

***Prosperity and security depend on a health environment***

***Fiona Wain, CEO, Environment Business Australia***

Climate change and more general eco-system services degradation will lead to 'asset atrophy' of our fundamental wealth and resources unless leaders around the world take positive action now to restructure commercial and lifestyle behaviour.

This was clearly recognised by Pan Yue, the Vice Minister of China's State Environmental Protection Administration (SEPA), who stated in late 2006 that "it would cost around \$US84 billion to clean up the pollution produced in 2004." This equated to 3% of GDP for that year. But he added "more realistic estimates put environmental damage at 8-13% of China's GDP growth each year, which means China has lost almost everything it has gained since the late 1970s due to pollution." I noted that SEPA has now been upgraded to a Ministry and Pan Yue's highly important work is being given greater recognition by the Chinese Government.

Soil erosion, dust storms, pollution of air and waterways are all symptomatic of a short-term approach to production and consumption, where the side effects of commercial and industrial activity is creating cumulative collateral damage.

Changing commercial activity doesn't mean an inferior standing of living, or lowering of employment, or curtailing business. It means we have to get smarter about the technologies we use and the type of energy that fuels our economies. We need to look urgently at our production and transportation systems and better evaluate the materials in the supply chain, and we need to reuse our waste as resources. This fresh clean technology and materials 'stewardship' approach increases our options and offers many new opportunities to deliver energy, goods and services.

According to UK based analysts New Energy Finance, clean energy investment grew to \$US117 billion globally in 2007 and this was an increase of 41% over the previous year. In spite of the international market turbulence, 2008 it seems will also favour cleantech as the world begins to seriously address the major threat of climate change.

Cleant technology is vital if we are to protect the eco-systems that supply us with some of our most basic commodities. The danger is that if they become dysfunctional, our health, quality of life, economies and global stability will be eroded.

The basis of the dilemma is that the most significant asset class - the environment - remains largely unvalued, while we focus on short-term market returns, based on trading those commodities on which we are used to putting a price tag. But when we can no longer farm in areas that used to be productive, and when air pollution is making workers sick and less productive, there are no winners.

As an example, for decades we have planned our social and economic infrastructure based on the assumption that we will always have cheap and abundant energy. This unrealistic approach to the real cost of energy has kept us on a pathway that is neither clean nor efficient.

Climate change has given us the 'heads up' that we cannot continue to plan our social and economic infrastructure based on the assumption that we will always have cheap, abundant and secure energy. And for China the problem is compounded by the rapid growth and infrastructure development - major infrastructure investment decisions made now will be with us for the next 40 years or so and once money is invested into one form of energy plant, it is locked away until the amortisation cycle is completed.

If the next industrial revolution is, as I believe, to be based on sustainability, we need a new roadmap if we are to take advantage of the huge opportunity for wealth creation and wealth maintenance. There is an old Chinese saying: "If we don't change the direction we are going, we will end up where we are headed"

Identifying innovation

A better way forward would be to look for the big leaps in innovation that are theoretically possible, and then at the many small steps that will be the building blocks to these great transitional bounds forward.

The new Australian Government, led by Prime Minister Kevin Rudd, is helping to forge stronger links between Australia and China as we seek technology solutions to reduce greenhouse gas emissions. Innovation from both countries will benefit both countries.

Certainly there needs to be a way to weave in new technologies and weave out those which cannot compete in a new 'clean and green market place', and this will require all of industry's innovation. But it will also need governments around the world to provide an over-arching 'enabling framework' to get us on the right energy trajectory. The tools and levers at governments' disposal are powerful forces for change in the marketplace. Taxation, regulation, procurement and investment, education, market-based instruments – these are the basis for a 'friendly market' that only governments can initiate.

Australia has a strong track record in addressing environmental challenges and has a world class environment and sustainability industry with a turnover in excess of AS20 billion a year.

But there is an issue that has still to be resolved. We rely on markets identifying the collateral damage caused by negative externalities - but markets have not been receiving timely and meaningful intelligence about the atrophy of assets caused by pollution, run-down and general degradation. Markets may serve very short-term consumer and shareholder interests well but they do very little to avoid the huge bill that taxpayers must pay for mitigation or clean up of pollution.

However, the market is starting to react and alarm bells are being rung by some major investment groups such as the Carbon Disclosure Project, which is seeking to avoid investing in 'carbon liability' companies. At the time of writing the CDP had over US\$40 trillion of assets under management represented by 140 or more leading institutional investors leaning towards action to combat climate change.

Increasingly investors are concerned about the scientific research which is revealing previously unrecognised step changes in climate associated with man made greenhouse gas emissions. While climate variation is part of the planet's history, carbon dioxide concentrations in the atmosphere have increased in the last century to 380 parts per millions (ppm). This is 100 ppm more than at any stage in the past 800,000 years, according to the UK's former Chief Scientist, Professor Sir David King. Even more worrying is that the IPCC report issued late last year says that Earth is now blanketed in an atmosphere that contains 455 ppm CO<sub>2</sub>e (that is carbon dioxide and other greenhouse gases expressed as equivalents to CO<sub>2</sub>). NASA scientist Dr James Hansen released a paper in March this year saying that all efforts should be made to reduce atmospheric carbon to no more than 350 ppm.

