



Turning Green into Gold

Australian Cleantech Venture Capital and Private Equity Investments

Co-authored by:



Accelerating the next wave of innovation®



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+1 810.224.4310

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ABOUT THE AUTHORS

Anastasia R. O'Rourke

- Author



Anastasia has written over 20 reports, articles and whitepapers on trends in cleantech investing and environmental business, including

for the Cleantech Venture Network (2005 & 2006), The Carbon Trust (2007) and SVB Alliant (2007). Anastasia is an experienced consultant and researcher, having worked in Sweden, France the U.S. and Australia. She is currently completing her Ph.D. at Yale University. At Yale she serves on the Endowments' Advisory Committee for Investor Responsibility. In 2006 helped to develop the United Nation's 'Principles for Responsible Investment'. Anastasia has a M.Sc. (Industrial Environmental Management) from Lund University in Sweden (2000) and a B.A. (Hons 1st Class and University Medal) from Sydney University, Australia (1997). She is an Australian citizen and currently lives in New Haven, CT.

Hans De Zwart,

Cleantech Ventures Pty Ltd.

- Researcher/Co-Author



Hans has over 25 years experience in management, strategic planning, research, marketing communications, new product

development and sales. Prior to Cleantech Ventures he worked for the Centre for Energy and Greenhouse Technologies where his in-depth knowledge of many industry sectors played a key role in investment evaluations particularly with respect to technical assessment and market analysis. Hans established an independent consulting business in 1992 providing services to clients across the energy, automotive, telecommunications and finance sectors, and has worked with organisations such as CitiPower, Energy 21 (now Origin) and Nissan Motor Company. Hans holds a Bachelor of Business from Monash University and is a Fellow of the Australian Marketing Institute.

Keith Raab,

CEO & Co-Founder
Cleantech Group, LLC.

- Editor



In partnership with Nicholas Parker, Keith introduced the "cleantech" concept in 2002 and has helped develop it as a viable investment

category. Keith has accumulated 14 years of entrepreneurial experience starting, managing and growing cleantech businesses. Keith currently serves on CalSTRS' Clean Technology Advisory Board and the Erb Institute, Ross School of Business at the University of Michigan. Keith has an MBA in Finance and Entrepreneurship from Indiana University, a Masters of Engineering in Gas/Fluid Dynamics from the University of Michigan and a Bachelors of Engineering in Aerospace from the University of Michigan.

Future Cleantech Network Activities In Australia

The Cleantech Network will continue to regularly track and report on Australian cleantech investing in its quarterly Investment Monitor publication and in its online databases (available to members). We are excited to be adding an Australian venue to our 2008 rotation of Cleantech Forums hosted globally. We offer many opportunities for involvement including the ability to support our efforts as one of only twenty founding members in the region.

If you are interested in joining this effort, please contact us at:

sales@cleantech.com

(+1 810) 224.4310 x7151



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FOREWORD

Cleantech Ventures had no hesitation when presented with the opportunity to co-author this report with the US-based Cleantech Group. As the world's leading cleantech industry membership network, the Cleantech Group has, like ourselves, recognised the significant cleantech investment opportunity that exists in Australia, one that is certainly worthy of wider investor attention.

To date, what has been missing in Australia is a quantitative analysis of the status of cleantech investing, a fundamental requirement if we are to benchmark this exciting sector when tracking its future growth and performance.

Views on the cleantech investment sector and its drivers are expanded on within this report however some key points are worth stating at the outset. Australia faces unique



Photo: Roaring 40s

environmental challenges as the world's driest inhabited continent, we are a dispersed population requiring significant built infrastructure and have one of the world's highest per capita levels of greenhouse gas emissions. The environmental and social impacts of climate change are likely to be early and substantial.

Interestingly, these challenges bring with them significant natural advantages in capturing early cleantech investment opportunities. Historically, our remote geographic location and entrepreneurial spirit, together with significant long-term government commitment to R&D has seen Australia recognised world-wide for its knowledge creation and innovation. Our studies have identified a wide range of sources of cleantech innovation in Australia across all its sub-segments. Arguably, cleantech simply hasn't been thought of widely as a category in the past nor has it been considered against the global backdrop of burgeoning demand and interest in clean technologies required to address environmental issues and growing resource constraints such as those associated with energy, water, waste and air quality.

Even accepting the potential of cleantech in Australia, clean technologies must meet the primary test of investment attractiveness and the significant but secondary test of improved environmental and resource outcomes – it's not "green for the sake of being green" it's about "turning green into gold".

**Jan Dekker
and Andrew Pickering**
- Principals, Cleantech Ventures



EXECUTIVE SUMMARY

Australia has a long history of technological invention, a dynamic economy and an energetic engagement with environmental issues. Cleantech – which brings together technology, environmental and financial performance - seems to be a natural fit. The term “cleantech” embraces knowledge-based products and services that optimise the use of natural resources while reducing ecological impact and adding economic value through lowered costs or improved profitability.

This report comprises the first-ever comprehensive summary of the trends in venture capital investing in Australian cleantech companies for the period analysed. It presents data on cleantech IPOs and Buyouts of Australian companies between 1999 and 2006, and Australian cleantech Mergers and Acquisitions activity between 2005-2006. Venture capital investment data covers the period 1999 – Q1 2007.

Australian cleantech companies are being bolstered by ongoing venture capital investment, while IPOs, Buyouts and M&A activity paint a relatively optimistic picture for exiting those investments further down the track. Investment in the nascent Australian cleantech industry has grown, but not at the same scale or speed as cleantech investing in North America and Europe where it has boomed. However with cleantech coming into the limelight for institutional investors, policy makers and the general public, we expect venture capital investments to pick up quickly in Australia in the coming two to three years. We see Australian cleantech investing being at the same stage as North America some three years ago, that is, poised for rapid growth and the harvesting of returns for early investors.

Key drivers behind the investment activity specific to the region include:

- Technology readiness and capability
- Environmental pressures, including climate change and drought
- Government policy and programmes aimed to stimulate different cleantech segments and venture capital investing
- Consumer/end-market demand for environmentally friendly & more efficient products
- The availability of capital.

How have these larger trends translated into actual venture capital (VC) investments to date? Our study of investments made between 1999-Q1 2007 found that:

- A total of \$539m (\$360m US) was invested into some 75 companies

by VCs. This capital was dispersed in a total of 174 deals.

- Cleantech companies comprised an average of 21 venture capital deals per annum worth on average \$65m (\$43m US) per annum; which translates to a quarterly average of 5-6 deals and \$16m (\$11m US).
- Cleantech investment accounted for an average of 3% of total Australian VC investments by amount and 4% of the total number of VC deals per year (total VC as measured by the Australian Bureau of Statistics, 2007). In the fiscal year of 2002 (i.e. Q3 2001-Q2 2002) Cleantech reached 6% of all VC invested in Australia by amount, and 7% of the number of deals.

