exposure. Table 1 below outlines some different ways in which the Investment Gain component of the ROI equation can be estimated:

Table 1. Investment Gain Type and examples

Gain Type:	Example. Through money spent in conducting an initial energy efficiency audit:
Money saved	Cost savings identified (\$ per year)
Money earned	Using efficiency practices/case study to support marketing differentiation and support revenue/sales (\$ in sales)
Costs avoided	Future energy- and carbon-related costs avoided (\$ per year)
Funds attracted	Grant funds obtained (based on results of initial audit) from State/Federal Government sources to implement new processes to improve productivity (\$)

By recognising that sustainability initiatives usually create multiple benefits, businesses can determine the financial benefit of any decision-making on sustainability in a number of ways to make the business case stack-up. However we must also be wary of what investment we're making in the initiative to make it happen; many businesses understand this to be just the money spent for implementation, but not many consider the time, effort and other costs that go into the initiative beyond the straightforward investment of money. Consider some other ways in which the Investment Cost component of the ROI equation can be estimated (Table 2):

Table 2. Investment Cost Type and examples

Cost Type:	Example. Through money spent in conducting an initial energy efficiency audit:
Money spent	Money invested to conduct the audit and/or install more efficient equipment and metering (\$)
Time spent	Internal resources used during the auditing process, including potential 'headspace' required by the Managing Director (\$ calculated in staff hours x staff \$/hr)
Opportunity cost incurred	The revenue or cost-reductions foregone by not investing the money (used to conduct the audit) into a different initiative or equipment (e.g. a customer relationship management system, or giving high-performing staff a pay-rise).

By calculating ROI using different estimates for 'Return' and 'Investment', the business can make a more realistic assessment of the costs and benefits associated with a particular sustainability initiative, and hence a more robust 'Business Case for Sustainability' that brings the 'good idea' and the financial rigour together to create a successful outcome for the business.

Other metrics and procedures for creating a useful financial case for sustainable business practices is covered in the BSA's upcoming workshop *Financial Case for Sustainability*.

Next month: '**Resource Efficiency – The Enabler of Business Transformation**'. Next month's article will highlight how efficiency initiatives can be leveraged to increase profitability beyond just the direct cost savings.

To find out more about sustainable business practices and how your business can leverage real value business returns from sustainable and resource efficient practices, contact the Business Sustainability Alliance at bsa@innovatesa.com.au or visit the website www.innovatesa.com.au/bsa

This article was produced by **Nick Palousis, Managing Director, 2xE**. 2xE is a South Australian-owned specialist business consulting team, delivering smart and practical resource efficiency and sustainability solutions for SMEs and urban development projects. Contact nick@2xe.com.au

Article 3 - Setting the Record Straight: What is 'Sustainable Business Practice'?

What is a 'sustainable business'? A quick Internet search will reveal at least 50 different interpretations. It's no surprise that businesses are confused by what 'sustainability' is and how it stands to benefit them.

We need to cut through the noise and get to the heart of what 'sustainable business' really does mean – to do this we need to understand why the world began talking about sustainability in the first place. Since 1972* we became aware of the impact western economic growth was having on the world's natural resources our civilization needs to survive -- water, oil, forests, foods, minerals/metals, and other valuable services provided by our ecosystems such as clean air and soil.

In recent times we have come to accept an inconvenient truth -- we as a human species have exceeded the Earth's 'credit threshold' of resource consumption – and we're now in serious debt. And to correct this situation, sustainable economic development must begin, which *"meets the needs of the present without compromising future generations to meet their own needs."***

Today, most sections of government, civil society and industry across Australia and internationally are participating in what many now call The Next Industrial Revolution. Economic powerhouses such as China and South Korea are investing heavily in infrastructure and industry development that decouples their economic growth from resource consumption. New market developments such as placing a price on carbon will come into effect in the next five years. And influential business-backed organisations such as the World Economic Forum are heavily advocating the business case for sustainable resource consumption and the industry response to climate change.***

So what about South Australia? What is the role of local business in creating a sustainable economy and how can we identify when a business is serious about it?

The role of SA business is straightforward. The purpose of business is to make money through satisfying a need in the market. A business that doesn't make a profit isn't a business – it's in serious financial trouble. A sustainable business is no different to any traditional business in this regard – cashflow is king, especially for Small-to-Medium Enterprises. The key difference however is that now business will need to manage its environmental and social performance, as well as the usual dollars and cents. This may seem like yet more work for those of us who are busy enough as it is. But done the right way, environmental and social practices will add benefit (not impost) to the business and improve its financial performance.

A sustainable business is therefore one that meets its short-term needs (profitability, satisfaction to consumers, employment) without compromising the long-term needs and wellbeing of our economy, environment and society.

*UN Conference on the Human Environment, Stockholm, 1972.

**Brundtland Report, Our Common Future, UNCED, 1987.

***World Economic Forum, The Consumption Dilemma report submitted to Davos 2011.

So what characterises a sustainable business? Here are a few key traits:

1. Mindset -- recognising that ‘sustainability’ and making money are not in conflict. First a business needs to take comfort in knowing that adopting sustainable business practices DOES NOT mean foregoing profit ‘for the greater good’. A business is no use to anyone when it’s insolvent – any decision that puts the company in jeopardy is not ‘sustainable business practice’. But neither is a business that consumes resources and emits pollution at unsustainable rates. These kinds of practices creates an unhealthy dependency on dwindling, price-hiking resources, which only puts the business at risk. Sustainable business practice is about securing short- and long-term profitability for your business, without the unnecessary consumption of, or impact on, our natural resources and environment that both society and business relies upon for survival.