A tough call

There is international consensus on the need to stabilise atmospheric carbon to avoid crossing a two-degree centigrade rise in average global temperature. To achieve this, at least 60% cuts in emissions need to be made by 2050, and at least 80% cuts in emissions by the end of the century.

This is an extremely tough call given that energy demand is predicted to rise by 70% by 2030 under a business-as-usual scenario. It is exceptionally difficult for developing countries where more than 1.5 billion people are still without electricity or the basic survival services of clean drinking water and sanitation that electricity can help to provide. But without action to combat climate change the situation in many of the least developed nations will worsen, not improve. Single commodity countries would face irrevocable harm, and climate change must therefore be recognised as one of the most important development challenges.

In northern China the impacts of drought, desertification and dust storms will likely have an increasing economic drain on the country as a whole. The task is monumental and will require every technology and approach available. Energy efficiency, insulation, smart metering, cleaner combustion, fuel-switching, and renewable energy sources provide a vast portfolio of innovation available to the Chinese market - and these solutions can be sourced from Australian companies.

Some technologies like wind energy are tried and tested; others, such as deep hot dry rock geothermal, need to be taken to full prototype demonstration as quickly as possible. And logic

demands that great support be given to tapping into abundant and permanent energy sources such as wave, tidal and solar energy.

#### Future directions

In Australia, as elsewhere around the world, there is fierce debate at the moment as to whether the energy future belongs to coal, nuclear or renewable energy technologies. I suggest that the focus should be on assigning a proper valuation to the delivery of energy services, and on making sure we have as many tools as possible to deliver energy to a carbon-constrained world.

There is, at present, no magic bullet to deliver inexpensive, clean and safe energy. And while all countries are looking for technology to solve the carbon dilemma, it is imperative that existing technological solutions be implemented as quickly as possible. Further major technological breakthroughs will only occur when markets, governments, society and business are providing incentives that will nurture change on an incremental basis. R&D and its commercialisation take time, and operational refinement will be key.

A great deal of research is being undertaken in Australia to overcome the costs involved in the capture, compression, interim storage, and transportation of CO<sub>2</sub>. But there is no guarantee that carbon capture and geological storage will be commercially viable at sufficient scale or that it will provide adequate security of storage. The security implications of geo-sequestration will be the make-or-break for this technology. A major leak of toxic CO<sub>2</sub> would have a devastating effect on life nearby (CO<sub>2</sub> is heavier than oxygen and would effectively replace breathable air until dissipated). Some early research and trialing suggests that a biomimicry approach may work – the idea is to 'force feed' CO<sub>2</sub> from power plants to rapidly growing biomass like algae. The algae would then be used to make bio-diesel without competing with the food chain, and importantly without taking valuable carbon, minerals and nutrients out of soil (algae can be grown successfully on brackish water).

The economic risks of failure of CCS to work would be high. In a global carbon trading system this would be a debt to be called in, needing either financial payment or offsets from other GHG-abating technologies or natural sinks. Therefore even clean coal technology requires other energy technologies to be developed alongside.

On the nuclear front, Australia has 40% of the world's uranium supplies, making us the equivalent of OPEC (Organization of Petroleum Exporting Countries) as a supplier of energy resources. While cleaner than current coal technology (in greenhouse gas terms), there are major public acceptance issues relating to the risks associated with nuclear energy. There needs to be a clear-headed comparison of the potential of local or regional threats versus the insidious but inevitable impacts of climate change if the current carbon footprint is continued.

In my view, coal and nuclear should both be seen as bridging technologies to renewable energy sources. While renewables are coming off a low base there is significant potential for the longer term in solar photovoltaic while solar thermal plants are already capable of providing baseload energy. Wind, wave, tidal, some forms of biomass (such as the algae mentioned above, and deep hot rock geothermal also have tremendous potential. Australia's biggest geothermal site in South Australia is in initial trials and commentators suggest it could provide the equivalent energy potential of four times the whole of the North West Shelf which to date is Australia's biggest energy project. Finding sites in China with suitable geological formations to allow for energy capture using known mining technology would be a great boon.

Renewables will gain a secure market foothold when the costs of externalities from fossil fuels and nuclear are included in the analysis of energy costs. Any realistic cost analysis should also include the likely costs of mitigation or adaptation to climate change that could be avoided by the use of low or zero carbon energy and fuel sources.

As the geo-politics of energy supply and demand adapt to China's growth, the changing economic fortunes of the USA, and the turbulence in international markets, renewables are likely to be seen as more secure, as well as less carbon intensive.

Therefore, it is interesting to hear criticism from some quarters that the environment and sustainability industry can only develop its competitive edge by appropriating the environment. I ask the simple question: "Which is better - developing a market from the public good of protecting the global commons, or developing a market by stripping the commons of their ability to provide for future generations?"

At last year's UN Climate Change Conference in Bali (CoP13-MoP3), Australia ratified the Kyoto Protocol, this was the first order of the new Government which shows that Prime Minister Rudd and his Cabinet consider action to tackle climate change to be one of the most important things for the new government to focus on.

Environment Business Australia's message is - "While there is cost and complexity in tackling climate change, a *'planet that is no longer fit for purpose'* is a cost too high!"

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