Figure 1: Australian Cleantech VC Investments Amount Invested & Number of Deals by Year



Figure 2: Australian Cleantech Investments Number of Transactions by Type (M&A transactions only gathered for 2005-06)

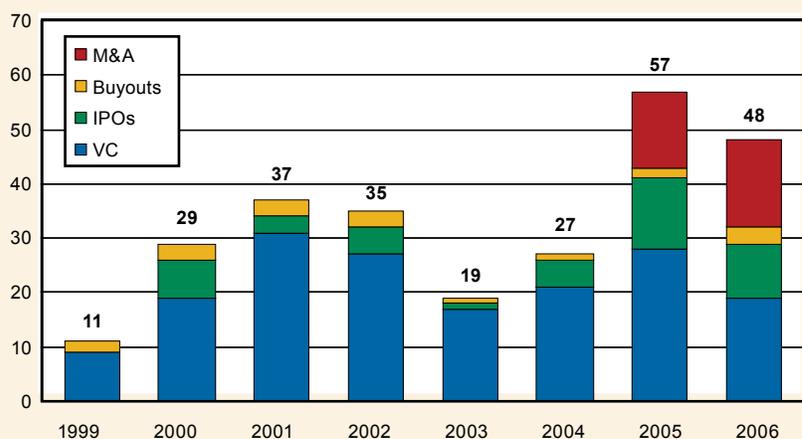


Figure 3: Cleantech VC investments Canada, Europe and USA (2003-2006)

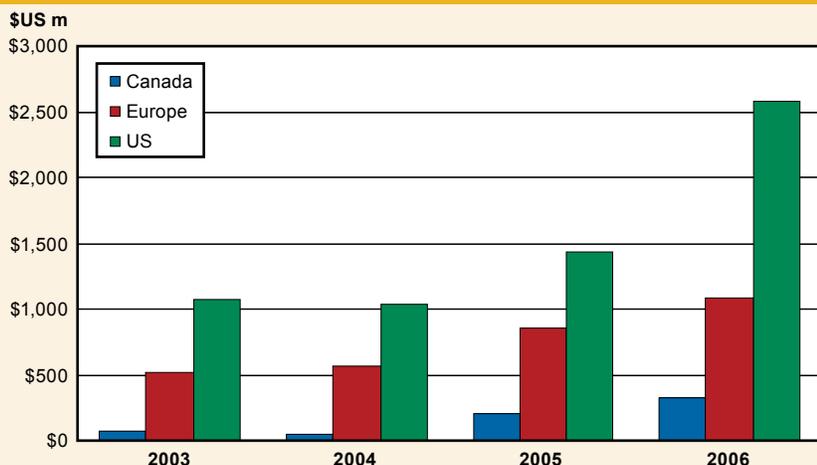


Figure 4: Summary Table

	1999	2000	2001	2002	2003	2004	2005	2006	Q1 2007	Avg.
Number of Deals	9	19	31	27	17	21	28	19	3	21
Amount AUD m	\$21.51	\$88.76	\$121.20	\$91.51	\$75.04	\$35.12	\$52.94	\$35.51	\$17.00	\$65.20
Amount USD m	\$13.89	\$51.72	\$62.81	\$49.80	\$48.98	\$25.89	\$40.38	\$26.76	\$13.73	\$40.0

- Total Australian cleantech investment represents 4% of total \$US cleantech investment by amount and 14% of the number of deals. Compared to Europe, Australian cleantech investments in 2002-2006 were 6% of the total European amounts invested and 18% of the total number of deals. Compared to Canada in 2002-2006, Australian Cleantech venture investments were 25% of the total amount invested and 51% of the total number of deals.
- While Australian cleantech investing is small by comparison to the US, Europe and Canada on a dollar for dollar basis, adjusting for the relative size of the economies (using GDP as a measure), Australia's cleantech VC investments are 47% of the US and 36% of Canada.
- Cleantech deals are smaller on average than those in Europe, and smaller again than in North America; anecdotally, valuations are also lower.
- NSW and Victorian based companies are leading in their ability to attract venture capital investment; together the two states captured almost 75% of all the Australian deals. The activity is concentrated around Sydney and Melbourne. Two emerging clusters of note: South Australia and Queensland see more agricultural technology investments, and Western Australian deal flow is concentrated in water-technology companies.
- Australian investors have done a higher proportion of cleantech investments in agriculture, energy storage, transportation and water segments than we have seen in North America and Europe. Energy generation technologies are also popular – attracting the largest proportion of seed and early stage funding which bears well for future growth in the segment. There were surprisingly few solar energy VC investments given the high level of expertise in solar in Australia. Geothermal and biofuels

companies were more successful in raising venture capital.

The bulk of the investors in cleantech were predominantly generalist funds, though several specialist venture capital funds were the most active in terms of number of investments made. There have been recent closings of several specialist cleantech funds in the region, as well as interest coming from European and North American cleantech investors where the category has much stronger attention and interest. Australia is currently seen as fertile ground for foreign investors in cleantech.

Exit activity for Australian cleantech companies has been robust, with at least 30 cleantech merger/acquisition (M&A) transactions between 2005-2006 and 66 IPOs of Australian cleantech companies between 1974-2006, mostly on the Australian stock exchange. The recent boom in buyouts experienced in Australia also hit cleantech, with at least 18 transactions, including three larger buyouts by private equity investors in the recycling/waste industry in the last two years.

As international trends have indicated, cleantech is a force to be taken seriously. Our research indicates that Australia is at the same stage North America was some three years ago, that is, poised for rapid growth in cleantech investments. The key challenge will be supporting entrepreneurial cleantech firms in their global ambitions, and providing long-term policy support to kick-start their markets at home. In the absence of any major setbacks and supported by policy and consumer demand, cleantech could become a significant high-growth export industry for Australia.



INTRODUCTION

Australian industry has a history of developing technologies to exploit its abundant natural resources. Successive policymakers have endeavoured to turn Australia from 'the lucky country' (with its natural resource base) into the 'clever country' by supporting research and development and the commercialisation of innovation. Australians tend to rapidly adopt new technologies as consumers - Australia's consumption of information and communication technologies is the second highest in the world as a proportion of GDP (behind Sweden and ahead of the US) according to the International Monetary Fund¹. It is now one of the most urbanised countries in the world with an economy dominated by the service industry, tourism, agriculture and mining. These capabilities are now being transferred to exploit a new category of natural resources - technologies that create clean energy, water and materials. Will Australia become the next major cleantech country? We challenge it to become so.

REPORT AIM AND SCOPE

We aim to provide reliable quantitative information about cleantech venture investments and exits in Australia to allow investors, entrepreneurs, policy makers and others to make intelligent and informed decisions.

The report summarises an in-depth study of cleantech Venture Capital investing trends, Mergers & Acquisitions (M&A), Buyouts, and Initial Public Offerings (IPOs) in Australia. We set out to answer the following questions:

- How much of this activity was fuelled by venture capital investment?
- What types of clean technologies are being backed in Australia and where is this activity mainly occurring?

- What are the prospects for exiting cleantech investments in the region - by way of M&A, Buyouts or IPO?
- Who is doing the investing in cleantech today and what does this tell us about the future of the sector?

We believe this is the first comprehensive cleantech analysis on Australia available and that the thoroughness of our research and analysis, combined with our institutional knowledge of the cleantech marketplace, make this a landmark report.

METHODOLOGY

The Cleantech Group™ has been collecting comprehensive data and intelligence on cleantech investing since 2002, tracking data back to 1999. The team tracks the activities of companies and investors involved in innovative technologies that optimise the utilisation of natural resources while reducing ecological impact and adding economic value through lowered costs or improved profitability.

In conjunction with Cleantech Ventures Pty Ltd in Australia, we aggregated data on Australian cleantech venture investments, initial public offerings, buyouts, and mergers and acquisitions based on several sources. Data on venture capital investments and buyouts was collected from Cleantech Group databases, Thomson Venturexpert, Dow Jones Venture Wire, Australian Venture Capital Journal/PricewaterhouseCoopers Venture Capital Survey, The EcoInvestor newsletter, investor announcements, news wires, press releases, company and government websites. M&A deals were screened from the Mergerstat database, as well as news wires, press releases and company websites. IPO data was gathered by screening the main stock exchanges where we expected to find Australian companies being listed - The Australian Stock Exchange (ASX), National Stock Exchange (NSX) and the London Stock

Exchange's Alternative Investment Market (LSE AIM). Companies in the Cleantech Group VC database were also searched for public listings.

In order to systematically search these data sources for Australian cleantech investments, three main criteria were applied:

1. Is it a cleantech company?
2. Is the company headquartered in Australia; and,
3. What type of investment was it?

Cleantech deals are found in many traditional industry verticals, therefore nearly all sectors were searched to find them. Between 1999 and Q1 2007, thousands of companies were screened down to the 100-odd companies that make up the core of this report.

