

Clean Technology Investments: Short and long term trends

By John O'Brien

Clean Technology investments are often seen as highly speculative and backing only the 'bleeding' edge of science innovation. If this was the case, then it would only suit those with a very high risk tolerance seeking large returns. Some of the larger US and European venture funds have taken this approach and put significant resources behind some very early stage biofuels and energy storage technologies that, if they succeed, will change the world.

The truth however is that with a little bit of research, it is easy to find a good number of companies that base their businesses on making money from doing environmental good without necessarily being at the forefront of technological innovation. That's not to say that every company claiming environmental benefits is a good investment – far from it – but there are plenty of options available for investors of all risk appetites.

Companies that fall into the clean technology (cleantech) basket include those that are focussed on renewable energy (wind, solar, geothermal etc), water technologies, waste management and recycling, green buildings, energy efficiency, biomaterials, energy storage, vehicle technologies, environmental services, biofuels and carbon. The element that binds these diverse companies together is that their products and services all have both 'economic and environmental benefits'.

Global activity

Globally, there is plenty of activity in the cleantech sector. California is moving forward with its emissions trading scheme, Ireland, despite being broke, is driving hard to deliver a large scale wave power industry, and even the UK – not famed for its sunshine – is rolling out large scale solar projects driven by its commercial scale feed-in tariff.

Even the countries that are supposed to be the laggards are moving forward quickly.



Korea is driving economic growth through its Global Green Growth Initiative and China is driving the growth and development of many cleantech industries to both clean up its own problems and to create export industries and India is driving utility scale solar projects. There is now even talk of a North Asia emissions trading scheme involving China, Korea and Japan.

Sadly, Australia with all of its abundant natural resources in renewable energy and its excellent research activity is falling well behind the pack. This is partly to do with a lack of political will, partly driven by the riches being created through the resource sector and partly the lack of educated investors.

To understand the potential of cleantech for investors, for governments and for the community at large it is necessary to understand the drivers behind cleantech adoption, the short term sectoral trends and the longer term technology trends that will produce the long term solutions. Each of these areas is examined below.

Drivers of growth

Much has been written on why investing in cleantech should derive superior long term investment returns¹. There have however also been discussions that the sector is just a 'green bubble'². The growth of this sector is however underpinned by four key and strong drivers that will ensure its longevity.

- There are many tangible assets being constructed to provide core services such as power, water, waste and recycling.
- The demand for these core services and for reduced impacts on the natural environment is growing due to both population growth and increasing wealth.
- As the world continues to use and deplete its natural resources there is increasing pressure on communities to adopt cleantech solutions to increase efficiency and decrease waste.
- There is the recognition of climate change and consequent regulatory regimes. This is a separate driver from those above and, whilst it will result in additional growth

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in some cleantech sub-sectors, it does not underpin the cleantech sector as a whole.

On a more immediate level, demand for cleantech products and services will grow from increasing demand from industrial companies. This demand is being driven by two issues:

- Larger companies are facing increasing regulatory pressures to report on and reduce their environmental impacts. This not only includes emissions reporting but there are a multitude of other environmental regulations regarding air quality, effluent standards, impact on native vegetation and reduced water availability that are driving companies to seek more resource efficient and less polluting technical solutions.

- Companies are also starting to face supply chain pressures to both report on the environmental impacts of their operations and strive to reduce this footprint. Companies such as Walmart and Tesco are leading the way in this. In Australia, Reputex is now analysing and reporting on the supply chain emissions of the largest listed companies and this will increase this focus.

Cleantech trends for 2011

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Here are the top cleantech forecasts for 2011:

- **Carbon Déjà Vu** - The carbon debate in developed countries seeking to introduce schemes will have a feel of déjà vu with the same arguments pulled out to oppose any broad based emissions trading scheme as have defeated previous proposals;

- **Scrambling Pollies** - There will be an increasing realisation within the community of developed countries that they are dropping far behind those countries seeing cleantech as a global industrial opportunity. The na-

tional politicians will then start to scramble to show that there is progress and that they are being competitive with the developments of China and Korea;

- **Chinese Wind to Dominate** - Chinese wind turbine suppliers will continue to enter new markets and their move to dominate global supply with high quality, cheap products. This growth will be accompanied by local assembly plants and partnerships in many countries.