2. Operations -- looking inward and adopt efficiency improvements. Many businesses already recognise the value of improving the efficiency of their operations – such practices save money through reducing the amount of labour, materials, energy, water and time it takes to deliver products or services to the market. Done correctly, these efficiency practices lead to greater business profitability, better management of staff and a reduced environmental footprint. However many companies ‘pick the low hanging fruit’ and stop, resulting in business operations that are ‘a little less bad’. The bigger rewards remain for those businesses adopting a culture of continuous improvement, constantly on the lookout for new ways to do more-with-less. And the more you look, the more you’ll find.

3. Market Offering -- looking outward and explore more effective products and services. If ‘efficiency’ is about looking inward to improve existing business operations, ‘effectiveness’ is about looking outwards to the market and exploring new business models, products and service offerings that achieve step-change improvements in the economic, environmental and social performance to both the business and the consumer. If businesses feel that they have squeezed out all they can from the business through energy, water and materials and process efficiency improvements, the next step is to look at more effective ways of satisfying the market need without unnecessary resource consumption or environmental impact. This may seem constraining, but many businesses are using these constraints to their advantage, innovating new products or services that deliver superior performance (e.g. quality, durability, serviceability, value-for money etc.). The end result is that everyone wins – business improves its competitive advantage through a superior offering to the market, consumers get better value for money, and the environment wins through reduced resource consumption by both business and the customer.

4. Responsibility -- acting in the best interests of current and future generations. We’re all aware of how challenging it can be for an SME focused on survival and managing growth. To think about anything else but where the next dollar is coming from can be a big step. But the reality is that both the community and government are looking for leadership from business to create a sustainable future economy. And so they should; businesses and markets are the most efficient and effective distributors of solutions to the world. Businesses therefore need to recognise the important role they play, beyond just making money, in taking responsibility to act in the best interests of the community, now and for future generations to come.

This article was produced by Nick Palousis, Managing Director, 2xE. 2xE is a South Australian-owned specialist business consulting team, delivering smart and practical resource efficiency and sustainability solutions for SMEs and urban development projects. Contact nick@2xe.com.au

Article 4 - Sustainable Practices - The Cost of Inaction

Most businesses are increasingly recognising the role they can play in facilitating the transition to a low carbon and low resource economy by reducing their environmental footprint, improving productivity and developing innovative products and services.

But despite this awareness, only a fraction of these businesses are taking steps to seriously implement sustainable business practices. Instead many companies select one of the 'Top 5' excuses that keep them from acting:

1. "It's just a fad."
2. "It costs too much."
3. "Customers don't ask for it."
4. "It can wait till next year."
5. "I don't know where to find help."

Business needs to realise that such excuses are only delaying the inevitable and therefore placing themselves at significant business risk. In this article, we dig a little deeper to debunk each excuse and provide evidence to demonstrate that the cost of inaction is now too big to ignore.

Excuse #1: "It's just a fad."

Fads get really popular for a short amount of time and then die. In contrast, the cleantech and sustainable industries markets have been growing steeply since 2005 and show no sign of slowing down. Leading economies (and major export destinations for Australia) are investing heavily in transitioning their economies for a low carbon and low resource future – China is adopting an ambitious sustainability agenda in its 12th 5-Year Plan (2011-2015)[1], and South Korea are spending US\$84billion over 5 years to promote cleantech growth[2]. And almost every major economy in the world is trialling some kind of carbon pricing mechanism, so it seems that a price on carbon is inevitable.

Smart and prudent investors like Warren Buffet are investing heavily in cleantech businesses that have proven themselves as potential market leaders[3] and conservative technology companies such as Siemens have used global cleantech demand to drive strong revenue growth in recent years.[4] In 2009 high-end auto company BMW announced their exit from Formula 1 to re-focus investment into "sustainability and environmental compatibility".[5] Market players like these don't invest this much into a fad – they go for opportunities with a high probability of success. And, as with every new technology that's shaped our economic landscape over the last 100 years, the sustainable practices and obligations adopted by the big international companies will filter down to SMEs as a new standard of business practice.

Excuse #2: "It costs too much."

Any bad business decision is usually costly – those businesses that think 'sustainability costs instead of pays' have either experienced firsthand or witnessed a business adopting a sustainability initiative without a sound business case behind it. Reducing a company's environmental footprint without understanding how it would generate value for the business will almost certainly cost the business. Contrast this with companies like Toop & Toop, a well-known local real estate company, who recently developed their own intelligent system for improving their property management business. They knew that although investing in the new system would require upfront investment, the cumulative savings in resources and time would mean the system would more than pay for itself in 12 months. The result – a 371% increase in

productivity, a total reduction in operational costs (fuel, paper, energy, admin) of \$170,000 per year, a growth in revenue of 21% and carbon footprint reduction of 25% from fuel. As this example describes, sustainable business practices can create numerous benefits for the business that can't be captured using a simple Return On Investment formula. If implemented correctly, sustainable business practices result in businesses that are more efficient, higher performing, more resilient and better recognised and respected in the market – some of these benefits can't obviously be measured, but are super-critical to the success of the business.

Excuse #3: “Customers don't ask for it.”