For venture capital investments and buyouts, we looked back to 1999 to see how cleantech companies fared during the venture-backed technology boom and bust cycle of 2000-2001. For Mergers and Acquisitions we covered more recent deals done between 2005 and 2006. For IPOs we went back to 1974 when we found what we think was the first Australian cleantech IPO. Many of these early cleantech pioneers are still active and listed. It is worth noting that some of the companies tracked here have both cleantech and non-cleantech divisions - as companies get larger they often diversify into different markets and applications. Only those with a significant portion of their revenue coming from cleantech products were included.

All amounts in the Report are given in Australian Dollars, unless otherwise indicated. When converted to an alternative currency (e.g. USD), an average exchange rate was used for the quarter in which the investment or transaction took place or for an average exchange rate for the period².

Investments are sometimes not made public to protect the company and/or investor's competitive advantage. For such undisclosed investments (where the amount invested was

missing), an amount was imputed which reflected the stage of investment, and the cleantech sub-segment which it represented. This information accounted for only 2% of the total data set. Every effort was made to triangulate and validate the different data sources in the research for this report, including validation by several of the most active deal makers in the region.

It should be noted that, while we tried to be as comprehensive as possible, data coverage on private investments in Australia is in general less comprehensive than in North America. In addition, our focus on Venture Capital, IPOs and M&A deals means that other sources of capital are not reported on here – such as angel investing, debt, mutual funds and project finance. The pool of total investments into cleantech companies and systems is thus likely to be larger than identified here.



WHAT IS CLEANTECH?

The concept of cleantech embraces a diverse range of products, services, and processes across industry verticals that are inherently designed to:

- Provide superior performance at lower costs
- Greatly reduce or eliminate negative ecological impact, and
- Improve the productive and responsible use of natural resources

Such technologies range from alternative forms of energy generation to smart materials and water and wastewater treatment. The concept extends beyond environmental technologies that historically dealt more with end-of-the-pipe solutions to regulatory requirements than with front-end products that address market needs and simultaneously produce an environmental benefit.

Cleantech is supported by growth in technological innovations from other spheres, in particular, nanotech, biotech and IT which can often be applied to, or enable, cleantech end-market applications. Deployment of these technologies to cleantech ends is opening up new and large markets, which is why it has been so attractive to venture capital type investors. It also means that cleantech is more of an investment theme than a 'sector' per se, as cleantech spans several different industry verticals, including energy, water, industrials and agriculture.

The Cleantech Network™ analyses cleantech investments into the following 11 segments.

- 1. Agriculture**
Natural pesticides and herbicides, land management, technologies that support organic food and aquaculture.
- 2. Air & Environment**
Cleanup/safety, emission control, monitoring/compliance, trading & offsets.

- 3. Energy Efficiency**
Lighting, building materials, glass, other
- 4. Energy Generation**
Wind, solar, hydro/marine, biofuels, geothermal
- 5. Energy Infrastructure**
Management, transmission
- 6. Energy Storage**
Fuel cells, advanced batteries, hybrid systems
- 7. Manufacturing/Industrial**
Advanced packaging, monitoring & control, smart production
- 8. Materials**
Nano, bio, chemical & other materials with cleantech applications
- 9. Recycling & Waste**
Recycling, waste treatment
- 10. Transportation**
Vehicles, logistics, structures, fuels
- 11. Water & Wastewater**
Water treatment, water conservation, wastewater treatment

Cleantech Ventures Pty Ltd use the following segments to classify cleantech:

- Advanced Materials
- Agriculture
- Air Quality
- Biofuels
- Cleaner Coal and Gas
- Distribution
- Efficiency
- Fuel Cells
- Recycling
- Renewable Energy
- Storage
- Water

VENTURE CAPITAL INVESTING IN AUSTRALIA

Entrepreneurs who hope to build their ventures into successful companies need to test their product or service, expand operations, hire staff, buy materials and perform other activities needed to operate and grow the business. All of these activities require capital - their needs can rarely rely on internally generated revenue or from the founders' initial investments alone. Venture capitalists provide one such source of capital. These are professional fund managers who invest equity into young and growing companies. Venture capital (VC) is an investment not only of money, but also of skills and time on the part of the investor. It is a long-term, high risk type of investment activity, but one that also promises high - and sometimes spectacular - returns.

VC in Australia is often classified as a sub-category of the asset class 'private equity'. In the North American context, VC is quite distinct from private equity which typically describes buyouts (of various kinds) using debt of more established companies. While there have been several high profile private equity deals taking place in Australia in the past few years, this report concentrates on venture capital as growth capital, as this is where we find many of the most innovative technologies, products and services emerging.

VC investors tend to invest in syndicates, which allows for a more diversified investment portfolio across technologies, regions and stages of investment. In any one venture capital fund under management, several companies may be invested into. Often several investment rounds are required for each company, with each round typically increasing in size as time proceeds. A common way of tracking venture capital investment activity is by counting the number of rounds (or deals) made, as well as the total amount of capital placed in each deal. Such investment deals are commonly categorised as:



Photo: Origin Energy

- **Seed**
Investment in a new company with an idea or technology, but as yet with no commercial production. This may involve continued research and product development and sometimes includes venture capitalists as well as other investors such as business angels, friends and family, or government funds. Typical investment range is from \$50K to \$1m.
- **First or Early Stage**
Investment in fast growing companies for product development and initial marketing, manufacturing and sales activities. The Companies' product(s) are either in development or commercially available. The typical investment range is from \$250k to \$10m.
- **Follow-on or Expansion**
Funds provided for the growth and expansion of a company whose sales volume is increasing and which is breaking-even or profitable. Typical investment range is from \$2m to \$20m.

VC funds generate returns when they 'exit' their investment, by either selling their shares to public investors (after an IPO), a company (an acquisition or merger) or to another private investor (such as a buyout).

The VC market in Australia - like the Australian economy at large - has proven resilient over the past few years. Nonetheless, in 2006 it remains a much smaller proportion of GDP than the UK and US. Relative to GDP, the level of Australian private equity investment (including VC and later stage buyouts) investment is around three-quarters of that in the UK³. Federal and state government schemes have aimed to foster VC type investing. In fact, many Australian VCs participated in government-sponsored programmes (in 2001, over half of the 150 VC investment vehicles were participating in a government program)⁴. Specific policies have created government backed funds, reduced onerous taxation rules, commercialised public sector research, and provided new opportunities for investment. In the past two years the policy focus has been on incentivising foreign investors into Australian VC/PE funds.

DRIVERS FOR CLEANTECH: FROM LUCKY TO CLEVER TO CLEAN

There are several factors that together have created the cleantech opportunity, and it is their co-existence and convergence that makes this emerging sector so attractive to investors. The following key drivers are highlighted that are especially pertinent to Australia.

The Lucky Country Commodity Boom

The Australian economy is now in its 16th year of expansion, during which time it has grown at an average annual rate of 3.6%. Australia is ranked third in the world for quality of life, education and standard of living, according to the 2006 United Nations Human Development Report. A surge in spending on private housing, the commodity boom and growth in general consumption cushioned the economy against the effects of weak global growth in 2001-02, and the impact of one of Australia's worst-ever droughts⁵.

As a large commodity producer, Australia has done well out of a surge in the prices of its exports thanks to booming global demand, notably from China. Aside from minerals and metals, Australia is a major exporter of energy resources:

- It is one of the world's largest coal exporters. 75% of the coal mined in Australia is exported, mostly to eastern Asia. Coal provides about 85% of Australia's electricity generation.
- It is the world's second largest uranium producer. Australia holds 40% of the world's known low-cost recoverable uranium reserves.
- It is the fifth largest global LNG exporter - the International Energy Agency predicts Australia will be the third largest by 2010.

The natural resource commodity boom has some interesting connections to cleantech innovations. Markets are being created by the need for greater efficiency in production, transportation and processing of materials to reduce costs and keep operations running safely, smoothly and with reduced overall environmental impact. The commodity boom in Australia has also generated tax revenues so that the government can continue to support diversification of the economy.

The Clever Country: Technology Readiness

The cleantech industry today is resting on a trajectory of intensive research, development and testing of new technologies from the past 20 odd years. Added to this, cleantech applications can be generated out of many different technologies, some of which are only now exploring cleantech as an end-market application.