- **Large Solar Roll Out** – Whilst there has been steady growth over the last few years in specific countries, this will become more widespread during 2011 as solar approaches grid parity and the subsidies required to make projects viable decrease. There will also be a growing roll out of utility scale (30-50 MW), small utility projects (1-3 MW) and commercial scale projects (50-200 kW) projects in Australia, the UK, India and in other jurisdictions.

- **Electric Car Uptake** – with the launch of numerous electric vehicles in 2011, the uptake of EVs will happen quickly and to the detriment of internal combustion car makers. This uptake will then also drive recharging infrastructure, although most of this is likely to be home-based, and then smart grid applications.

- **Asian Money** – in the same way that investment has been coming from Asia into the global mining sector, 2011 will see the first of the large scale Asian investments into the international cleantech sector. This will open up the sector to more ambitious growth;

- **Local Money** – there is also likely to be a growing interest and roll-out of community financed projects, where communities take control of local development and, at the same time, secure the investment returns;

- **Insurance Takes the Lead** – globally, there is a strong move from the insurance industry to quantify the risks inherent in climate change and the associated regulatory measures. The insurance market is likely to

start asserting its influence over investment decisions during 2011. Indeed, the insurance industry may end taking the lead in the climate debate and in driving industry and government to adopt and develop cleantech solutions.

To invest successfully in cleantech in 2011 requires an understanding of three areas.

Firstly, it is essential to understand which subsectors of cleantech have the greatest chance of success given the current regulatory trends, industry needs and global technology developments. In addition to the above, we see emerging opportunities in the treatment and delivery of water, improved monitoring technologies, economic distributed generation products, energy efficiency solutions for industry and recycling technologies driven by increasing commodity prices. We also see opportunities for consolidation in the solar panel installation and water products sectors.

Secondly, as with any good investment, it is necessary to complete detailed due diligence. Because many cleantech companies are using new technologies and even new business models, it is important to understand any additional risks. A focus on the technology and the commercial partnerships are also critical when considering an investment.

Finally, to provide the best chance of success requires an efficient and reliable method of accessing investible opportunities. In Australia, for example, the Cleantech Networks provide regular investment opportunities to investors interested in the sector.

Investing in the science of the future

Some examples of companies which are taking advantage of the current industry trends are set out below.

- An environmentally friendly chemical vapour deposition technology that uses less energy and less toxic chemicals in the production of light emitting diodes (LEDs) whilst at the same time reducing costs. This technology, being developed by BluGlass in Sydney, has now found a new application in the production of very high efficiency (>50%) photovoltaic cells that will potentially change the economics of global concentrating solar installations.

- A technology for recycling polypropylene (PP) back into pellets that can be used in the manufacture of new PP products of the same quality and at a reduced cost. Novarise Renewable Resources is based in Fujian province and is currently China's biggest PP recycler and is starting to roll this technology out globally.

- A wind mapping technology that allows the company to remotely identify the optimum sites for wind farms without the need to undertake a site visits. Windlab Systems operates in Australia, South Africa and North America and is managing to develop sites more quickly and in better locations than wind farm developers that use traditional techniques.

- A community finance business model that allows the community as a whole to invest in and buy power from large scale wind farms. GPAus Windpower is developing wind farms in Australia utilising its unique business model that involves both vertical integration and collaboration amongst all parties to provide an alternative paradigm to the current energy market design.

Many other companies and technologies are innovating through utilising innovative business models including community finance and energy service company models. Often, the greatest success stories involve combining technology innovation with business model innovation to change the way consumers behave and how products are used.

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Long term cleantech trends

To build both long term economic sustainability and investment returns, it is essential to have a view of the type and timing of technologies that will be adopted on a large scale. Much contemporary literature provides advice on current and forecast cost curves for future energy technologies. There are other reports that provide forecasts of the future energy mix to 2020 or 2030. However, these provide little assistance to governments or investors wanting to fully understand long term trends.



We have recently tried to consolidate many of the existing reports to provide longer term technology forecasts. The report, *Prosperous Sustainability: Clean Technology Forecasts to 2050*, presents a scenario of technology development. The forecasts include the timing of mass roll-outs of technologies and, possibly more interestingly, the timing of their decline. It is based on economic activity measures rather than installed capacity as this will indicate the areas of growth.

It could be argued that this is an exercise in picking winners - a risky proposition at the best of times. An alternate viewpoint is that by understanding technology development

regional centres of excellence.