When customers go to Foodland to buy some milk, they don't (usually) go looking for 'green milk'. With exception to the enlightened 'green' customer, the average customer is only interested in obtaining a product service at the right price and quality to satisfy their needs. Take Good Life Pizza, a local business that specialises in making gourmet organic pizzas. They have achieved huge growth in recent years and received the 'Best Pizzas Award' every year for the last 7 years.⁶ Most customers willingly pay a premium for the pizzas because they taste so good – the fact that they're marketed 'organic' just helps them validate their decision. But the reason why they taste so good is because of the organic produce, healthy recipes and other sustainable practices used in production – Good Life Pizza have figured out how to make sustainable = quality = premium = profitability. This examples shows that creating a 'sustainable product or service' isn't about making it at lower quality, higher cost or dropping it into a bucket of green paint. It's about making goods and services at the same or better quality, at the same or less cost, to yield a more profitable outcome for the business and better value for the customer, with a lighter footprint on the environment.

Excuse #4: “It can wait till next year.”

Many SMEs are flat out 365 days of the year, either servicing work or making next month's financial target. Anything that doesn't meet these immediate objectives is put on the backburner. Many know how important sustainable business practices are to their business – they just prefer to wait until it is absolutely critical to do anything about it. What many businesses don't realise is that adopting sustainable business practices the cost-effectively way takes (at least) a 2 year transition period. And with rising energy and water prices, and the real possibility of a carbon tax hitting the economy over the next 1-3 years, it is very important for businesses to start preparing as soon as possible.

Excuse #5: “I don't know where to find help.”

It's a valid excuse – the market is currently inundated with all sorts of solutions, products and services to help businesses improve their efficiency and sustainability, it's hard to know who or what to trust. The good news is that **Innovate SA** and **Zero Waste SA** have figured this all out for you; through the Business Sustainability Alliance they have established an expert panel of service providers and heap of funded programs aimed to help businesses identify and implement sustainable business practices – check out <http://www.innovatesa.com.au/bsa> for more information.

[1] <http://sustainablecitiescollective.com/commoncurrent/18098/chinas-new-national-plan-green-necessity>

[2] <http://cleantech.com/news/5672/report-rise-cleantech-south-korea>

[3] <http://www.businessinsider.com/the-real-reason-warren-buffett-invested-in-byd-auto-2011-1>

[4] <http://electric-vehicles-cars-bikes.blogspot.com/2011/01/clean-tech-at-heart-of-siemens-record.html>

[5] <http://www.guardian.co.uk/sport/2009/jul/29/bmw-formula-one-withdraw>

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Opportunities Beyond Carbon

Edited by John O'Brien



MELBOURNE
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Foreword

Professor Sir David King

As the colonists of North America extended their fingers west towards the Pacific and east to the Atlantic, that huge expanse of untamed territory became known as the land of opportunity. Land was plentiful and free for a while, but by 1900—even before the Union was complete—there was no land left to claim; it was already owned by someone.

Australia is more than three-quarters the size of the United States but, unlike North America, still has vast areas of hostile and unclaimed wilderness. It also boasts huge natural resources—not least solar power and other renewable energy sources. With climate change now the greatest threat we face, and with carbon cuts worldwide the greatest challenge we have ever been set, Australia has become the new land of opportunity.

There can never have been a more apt time to publish *Opportunities Beyond Carbon*. This year has seen the worst wildfires in Australia for more than 100 years—in Victoria—while floods have devastated land and livelihoods in New South Wales, Western Australia and Queensland.

More than 200 people died in Victoria, and at one stage more than 60 per cent of Queensland was under water, the floods lasting



for over a month and costing more than \$200 million. Climate change could well have been a significant factor in these tragic and costly disasters.

Prime Minister Kevin Rudd came to power in 2007 on a wave of brave manifestos and pledges. Among them was the promise to make his country do its bit to tackle climate change. One of the first things he did was to sign the Kyoto treaty, binding Australia to greenhouse-gas cuts. Most developed countries had long since signed, and Australia, and even more significantly the United States, had stood out among those nations still sticking their heads in the sand.

But lifting its head must only be the start for Australia, and Mr Rudd is under pressure to toughen his government's policies on climate change, not least to try to prevent any repeats the disasters Australia suffered earlier this year.

And that is where Australia can seize perhaps its greatest opportunity. The world's toughest problem ever could be, as Stewart Taggart says in his essay, the best crisis Australia ever had.

It is the developing countries that will suffer first from the impacts of climate change; some already are. In global terms, some of them are not that far from the Australian coast. All 10 000 residents of the Tuvalu islands and atolls, midway between Australia and Hawaii, are at risk as sea levels rise. And two of the thirty-three islands of Kiribati, also in the Pacific, have already gone under, while others were flooded so badly in 2005 that farmland was destroyed, wells contaminated with sea water and homes and a hospital inundated.

Opportunities Beyond Carbon points out that Australia, a much richer nation, is equally ripe for damage. Its dry climate and delicate coastline mean it will suffer more, and more quickly, than other developed countries.

This book rightly suggests that businesses that take on board those threats, and grab the opportunities climate change presents, could become industry leaders. Those that do not will be left behind.

The credit crunch could hamper plans to invest in renewables and other large-scale carbon-saving measures. In Britain, plans for large wind farms are at risk because of local planning difficulties. At the same time, there is relatively little government backing for carbon storage from coal burning despite coal being perhaps the cheapest

and most widely available energy source. No industry will invest without the backing of confident and determined government and a good policy on carbon-dioxide pricing.