Australia invests heavily in Research & Development. The national research agency, CSIRO (with 6000 employees), is held in high regard worldwide. Its new flagship structure has a strong focus on environmentally sustainable technology development across all cleantech sub-sectors - it is estimated that 40% of CSIRO's budget is directed to cleantech and advanced materials. Australia has a network of 70 Co-operative Research Centres (CRC's), 9 of which are focused on cleantech sub-segments and several others developing technologies that may lead to cleantech applications. Australia's 41 universities provide a strong source of technology innovation with many participating in energy, water, advanced materials and nanotechnology centres.

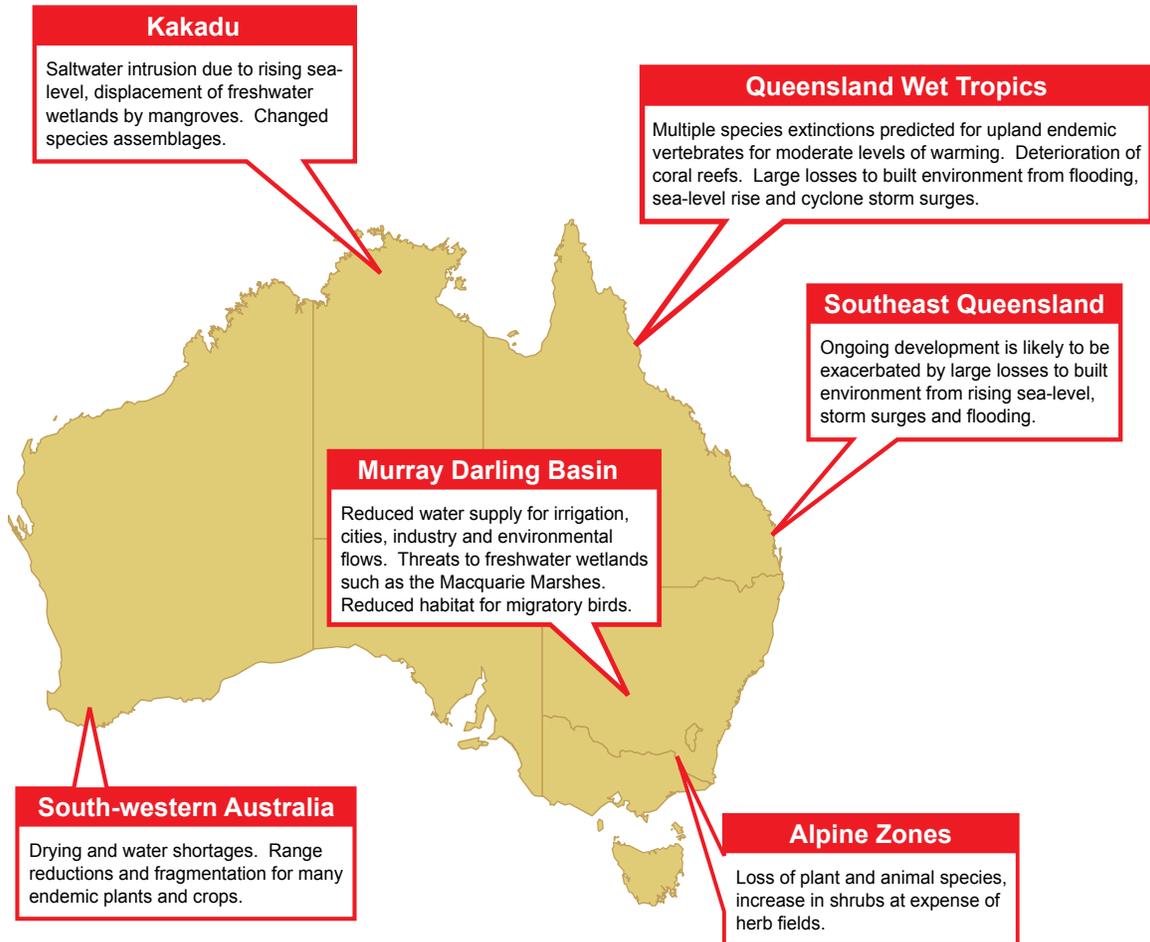
Australian researchers have produced leading work in fields like quantum computing, software engineering, wireless networking, photonics, network management, global positioning systems and mobile telephony. Added to this are several early cleantech breakthroughs - such as the development of the solar hot water heater by R N Morse at CSIRO in 1953, the invention of continuous self-cleaning micro filtration by a group of engineers and scientists

led by Dr Doug Ford in 1984; and Professor Martin Green's laboratory at the University of New South Wales (UNSW) setting a string of efficiency records for solar cells, raising the amount of sunlight energy that can be converted into electricity from 18% in 1983 to 24% in 2004. Technology from the lab at UNSW was the basis for the development of Suntech Power Holdings in China, which is now the largest solar module manufacturer in the world and had one of the world's largest IPOs in 2006.

Despite the existence of technological innovation and R&D, other research of entrepreneurial activity in Australia suggests that there is a gap in successfully commercialisation of innovation, in part driven by a lack of appropriate financial capital. The Westpac Global Entrepreneurship Monitor study of 2004 and 2005⁶ in Australia indicated that many entrepreneurial companies have low-growth expectations, are not export-oriented, and rank low on the scale of innovation in terms of both technologies used and business models. It also appears that financial markets are not adequately catering for home grown new ventures that have high growth potential. Australia faces a lack of independent and experienced angel investing (most business angel investors are family members or have close ties to the founders). Early stage capital from professional sources is also hard to access. Nonetheless, the same Westpac Global Entrepreneurship Monitor study ranks Australia third in the world for entrepreneurial spirit. Tapping that resource for growing successful cleantech companies will be key.

Environmental Pressures and Responses

Australia faces many different environmental pressures, the two gaining the most attention recently being climate change and drought. There has been a sea-change in how accepted these issues have become by Australian industry in the past few years; consideration of climate change risks is now mainstream⁷.



Source: IPCC 2007

Australia has had the highest per capita Greenhouse Gas emissions in the world due to a high reliance on coal, and high per capita energy consumption (Australia Institute & IIASA 2004). Australia is also one of the countries most at risk from climate change according to the UK Stern Review on the Economics of Climate Change (2006) and insurance companies such as the Insurance Australia Group who have projected more frequent and intense storms, floods, heat waves and bushfires⁸. Most large companies in Australia are now factoring in climate change (and the likely regulatory response) into their investment plans and risk assessments. There is a general perception that Australia is already experiencing climate change impacts, including stresses on water supply and agriculture.

Australia is the world's driest inhabited continent. A 10 year nationwide

drought has increased the focus on water use efficiency and sourcing. Nearly all Australian capital cities currently have tough water restrictions in place and several desalination plants have been built or are planned.

The Global Water Intelligence's Desalination Tracker⁹ shows the following desalination plants/plans in Australia as of August 2007:

- Perth (WA): 123,300 m³ per day - in operation. The energy used by the plant is offset by a wind farm that was purpose built to be equivalent in scale.
- Gold Coast (Qld): 125,000 m³ per day - under construction.
- Sydney (NSW): 250,000 m³ per day expandable to 500,000m³ per day - contract awarded.

- Upper Spencer Gulf (SA): 120,000 m³ per day - feasibility and environmental impact study under way.
- Wonthaggi, Gippsland (VIC): 411,000 m³ per day to be connected the Melbourne via a 85km pipeline - feasibility study under way.
- Wyong (NSW): 8,000 m³ per day - development application approved.

There are also several smaller desalination plants operating for mining projects (largest around 20 ML/d) and many are on the drawing board for small communities and island resorts.

Technologies which help to improve Australia's adaptation to climate change will find large markets as actual physical impacts of climate change become more visible. The Murray Darling Basin, accounts for the majority

of water use in Australia and supplies water to Queensland, NSW, SA and VIC, is drying up - seriously affecting domestic and agriculture water supply as well as river health.