Cities, states or nations will have the greatest chance of securing technology leadership by recognising this potential early and implementing proactive policies to build the foundations of industry growth. These foundations may include policies focussed on investment attraction and the development of industry, infrastructure and skills.

The key assumptions and findings of the report are set out below.

Wind Energy - The current wind technology will grow quickly over the next few years and gradually be replaced by second generation technologies, which may include vertical axis and darrieus turbines, towards the end of the decade. Eventually the requirements for large towers and motors, will mean that wind is left behind as an expensive technology for new installations.

Solar Energy - Solar Roof Top Solar Panels will continue to grow quickly over the next few years. After that however, it is forecast that other solar technologies, such as building integrated photovoltaics (BIPV), will become cheaper and retrofit panels will start to become obsolete. Utility scale solar is forecast to have a long gestation but will form a major component of the industry by 2050.

Other Renewables - Geothermal is another long term survivor although it is going to take more than five years for the industry growth to occur with any significance. Wave and Tidal power follow the same growth path as geothermal through to about 2030,

after which they start to decline as technologies with fewer mechanical parts emerge as cheaper options.

Transport Energy - Cellulosic and Algae Biofuels start to replace first generation biofuels within the next few years and, as oil prices increase, they will grow for some time. The growth of electric vehicles and recharging infrastructure has been brought forward by recent events in the global car industry. The major global roll out will commence in 2011-12 and continue to grow throughout the forecast period.

The Built Environment - The built environment comprises energy efficiency, green building products and materials and smart grids. It is forecast that this will continue to grow and innovate throughout the entire period. Energy efficiency and building products will grow quickly immediately as some of the easy wins are taken. Smart Grids, however, will only significantly expand in the 2020s once structural issues connected with distribution networks are resolved.

Water and Waste - Water and waste technologies are forecast to grow throughout the forecast period. Preserving, reusing and creating new sources of potable and 'fit-for-purpose' water along with materials recycling and resource recovery will be driven by growing populations and improved living standards.

There are of course many limitations to this type of foresight work. It will certainly not provide any policy or investment certainty. It may help to provide caution against backing industries with limited long term prospects. Its greatest use however is to provide a frame work for governments and investors to build long term economic benefits by focussing on the sectors of cleantech that are most likely to be 'winners' both globally and within their regions.

Benefits to society

The potential benefits to society of the spread of cleantech are far more than just reduced environmental damage. Cleantech products and services will create more efficient businesses, less waste, greater recycling of all materials, higher standards of living, more fulfilling jobs and urban environments that are better places to live. Through adopting technologies that reduce energy, water

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This applies not only to the starting of new companies with new technologies, but also to increasing the resilience of existing industry to more effectively compete in the future.

In the collection of essays, *Opportunities Beyond Carbon*³, the concept of the transition to a more sustainable world presenting opportunities to also find solutions to other societal problems is explored. For instance, by improving town planning and building design and utilising cleantech solutions, emissions and resource use can be reduced. This can also lead to more integrated communities and, ultimately, happier, more connected residents. Writing in the *Environmental Leader*, this thought is further developed by Mark Johnson⁴, who suggests that it requires a wider level of systems thinking rather than just the application of new technologies into existing systems.

The ultimate goal of cleantech is to integrate it into everything we do, and, in the words of Vinod Khosla (one of the world's leading cleantech venture investors), to become 'maintech'.⁵ The category will then not be something special: it will just be the way things are done. This is one of the reasons that investing in the sector has merit. Those technologies that do become 'maintech' will generate extremely healthy returns.

Professor Dexter Dunphy of the University of Technology Sydney takes this one step further. By considering how corporations can go beyond just minimising their negative impacts on their environment and stakeholders,

he envisages the *Sustaining Corporation*⁶. A Sustaining Corporation is one that has a positive impact on its surroundings by enhancing the quality of its community and natural environment. Cleantech solutions will be an integral part of achieving these outcomes.

Clean Technology investing is therefore not just about providing the scientific foundation for future technologies. Cleantech is just an essential part of the transition to a world in which efficiency is improved, productivity and economic growth improves and communities function more effectively.

About the author

John O'Brien is Managing Director of Australian CleanTech, a research and broking firm that provides advice to cleantech companies looking to grow, investors looking to invest in the sector and governments looking for economic development. Australian CleanTech works across Australia and has strong connections to Asia and in particular in China and Korea. Australian CleanTech publishes the *Australian Cleantech Review* and the *Australian Cleantech Index*.

Notes

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