And so back to Australia, which can steal a march on the Poms by forging ahead with renewable developments. Australia emits just 1.2 per cent of the world's carbon, according to data used in Monica Oliphant's essay. Yet Monica also shows that 90 per cent of the globe's 205 countries emit fewer emissions than Australia.

We are all obliged to act—not least Australia—and *Opportunities Beyond Carbon* shows how Australia can do its bit to slow climate change by becoming a major exporter of clean-energy technology. If Australia does this, we may become the new land of opportunity.

Introduction

By John O'Brien

This is an unashamedly optimistic book. It aims to serve as an antidote to the two contrasting types of mainstream coverage of climate change: the no-hope horror stories inciting paralysing terror, and the 'happy ever after thanks to science' approach offering an effortless solution.

The continual coverage of melting ice sheets, rising sea levels, droughts, severe storms and crop failures is essential in providing a context for debate on climate change. Such stories make climate change real to the general public and highlight the importance of tackling it. However, the tone is often so cataclysmic, so intent on relishing predictions of upcoming disasters, that many people are left with a defeatist attitude. In this light, the problem appears too big and too far advanced. It seems as if we have passed the tipping-point, rendering all action pointless.

Stories of wonderful inventions and developments that will 'solve' the climate-change problem are equally as damaging to the prospect of securing a better world. They allow their recipients to relax and dismiss cautionary news and opinion. To those accepting such stories, the problem appears insignificant in the face of mankind's scientific innovation. It seems that no additional action is required.

This book takes a very different approach to the issue. A world 'beyond carbon' is not a lost cause, nor is climate change something that can be solved by a scientific silver bullet. Progress will only be truly achieved once entire communities—local, national and global—change their behaviours and adopt different ways of living. All communities need to implement changes now that will ensure avoidance of the most dire predictions of scientists. This is the negative aspect of climate change: alter behaviours or perish. Surprisingly perhaps, there is also a positive side. Climate change presents a unique opportunity for the introduction of behaviours, systems and technologies able to improve all aspects of life on Earth.

Changes to atmospheric constituent proportions and the Earth's physical attributes are not the only problems we face. There are many other aspects of human life, in both richer and poorer nations, that are far from optimum. In rich countries, increased wealth does not appear to correlate with increased happiness, bringing instead a general desire for bigger houses, more cars and more gadgets. In poorer countries, particularly, the attraction of urban communities with their promise of riches has led to an exodus from country areas, although the transition often fails to result in a better life. As the world community is going to make changes to its fundamental way of operating in order to reduce emissions—changes that will impact every activity and every choice—it would be foolish to ignore the opportunity to improve other outcomes as well.

Representatives of all communities including governments, businesses, investor groups and industry networks should be asking themselves not simply, 'How do we reduce emissions?' but rather 'What changes might we make in our community to provide the greatest opportunities to improve both our physical and social environments?'

The advantages of this broader approach may be seen when considering a theoretical review of one city's vehicle emissions. When confronted with reducing such emissions, the relevant community faces change of some sort. A relatively quick and easy 'solution' would seem to be the creation of bus lanes throughout the city and its suburbs. Yet the need for change presents an ideal opportunity for the community and its leaders to question the whole structure of the environment in which they live. Is it easy and pleasant to walk or

bike ride within and between suburbs? If not, what can be done to make it so? Town-planning philosophies that design suburbs that exclude industrial areas force residents to travel long distances to work—is it possible to create jobs nearer housing or vice versa? How might the urban transport system as a whole be a positive influence in strengthening the community? It does not take much imagination to see how the implementation of projects answering each question may result in both optimum emissions reduction and a healthier, happier, stronger and more connected community.

Much benefit would be achieved if policy-makers created means of empowering their constituents, allowing innovation and the production of local solutions to local problems, and thereby enhancing social capital while protecting the environment.

Once mankind's contribution to climate change is accepted, the first step for many communities is a discussion on the means by which greenhouse-gas emissions can be discouraged. The main options are taxes, trading systems and regulations. Throughout the world this discussion has become a long, often hysterical, debate highlighting the complexity involved in introducing change to any community.

Vested interests abound. In Australia, Europe and the United States, emissions-intensive industries have threatened mass redundancies, relocation of activities to 'emissions friendly' countries and blackouts as a result of the closure of local coal-fired power stations. Yet there are some positive incentives that could be introduced to help companies make responsible decisions and to get positive publicity for doing 'the right thing'. For example, could emissions-intensive trade-exposed companies be awarded a Government or United Nations sponsored ERTEC (Environmentally Responsible Trade Exposed Company) tick?

Even if granted concessions, coal-fired power stations and other emissions-intensive operations are unlikely to be operational a few decades from today. Even so, their owners will understandably fight hard to retain profits for as long as possible. Those backing renewable energy counter, pushing hard for mandatory targets to enable earlier, larger profits for themselves. Looking back from 2100, all these claims will be seen for their exaggerated nature.

Many scientists have focused far ahead and are scared by what they have seen. It is, however, not their role to implement solutions that encompass environmental, social and economic benefits. It is the legislators who face the challenge of balancing short-term fears and frequent elections with long-term goals and exciting opportunities. All too often the general public's short-term fears, fuelled by those with vested interests in the status quo, necessitate the acceptance of slow progress. To those who wish to move forward at a faster rate, the legislators say that such gradual change is preferable to the only practicable alternative: no change at all.