Policy Push

There are many Federal, State and Local government policies and programmes that intersect with cleantech at various stages in the value chain (see box for Federal programmes). Several States have already instituted mandatory renewable energy targets and greenhouse gas trading schemes. While the Federal Government has chosen not to ratify the Kyoto Protocol, it was announced in June 2007 that a federal trading scheme will be established and that trading will be likely to occur in 2011 (Australian Government, Department of the Prime Minister). However, when and how Australia enters the global market largely depends on the results of the upcoming Federal election (Nov. 24th 2007) and the dynamics of greenhouse gas regulations internationally. The Federal Government is also participating in the Asia Pacific Partnership on Clean Development and Climate (AP6) along with the USA, Japan, China, India and the Republic of Korea to focus on the development, deployment and transfer of cleaner, more efficient technologies in the region¹⁰.

In regards to water, the Federal Government has announced a \$10bn scheme to address the problem - a major proportion of the expenditure is for infrastructure repair and replacement, metering and more efficient irrigation systems/technology. Plans are underway in several states to mix recycled water with fresh water for domestic consumption (despite consumer opposition). Pressure to increase water efficiency is also driving development in more drought resistant crops, advanced fertilizers, and technologies to improve the application of inputs, harvesting and processing. In addition, an innovative 'cap and trade' water regime has been introduced in the Murray Darling Basin which restricts the volume of water that may be diverted from the rivers for consumptive use by allocating tradable permits.

Federal Programmes

- \$2bn over 2004-2009 years for the "Australian Government Water Fund" which invests in water infrastructure, technologies and management of water resources. \$200m of these funds are set aside for the 'Water Smart Australia' grant program aimed at "accelerating the development and uptake of smart water technologies and practices".
- \$500m "Low Emissions Technology Demonstration Fund (LETDF)" - grant requiring matching industry funds.
- \$230m "Ethanol Production" grants.
- \$205m "Renewable Remote Power Generation Program."
- \$200m p.a. "Commercial Ready" grants for companies undertaking research and development, proof of concept and early-stage commercialisation.
- \$170m "COMET" program - grants for individuals and start-up companies commercialising emerging technologies and for working prototypes.
- \$100m over 5 years for co-operation for deployment of clean technologies as part of the "Asia -Pacific Partnership for Clean Development and Climate (AP6)".
- \$100m "Renewable Energy Development Initiative (REDI)" - grants requiring matching industry funds.
- \$75m "Solar Cities Program".
- \$52m "Photovoltaic Rebate Program".
- \$20m "Advanced Energy Storage Technologies" - grants requiring matching industry funds.

- \$10m "Biofuels Capital" Grants - to build biofuel production capacity.

In addition, specific programmes aimed to support the venture capital industry include:

- \$200m "Innovation Investment Fund" - to develop VC managers/funds for seed/early/expansion stage investments - \$20M per fund with minimum matching private funds.
- The "Early Stage Venture Capital Limited Partnerships Program" (launched in 2007), allows approved funds to be tax exempt.

State governments also operate funding programmes aimed at supporting clean technology innovation and demonstration. Victoria appears to be leading in this space and operates the following programmes:

- \$80m+ for pre-commercial brown coal demonstration projects.
- \$29m for the Centre for Energy and Greenhouse Technologies to equity fund the commercialisation of new sustainable energy technologies
- \$12m for Brown Coal Research and Development
- \$10m for Sustainable Energy Research and Development - including renewable energy, energy efficiency and clean distributed generation.
- \$42m (to date) Sustainability Fund - waste, water and energy projects.
- \$13m (to date) Smart Water Fund.
- \$8m Renewable Energy Support Fund.

Consumer/ End Market Demand Pull

Australia's population is largely urban (up to 88% of Australians live in urban areas according to the UN Human Development Report, 2004), however for regional and remote population centres accessing basic services has long been an issue, for example constraints in electricity transmission network capacity. The high costs of building new infrastructure makes distributed energy and water technologies an attractive option.

In part due to the drought, Australians have a heightened concern over climate, water, food security, fire and energy issues. This surge in consumer awareness has placed pressure on companies to reduce their contribution to the problem, oftentimes by deploying clean technologies. Companies are also exploiting this trend as a new market opportunity, serving consumer demand for environmentally friendly products.

In addition, new markets for cleantech products are surfacing worldwide focusing on the efficiency and cost saving aspect of cleantech - less on their environmental credentials. For example, the massive growth in mobile telephony and computing has put pressure on existing battery technologies. The competitive market has brought to the fore the need to reduce costs, improve energy storage capacity and reliability, and expand longevity.

Capital Available

Superannuation (Pension) funds continue to be the largest single source of new capital in VC Funds, a consequence of the way Australians finance their retirement (employer contributions to employee superannuation funds have been compulsory since 1990). Currently Australian superannuation fund managers only direct a small fraction of their total funds (typically less than 2%) into venture capital as an asset class. However, given the scale of the funds under management,

it still provides a large amount of capital. Institutional investors (who serve as the Limited Partners to venture capital funds) are increasingly formulating policies and strategies that serve to increase demand for cleantech investing. Several Australian superannuation funds have taken a strong stance on environmental, social and governance issues with VicSuper considered a leader and Catholic Super, Vision Super and HESTA as other examples.

In addition, international investors are starting to look at Australian VC deals, given the escalating degree of competition for deal flow that is occurring in North America and Europe, and also the relatively lower valuations Australian companies typically seek in exchange for equity. Most of these investments have been syndicated with Australian investors in the past, though there have also been some examples of direct investments made. Global public market demand for cleantech companies has also been strong, indicating a good exit market for equity investors and a positive capital raising environment for companies.



Photo: Australian Wind Energy Association

FINDINGS: VENTURE CAPITAL AND PRIVATE EQUITY INVESTMENTS INTO AUSTRALIAN CLEANTECH COMPANIES

Investment levels in cleantech companies in Australia have not experienced the same degree of growth as in North America and Europe in the same period, and have followed different trajectory. On the other hand, while VC investment activity was down worldwide during 2001-2003, in Australia, these were relatively stronger years for cleantech investments. Australia did not suffer the same economic downturn during that period, its economy and stock market stayed strong. In addition, the region had not experienced the same kind of tech bubble in the 1999-2000 period as North America, so the 'drop' was not as precipitous. However, while North America and European cleantech investments grew rapidly in 2003-2006, Australian cleantech investments actually declined.

The following key findings give some sense of the level and type of venture capital investing activity in Australian cleantech companies.

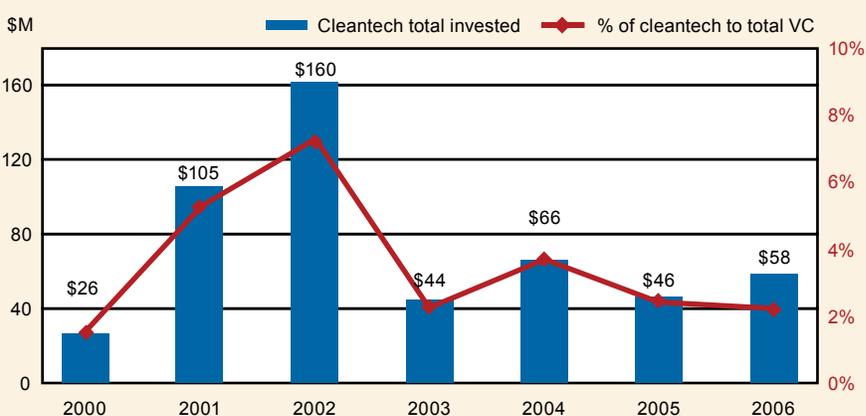
- Between the years 1999 and Q1 2007, venture investments in Australia grew to a total of \$539m (\$360m US) spread over 174 deals in 75 different cleantech companies. This represents an average of \$65m (\$43m US) invested in cleantech per year and \$16m (\$11m US) per quarter, and an average of 21 deals per year or 5-6 deals per quarter. Investment amounts and number of deals vary by the quarter; such fluctuation is to be expected given the relatively small sample size.
- 75 unique Australian cleantech companies attracted venture capital type investment in the period, each company on average receiving \$7.1m (\$4.7m US) in total.