Maybe it is possible for a government to have the courage to build a long-term vision of how a carbon-constrained economy will emerge. This could reframe the whole discussion over the transition to a lower carbon economy away from increased costs and job losses to one of green-collar job creation, economic development and more sustainable communities.

By building up a profile of what technologies will come to maturity at what stage over the next twenty to thirty years, it would be possible to target these technologies—and indeed specific global companies—and build a strategy for attracting them to Australia. If this vision were built up effectively, it could provide a foundation for the country's prosperity for decades. It might also be hailed as a world-leading strategy on how to build an economy of the future.

However, we have seen that the relatively simple task of pricing the externality of emissions has proved extremely problematic. Can we really hope that the broader approach to climate change, focusing on opportunity rather than fear, will be adopted by the global community? Despite being a relatively new concept, many groups throughout the world have recognised that alterations made inevitable by change are now creating opportunities to achieve multiple benefits.

It is only by taking a wider view that the best solution may be allowed to emerge. Allowing the solution to *emerge* is an important emphasis. A 'silver bullet' solution to the problem may appear in many forms, but is always nothing but a mirage. Carbon capture and storage is heralded as the complete answer by many (particularly those with investments in coal). Wind power is touted as the solution by turbine manufacturers. Some have even espoused that the growing

of genetically modified carbon-munching trees is the only alteration required to beat climate change. The total world system, combining global climate and human behaviour, is far more complex than allowed for by such approaches. A simple linear solution, one that encompasses only one dimension, will not provide *the* complete answer to environmental issues, let alone concurrently address social improvements.

In addition, the complexity involved means that it is impossible to design an optimum solution at any one point in time. We must therefore be prepared to observe and act on feedback and adopt an iterative approach to improving the world. This will frustrate those with a clear vision of what the world *should* or *must* look like, will be highly disconcerting to traditional leaders who have achieved their successes via 'set and forget' strategies, and may prove problematic for politicians with election promises to uphold.

So how do we approach this multi-faceted problem that requires the behavioural change of over six billion people? How do we approach climate change so that we secure opportunities to correct social defects as well as environmental ones?

The fact that the problem of mankind's contribution to climate change is even more complex, more global and more demanding of widespread change than any problem faced to date, is a wonderful chance to fundamentally alter the way in which we, individually, locally, nationally and globally, respond. It is not about assembling highly skilled task forces to 'knock over' the issue. Rather, it is about putting in place mechanisms that enable communities at all levels to deliver their own local benefits and systems. The bravest leaders will be those who inspire and enable change that allows millions of local heroes, all delivering a small part of the ever-evolving and improving response.

Simple changes in philosophy can produce multiple benefits. Utility infrastructure, for example, has traditionally been developed using economics as a guide. Pure economics dictates that it would be inefficient to have two power-distribution wires or water-distribution pipes running in the same street, and thus natural monopolies have emerged. However, greater system-wide benefits could be achieved if communities were encouraged to establish local energy and water hubs distributing through their own networks. Stormwater capture

and distribution as proposed in Adelaide, Australia, or distributed power generation as implemented in Woking, England, present examples of new, simple, local projects with multiple benefits. Each of these will threaten entrenched interests and are disruptive business models, so will meet with resistance. But each also presents an opportunity for improved community and environmental outcomes.

I believe that through the adoption of the broad approach advocated above, fears associated with climate change will be abated and the many opportunities present at this time will be realised. In initiating this project, I wanted to assemble a collection of stories that sparked new ideas and discussion across a wide section of the community. Additionally I felt the need to create a general feeling of opportunity rather than the pervasive doom that appears to grow with each new scientific report. I was concerned that, without such optimism, 'climate fatigue' would be inevitable.

It is important to recognise that every generation perceives itself as facing the world's greatest challenge. In the past, those discovering continents, meeting new tribes, fighting wars or changing social mores have all believed that they have, in some way, saved mankind. Many in the climate debate would have us believe that never before have we faced such a crisis and that, further, they alone have the means to save us. There can be no doubt that climate change presents the world and its communities with many challenges, yet the apocalyptic future described by some inspires nothing but defeatism. This is no Armageddon between emissions-emitters and greenies! Neither is this a situation that can be adequately responded to by one line of attack alone. Communities around the world must be encouraged to develop an approach that allows for a new way forward, individually and as one.

Recognising the enormity and complexity of the changes required, this book sets forth a wide variety of wonderful and extremely important ideas and concepts, yet does not seek to specify any one 'solution'. By necessity, the response will be ever-emerging and evolving. It is hoped, however, that this book inspires thought about climate change and proves to be a step in the iterative process towards building a world where people can live sustainably.

My own thinking on the climate-change problem, on how we may best approach it and what opportunities it creates for the

communities, businesses, investors, nations and the entire world, has been aided by two analogies.

The analogy between climate change and the debate over cigarettes is being written about more frequently. I first encountered it in a column by Phillip Adams in the *Weekend Australian*. It gained much coverage in the fascinating and ground-breaking legal action being pursued by residents of the Alaskan town Kivalina, who have accused many emissions-intensive companies of conspiring to hide the truth behind the climate changes destroying their town. The legal team leading this case happens to be the one that successfully pursued certain cigarette companies over their alleged conspiracy to conceal the harmful effects of smoking.

The comparison between climate-change effects and diseases caused by cigarette smoking has been used by some to create powerful pictures of the 'evils' that may be engendered by big business. I, however, find it more useful to adopt the comparison when considering how scientific knowledge of the health impacts of smoking has been used to facilitate behavioural change. Tackling the problem of cigarette smoking required a range of inputs to achieve any level of success. A price signal was introduced, through increased taxes on cigarettes, together with comprehensive and targeted education campaigns. The positive outcomes achievable, such as living a longer and more enjoyable life, were stressed in addition to the negative consequences of inaction. Yet new approaches were required and more recently there have been regulations imposing bans on smoking in many places, further reinforcing the messages delivered earlier.

While the warnings against smoking were put in purely personal terms, communities too have benefited from a healthier population and reduced litter. Transitioning to a low-carbon economy is a far larger and more complex issue, but the multi-strand approach to the problems associated with cigarette smoking provides some clues as to the thinking required.

Another analogy that I find helpful is that of viewing the global community as the mind of the Earth. Much physical harm has been caused by its disturbed mental state and it is now necessary for the global community to undertake some self-reflection, explore its motivators and understand its true 'wants and needs'. Only then can it leave the past behind and move forward to a sustainable future. The

human mind is a complex beast that rarely reacts in a linear fashion, and the comparison may provide a powerful means of approaching the behavioural changes and altered mindsets needed to tackle the problem of climate change.

Indeed it does seem that the communities of the world must understand why they have behaved as they have done and must then envision what they want as a future. They must accept past mistakes as part of the journey, grieve for any losses, and provide themselves and others with the positive encouragement needed to create a different world. This book aims to enhance the process of encouraging communities to take bold steps and seize the opportunities that are emerging.

To be self-indulgent for a moment, I should like to add that this project forms part of my own personal journey. With a family background combining business entrepreneurship and social activism, and having been described by a university tutor as 'a charming under-achiever', I have had a life to date of limited risk-taking and safe achievement. However, I have always been an optimist, albeit not always one who has demonstrated great courage.

A number of factors combined in recent years encouraging me to push my boundaries a bit further and some of these factors are, I feel, relevant to the topic at hand. An understanding of the beauty of simple things and happiness derived from an appreciation of my beautiful wife and vibrant sons, contrasted with lessons learnt from experiencing negative role models in both my professional and personal lives, has allowed me to establish my own personal goals. The implementation of these has not always been easy, requiring more introspection than I am comfortable with. The development of these goals coincided with a reading of Tim Flannery's *The Weather Makers* followed by Ron Penrick and Clint Wilder's *The Clean Tech Revolution*. The world's climate problem was obviously serious and opportunities were plentiful for those willing to move away from the past.

My own vision of catastrophe came to me one evening when watching the documentary *Shake Hands with the Devil* by Canadian General Romeo Dallaire, the commander of the UN troops in Rwanda at the time of the 1994 genocide. I had recently finished a fiction book titled *The First Century After Beatrice* by Amin Maalouf that told the

tale of riots and devastation in poorer countries following the discovery and widespread global use of an Egyptian bean that, when taken by a prospective mother, would ensure that her baby would be born a male. Both these sources showed that even if global devastation does not initially impact upon richer countries, genocide and mass population movements resulting from widespread, climate change – induced crop failures would ultimately affect everyone.

The optimist in me dismissed this horror as an option that could not be permitted to happen. I strengthened my resolve to tell tales inspiring visions of the opportunities that are emerging and the positive differences that can be made by mobilising global behaviour change. The telling of such stories will need to be done by many. However, the insightful writing produced by the authors in this book is, I believe, an important contribution.

The book is divided into six sections with a number of essays by different authors in each section. The order of the sections provides a widening circle of inclusion, but each focuses on the opportunities that exist for various groups. It starts with essays that set the scene: a look at the urgency of climate-change issues; a view of the courage and depth required to find the right solution; an overview of technological solutions and a discussion on how a positive vision may best be communicated. Section 2 explores opportunities for communities and looks at ways in which improvements may be made to their design and operation, enhancing the lives of their inhabitants. The book then proceeds by examining the opportunities that exist for businesses, investors, nations and for the world as a whole.

This book is not intended to provide the reader with a complete solution to the problems created by climate change. I hope, however, that it poses some useful questions and initiates further discussion. Read it with an open mind and use it to develop your own view on the ways in which a better world may be built.

The Cleantech Opportunity

John O'Brien

The clean-technology sector will be the success story of the next twenty years. Its global revenue has grown exponentially over the last few years and this growth is forecast to continue for many years to come.

What is Cleantech?

On forming Australian CleanTech in early 2007, I was asked several times whether I would be cleaning carpets or curtains. Although an increasingly common term in the United States for several years, 'cleantech' has until recently been relatively unheard of in Australia. The use of the term has been increasing and I'm happy to say that I have not faced one recent query regarding the rejuvenation of soft furnishings.

But what exactly is 'cleantech' and why does the definition seem to change depending on where you look?

Guiding principles may be given in an attempt to define what cleantech is. An example is the following from the US firm Clean Edge who state what cleantech is 'A diverse range of products, services and processes that harness renewable materials and energy sources, dramatically reduce the use of natural resources and cut or eliminate emissions and wastes'.

Broadly, cleantech seems to encompass companies that have both environmental and economic benefits.

However, each individual is left to decide whether a particular industry sector fits within the spirit of cleantech as defined by such principles. Some organisations clearly state what they are and are not including in their definition, but then do not go on to explain how these decisions have been made.

The term 'cleantech' therefore tends to be a more amorphous industry group than, say, environmental services, and a less rigid investment-asset class than, say, financial services.