- Cleantech remains a modest segment relative to venture capital investing as a whole in Australia. The dominant industries capturing venture capital were Consumer-related; Manufacturing/Industrial; IT, Media, Electronics & Communications; and Biotechnology/Life Sciences, according to the Australian Venture Capital Association and The 2005-6 Australian Bureau of Statistics Venture Capital Survey.
- We estimate that in the fiscal year of 2000 (i.e. Q3 1999-Q2 2000), Australian cleantech was only 1% of all venture investment amounts in Australia. This grew to 7% in 2002 but dropped back down to 2% in the fiscal year of 2005-2006¹¹. By comparison, in 2006 cleantech garnered up to 13.5% of all VC in Europe, and 10% of VC in the US.
- Australian venture investments into cleantech have not grown at nearly the same rates as in North America and Europe. The VC investments into Australia cleantech companies represents some:
 - > 14% of the total number of US cleantech deals, but only 4% of the total US cleantech VC amounts invested between 1999 and 2006;
 - > 18% of the total number of European cleantech deals, and 6% of the total European cleantech VC amounts invested between 2003 and 2006; and
 - > 51% of the total number of Canadian cleantech deals, and 25% of the total Canadian cleantech VC amounts invested between 2002 and 2006.

Figure 5: Australian Cleantech VC Investments Amount Invested and Number of Deals by Quarter



Figure 6: Australian Cleantech VC: Amount Invested in Cleantech VC and % of Cleantech to total VC invested by Fiscal Year (Source for Total: ABS, 2007)



- While Australian cleantech investing is small by comparison to the US, Europe and Canada on a dollar for dollar basis, adjusting for the relative size of the economies (using GDP as a measure)¹², Australia's cleantech VC investments are 47% of the US and 36% of Canada.
- Nonetheless, Australia's cleantech investments, as a percentage of GDP have fallen behind Canada and the US, where total yearly cleantech investments as a percentage of GDP have grown substantially, as seen in Figure 7.
- The differences in percentages between the amounts invested and number of deals indicates both that deal sizes are smaller in Australia. Anecdotal evidence indicates that valuations for Australian cleantech companies are also lower than Europe and especially the US.
- Figure 10 lists the 20 cleantech companies who raised the most venture capital, pre-IPO. We can see that NSW and Victorian companies dominate the list. In North America and Europe, comparable rankings tend to be dominated by energy generation technology companies – here we see fuel cells, agriculture and transportation segments taking the lead.

Why is it that Australian Cleantech investments declined after 2002 while internationally it boomed? Most of the same global drivers affecting cleantech in Europe and North America – such as energy security and concern over climate change – also affect Australia. However, the political framework for dealing with these pressures has responded differently in Australia, especially compared with Europe. Given that Australia's Federal government has followed a similar path to US Federal policy, with respect to Kyoto, the big difference is in the scale of what individual States have achieved in the US compared with Australian State governments. In addition, cleantech companies in North America benefit from access to a larger, less conservative pool of risk capital than that which is available in Australia.

The decline in the amount invested since 2002 is also partially due to an increase in early stage deals (which typically raise smaller amounts) combined with some expansion stage cleantech companies listing on stock exchanges (worldwide) as an alternative to raising later stage

venture capital or private equity. As many of these earlier stage companies grow and require greater capital infusions, we expect the total amounts invested into cleantech VC in the region to increase in the coming years.

Figure 7: Cleantech VC investments as a percentage of Total GDP* per country and year in the USA, Canada and Australia

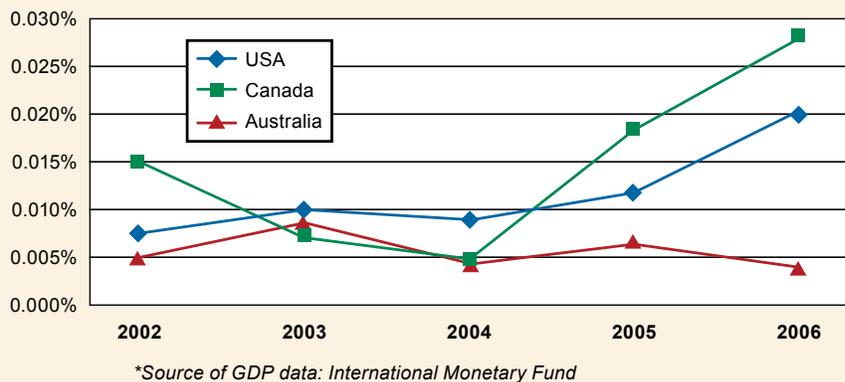


Figure 8: Australian Cleantech VC Investments Average and Median Deal Size by Year (AUDm)



Figure 9: Australian Cleantech VC Investments Average and Median Deal Size by Stage of Investment 1999-Q1 2007 (AUDm)

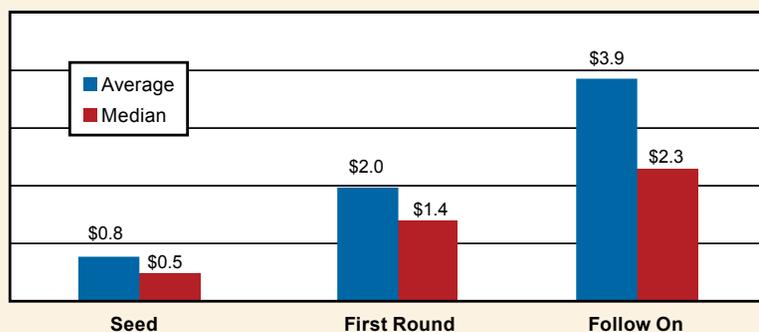


Figure 10: Table of Top 20 Australian Cleantech Companies by Amounts Raised, pre-IPO

Rank	Company Name	Segment	State	Total AUDm
1	Ceramic Fuel Cells, Ltd.	Energy Storage	VIC	50.5
2	Cap-XX Pty., Ltd.	Energy Storage	NSW	48.2
3	Beeline Technologies Pty., Ltd.	Agriculture	QLD	43.5
4	Agrilink Holdings Pty., Ltd.	Agriculture	SA	36.4
5	Pacific Handling Solutions, Ltd.	Manufacturing/Industrial	VIC	33.1
6	Environmental Waste Technologies Pty., Ltd.	Recycling & Waste	NSW	32.9
7	SIGTEC Pty., Ltd.	Transportation	VIC	28.3
8	Permo-Drive Technologies, Ltd.	Transportation	NSW	24.1
9	Agri Energy, Ltd.	Energy Generation	VIC	14.0
10	Pro-Pac Group, Ltd.	Materials	NSW	13.1
11	Energetech Australia Pty., Ltd.	Energy Generation	NSW	12.9
12	Geodynamics., Ltd.	Energy Generation	QLD	12.4
13	Wind Corporation Australia, Ltd.	Energy Generation	NSW	12.3
14	Plantic Technologies, Inc.	Materials	VIC	11.4
15	Petrecycle Pty, Ltd.	Recycling & Waste	VIC	10.9
16	Total Eden Holding Pty., Ltd.	Water & Wastewater	WA	10.0
17	Traffic Technologies, Ltd.	Energy Efficiency	VIC	9.1
18	GridX Power, Ltd.	Energy Generation	NSW	8.0
19	HydroChile Pty, Ltd.	Energy Generation	VIC	8.0
20	Hancock Victorian Plantations, Ltd.	Materials	VIC	8.0



INVESTMENT BY STAGE OF GROWTH

On average, the deal sizes for Australian cleantech companies reduced between 2004 to 2006, which is in contrast to the US, Canada and Europe activity in the same period. Yet further analysis revealed that this was partly due to an increase in seed stage investments being made between 2004 and 2006. In 2003, there were no seed stage investments made and only two first round investments. This pattern is most likely following broader