Sectors that appear to fit into the definition of cleantech without dispute include the following:

- Renewable energy—wind, solar thermal and photovoltaics, wave, tidal, hydro, geothermal, biomass and biogas;
- Water technologies that increase either water or energy efficiency;
- Energy efficiency, green buildings and biomaterials;
- Waste management and recycling;
- Energy storage and fuel-cell technologies;
- Low-emission vehicle technologies; and
- Environmental services.

Other sectors are controversial with some cleantech definitions including them within cleantech by reason of their environmental benefits, while others reject them because of insufficient positive environmental benefits or too many perceived negative impacts. Examples are set out below.

Biofuel

Biofuel is an emotive subject. Seen by some as the saviour to high oil prices and energy security issues, but by others as the cause of rising food prices, food riots and increasing monoculture. Research into cellulosic and algae-based biofuels, if successful, may remove many of the downsides of current technologies.

Carbon Trading

Carbon trading is clearly driving much of the investment behaviour in cleantech, but it is questionable whether the act of trading has any

direct environmental benefits. Through facilitating investment in environmentally-beneficial outcomes, it can, however, be seen as a key part of the cleantech chain that should be included.

'Clean' Fossil Fuels

'Clean' fossil fuels include natural gas, coal seam methane, underground coal gasification, gas to liquids, carbon capture and storage, and clean-coal technologies. These are often included in clean-energy indices and funds due to their reduced emissions profiles. However, despite the 'clean' tag, they remain fossil-fuel energy sources and are therefore, at best, only transition resources or technologies. Their inclusion in funds and indices have been highly advantageous in recent years with some stock prices in these sectors outperforming all others. A great example of this in Australia is the rise of the Coal Seam Methane (CSM) companies as the opportunity of Liquefied Natural Gas export using CSM reserves becomes more likely.

Nuclear Power

Nuclear power, along with its associated uranium production and treatment, clearly has a lower emissions profile than the fossil-fuel equivalent. The nuclear industry is highly likely to form part of the long-term global solution to climate change. However, deep concerns remain over the environmental and social impacts of uranium transport, usage and waste storage. There are arguments that the best place in the world for a nuclear power plant is at Roxby Downs, with its massive reserves, stable geology for waste storage and minimum transport requirements. An inconsistency in Australians' objections to nuclear power is that there is little objection to the export of uranium to other countries for use in nuclear reactors yet we think it far too dangerous to use at home. If the concern is that high, surely the only responsible action for Australia would be to leave all the 'nasty stuff' safely in the ground.

Maybe Australia's most responsible action with respect to nuclear energy would be for the country to lead the world by demonstrating the safest, most integrated nuclear power plant in the world. This could be combined with a power park concept that demonstrates geothermal and solar thermal, and is connected to the grid

through HVDC cables that also connect to the best wind and wave sites. A grand plan that it is detailed further in chapter 22.

Agri-Businesses

Agri-Businesses are included in many measures of environmental performance due to their clear interaction with the environment. Yet this interaction is not always a positive one for the environment and the communities involved. Some see cleantech as encompassing those companies that provide products and services to improve agriculture's impact on the environment through, for instance, the use of water- and energy-saving technologies, and do not include the businesses that merely purchase these technologies.

It is clear that decisions on what is included as being part of cleantech depends on the viewpoint and vested interest held. Lobby groups, investment-fund managers and participating companies all have desired outcomes that help shape their arguments on the definition.

Despite this, cleantech is not just another term for Socially Responsible Investments (SRI) or Environmental, Social and Governance (ESG) performance. Cleantech is a term that embraces organisations whose essence, whose *raison d'être*, is to provide environmental benefits. SRI and ESG look at incremental improvements in company performance and can be seen as 'operational hygiene' measures that find the 'best in class'. Cleantech is about doing 'more good' rather than 'less bad'.

To those who ask 'What is cleantech and what does it encompass?', there is no definitive answer as both subjective opinion and vested interests are involved. However this should not detract from the multiple opportunities and benefits provided to investors, communities, employees and society by the work of the cleantech industry.

No Green Bubbles in Sight

Some commentators have dismissed the cleantech phenomenon as being a mere 'green bubble', similar to the IT bubble of the turn of the century. However, the drivers behind cleantech's growth are significantly different. First, there are many real assets being constructed to

provide core services such as power, water, waste and recycling. Secondly, the demand for these core services is growing due to population growth and increasing wealth. Thirdly, as the world continues to use and deplete its natural resources there is increasing pressure on communities to act sustainably.

Finally there is the recognition of climate change and the consequent regulatory regimes. This is a separate driver from those above and, while it will result in additional growth in some cleantech subsectors, it does not underpin the cleantech sector as a whole. As a result, the growth of cleantech will be unstoppable.

Research and forecasts by Clean Edge indicate that the clean-energy sector alone had global revenues of US\$77.3-billion in 2007 and this is forecast to rise to over US\$250-billion by 2017.

In Australia, the definitive measure of cleantech performance is the ACT Australian CleanTech Index. This tracks seventy-five cleantech companies listed on Australian exchanges with combined fiscal year – 2008 revenues of over A\$13-billion and a combined market capitalisation at the end of June 2008 of over A\$15-billion. The ACT Index outperformed both the S&P/ASX200 and the S&P/ASX Small Ordinaries during the bull run of the 2006–07 financial year with a gain of 42.9 per cent. More interestingly, it also outperformed both of its benchmarks in the bear market of 2007–08 recording a loss of *only* 16.0 per cent. Being able to outperform in both good times and bad is exceptional and demonstrates the resilience of the cleantech sector.