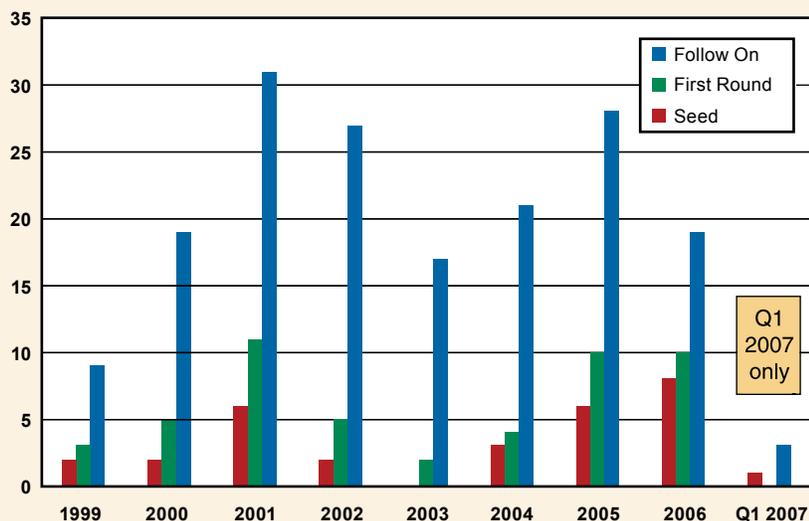
cycles in the venture industry, including fund-raising which influences investor's appetites for taking on new companies in early stage deals.

- The average size of deals also fluctuated in the period, and is often skewed by a few larger deals (which the median deal size corrects for). The overall average deal size was \$3.1m (\$2m US) while the median deal size was \$1.5m (\$1m US). These average deal sizes are small compared to what we see in North America and Europe. In Europe average cleantech deal sizes in 2003 were

\$6.4m (\$4.3 US) climbing up to \$16.7m (\$12.6m US) in 2006. In North America, the average deal size almost doubled from \$8m (\$5.3 US) in 1999, to \$15.4m (\$11.6 US) in 2006.

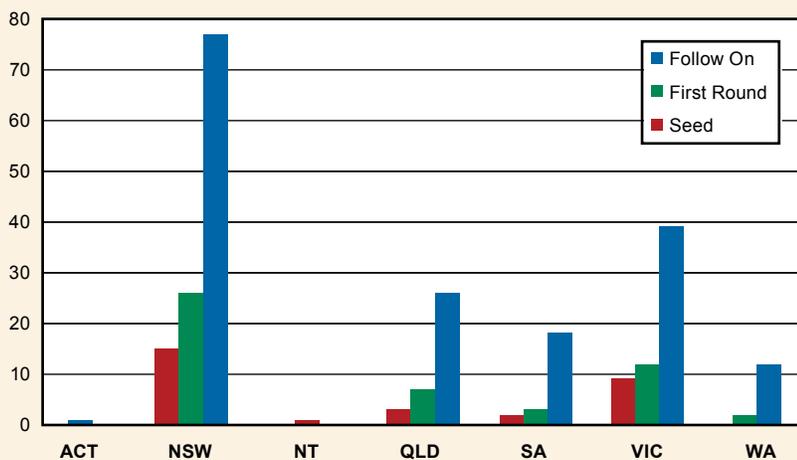
- Breaking out the average and median deal sizes by stage of investment shows that:
 - > Seed stage deals were on average \$0.8m (\$0.5m US) with a median of \$0.5m (\$0.3m US).
 - > First or early stage deals are on average \$2.0m (\$1.3m US) with a median of \$1.4m (\$0.93m US).
 - > Follow-on or expansion stage deals display more variation in deal size.

Figure 11: Australian Cleantech VC Investments Number of Deals by Year and Stage



The average amount invested per deal is \$3.8m (\$2.5m US) while the median drops back to \$2.3m (\$1.5m US). This is because of a few larger follow-on deals, the two largest being Pacific Handling Solutions capital raise of \$33.1m in Q3 2003 (\$21.6m US), and Cap-XX Pty. Ltd. raising \$32.4m in Q3 2001 (\$16.8m US).

Figure 12: Australian Cleantech VC Investments Number of Deals by State and Stage, 1999-Q1 2007



EMERGING CLUSTERS: REGIONAL ANALYSIS

Australia is a large country, whose population is highly urbanized and concentrated on the Eastern, South Eastern and Western coasts. Technology companies follow the same pattern – we found that cleantech companies raising VC investments appear to be clustered around the main Australian cities.

- The State of NSW (primarily the Sydney region) leading in terms of total amounts invested as well as number of deals.
- Victoria, the second largest state for VC deals, has cleantech companies which on average are raising larger amounts per deal than NSW.
- There are proportionally more seed and early stage deals in NSW and Victoria than in Queensland, South Australia and Western Australia.
- Some technology clustering also seems to be occurring; for example, South Australian cleantech deals were nearly all in the Agricultural sector, with Queensland also showing several agricultural companies. Western Australia is developing a water technology cluster. Victoria has the majority within energy and recycling.

Global Markets

Many entrepreneurial Australian companies are “born global”, that is, they have an international focus and footprint from the start of the new company in order to reach large end markets outside of the region. This can put extra pressure on new firms’ resources, and explains why some Australian firms have instead moved closer to their end markets or chosen to license their technology instead of building it up into an independent company. Cleantech companies face the same dilemmas, especially those addressing industrial and manufacturing markets in which Australia is relatively weak. It is thus especially important for

Australian cleantech companies to form international alliances and why an international investor can be so valuable to these companies.

Figure 13: Australian Cleantech VC Investments Amount Invested and Number of Deals by State, 1999-Q1 2007

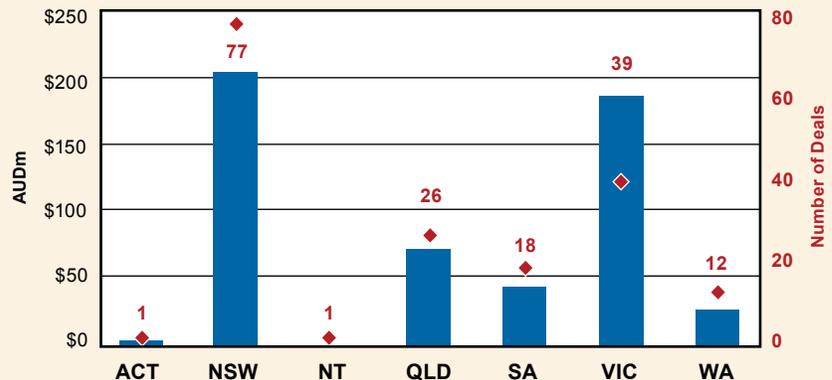


Figure 14: Australian Cleantech VC Investments Number of Deals by State and Segment, 1999-Q1 2007

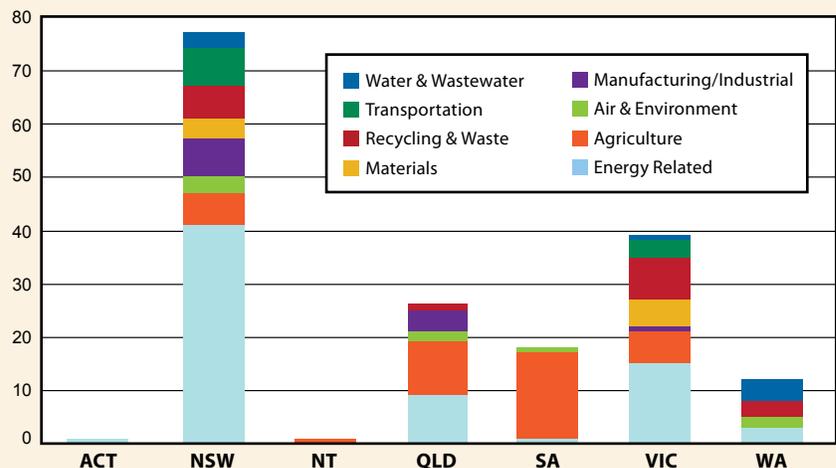
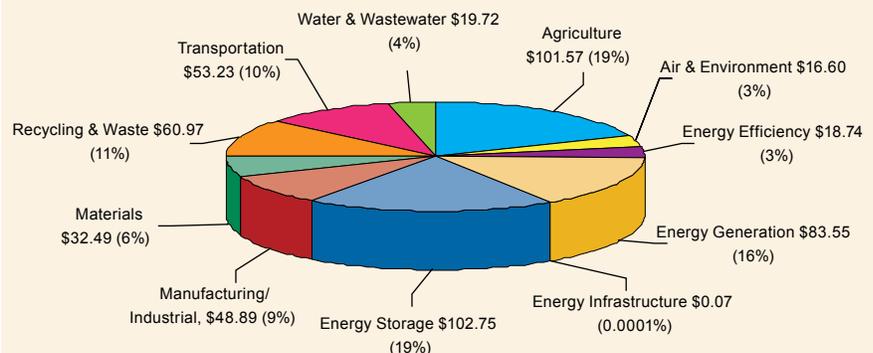