If the Australian growth matches the global forecasts, annual revenue for the Australian cleantech sector could exceed \$40-billion within the next ten years.

The dominant Australian cleantech subsectors are currently waste and wind, with large companies also present in water, biofuels and environmental services. An assessment of what subsectors will dominate in ten years can be made by looking at Australia's areas of natural competitive advantage. With its abundant solar and wind resources, along with its water scarcity, the country is likely to see the emergence of large-scale solar generators and providers of water-efficiency solutions.

Until recently the Australian cleantech market has lagged behind both its US and European counterparts. In the United States the

strength of venture capitalists together with favourable regulation in some states has spurred innovation. In Europe, growth has been largely driven by regulation and mandated targets supported by financial gains through carbon trading. In both cases, the link to the finance industry has enabled the recent growth. Australia is now turning the corner and financial markets here are starting to see opportunities for profitable investments.

A Cure for Climate Fatigue

Cleantech also has the advantage of implementing change through multiple local projects that affect all within a community. It is this aspect that in many ways, makes the growth of the industry most valuable. The ability to connect with and engage many individuals will highlight the opportunities and benefits available and will keep the focus on driving ongoing changes.

This will be critical when negotiating an emerging challenge for those fighting the effects of climate change—‘climate fatigue’. Each day the public is bombarded with terrifying prognoses for the future that they and their forebears have created.

Many people are understandably confused about the possible effects of climate change and feel an inability to make any meaningful difference. They sense a lack of control and eventually fear will give way to resigned boredom and the distractions of more immediate and local issues. So, ironically, as media exposure on the issue of climate change increases so too does the danger of climate fatigue.

Yet it is essential that individuals and their communities do stay motivated and engaged with the solutions to climate change—it is not enough simply to rely upon scientists and politicians to alleviate the consequences. Cleantech provides the solutions that will deliver both global and local benefits, and ensure the community engagement is maintained.

Climate fatigue may be compared with the well-documented phenomenon of famine fatigue. The BBC has recorded the example of Victorian England’s fatigue of the Irish famines and there are numerous examples in Susan Moeller’s book *Compassion Fatigue*. Everyone remembers their ‘first’ famine: the first one they really cared about. Mine was the Ethiopian famine in 1984. As news of ever more famines continue however, the length and depth of compassionate

feelings reduces until there is a tendency to accept famines as unavoidable.

Famine fatigue or, more generally, compassion fatigue occurs fastest when the suffering is far removed. Climate fatigue is no different, as shown by Russian President Vladimir Putin's retort in 2002 that warming might be good for his nation saying 'Maybe it would be good and we could spend less on fur coats and other warm things'. The effects of climate change are often seen as a problem belonging to the distant future and far-flung places of the world. However, recent Australian weather conditions—floods, fires and droughts—have focused many Australians on the immediacy and relevancy of the problems created by climate change. Extreme weather patterns elsewhere, such as the United States and parts of Europe, have had the same effect. Enthusiasm for change is high, both here and abroad, and fatigue has yet to set in to any great extent.

To harness this enthusiasm and secure its benefits requires two aspects: first, local benefits must be visible to communities so that the benefits of change are clear; and secondly, networks and forums must be established to facilitate new connections and enable new collaborations.

For example, the adoption of revised town planning to improve public transport, pedestrian and bicycle facilities while reducing suburban satellite housing will reduce commuter traffic and have a significant long-term impact on emissions. It may also facilitate an improvement in the overall fitness of the community. Similarly, networking and collaboration may be used to reduce food transport, leading to lower emissions, increased local production and possibly even more nutritious diets.

Focusing on local benefits while also delivering part of a national or international solution is not easy. It requires collaboration and understanding between business, investors, academia, all three tiers of government and, most importantly, the general public. Providing a forum to have these conversations is a vital first step to delivering the greatest benefits from changes that are going to be required as a result of climate change.

One example of this first step is the Adelaide Cleantech Network. This brings together all of the disparate groups and enables discussions to start on wider, more ambitious solutions.

By changing the story from one of worry to one of opportunity, cleantech alters the whole dynamic of climate change. It is a twist on the concept 'think global—act local' which has historically been seen as taking local detrimental actions to achieve global benefits. Instead this is thinking about worrying global events and turning them into an excuse to deliver local benefits.

Imagine the change to a region such as Australia's coal-rich Hunter Valley once it moves on from fear regarding the decline of the coal industry to embracing the opportunities associated with becoming a centre of excellence of cleantech manufacturing and 'green collar' employment. The subsequent economic development, healthier work environments and improved prospects for all will make the community look back and be thankful that climate change became so serious.

By focusing on how cleantech solutions can deliver local, as well as global, benefits and by starting new conversations and collaborative relationships, we have the opportunity to make climate change be seen as the great motivator to a better world.

The future for cleantech, both here and abroad, is therefore bright. It has multiple global drivers and government backing, which makes it stand out from previous growth industries. As it grows, mainstream corporate Australia will buy in through purchasing and acquisition decisions and this will enable the entire economy to move towards sustainability. Through its facilitation of local benefits and community action it will maintain a focus on the required changes without lapsing into climate fatigue. By combining industry with investors to produce profitable, sustainable and local solutions, the cleantech sector will underpin and be essential for the transition to a sustainable world.