Figure 15: Australian Cleantech VC Investments Amount Invested by Segment, 1999-Q1 2007 (AUDm)



WHERE HAS THE MONEY GONE? SEGMENT AND TECHNOLOGY ANALYSIS

Cleantech companies are spread across different industry verticals. The Cleantech Network™ categorises them into eleven different segments, with further sub-segments therein. What segments generated the most venture capital? The pattern of companies that received VC funding in Australia amongst these segments is somewhat different to what we see in Europe and North America.

- Agricultural technologies** are garnering a greater relative proportion of cleantech deals (22% of number of cleantech deals, and 19% of the total amount invested) than in Europe and North America (for which typical percentages are 4-5%). This investment was led by companies such as Agrilink, Beeline Technologies, Hatchtech, and Micromet – each of these companies have received several rounds of VC funding since 2000-2001.
- Consistent with European and North American experience, the **Clean Energy** segment as a whole dominates with 38% of the total amount of VC invested in the period, and 40% of deal flow. However this trend is less

exaggerated than in Europe and North America. For example, the European clean energy segment captured over 70% of the amounts invested and 58% of the number of deals in 2002-2006. Seed and early stage funding is mainly going into energy generation technology companies so we can expect more growth in that segment in coming years.

- The **Energy Storage** segment is receiving more VC than Energy Generation. Energy Storage

companies in Australia are largely centered on the development and commercialisation of solid oxide fuel cells, flow batteries, ultra-capacitors hydrogen storage technologies.¹³

- > **Energy Generation** companies in Australia are spread between biofuel producers, wave and tidal, geothermal and wind technologies. There was just one solar energy company we tracked as receiving VC backing (Sustainable Technologies International -

Figure 16: Australian Cleantech VC Investments Number of Deals by Segment and Stage, 1999-Q1 2007

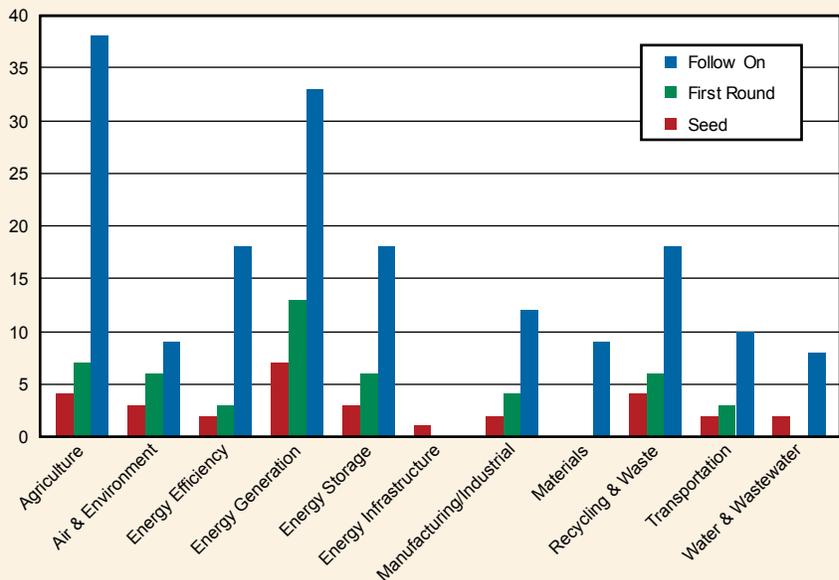
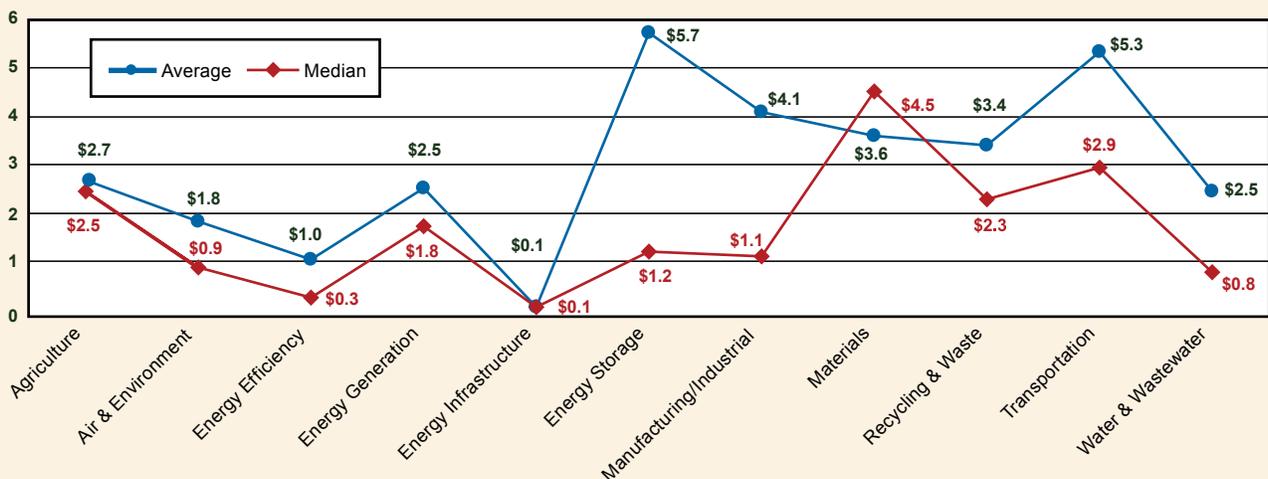


Figure 17: Australian Cleantech VC Investments Average and Median Deal Size by Segment, 1999 - Q1 2007 (AUDm)



developing dye sensitised solar cell technology - see Dyesol). This is surprising given the abundance of solar energy resources in Australia as well as its known leadership in developing solar technologies in the past 20 years. There were, however, four solar IPOs on the Australian Stock Exchange - Advanced Energy Systems (AES) in 2000 raising \$6.3m (3.6m US); Dyesol Ltd. (DYE) in 2005 raising \$3.5m (\$2.7m US); Enviromission Ltd (EVM) in 2001 raising \$3.5m (\$1.8m US) and Solco Ltd (SOO) in 2000 raising \$5m (\$2.9m US).

> There was a notable lack of venture capital investments into 'clean coal' technologies. Notable because of Australia's heavy reliance on coal for its energy needs and also because of the high degree of government and industry interest in developing the

technologies. An explanation could be the capital intensive nature of these technological developments requiring a different level of funding than VCs could typically provide. Cleaner coal development is being undertaken by larger companies. For example, White Energy is developing cleaner black coal technologies aimed at drying/briquetting to reduce both freight cost and GHG emissions.

> For **Water and Wastewater technologies**, while the abundance of solar energy resources did not seem to translate into VC financings in Australia, the scarcity of water resources did make an impact both on public and private markets. Water technologies funded cover the spectrum of monitoring and diagnostics, conservation devices, irrigation management,

wastewater treatment and storm water systems and services. Western Australia has several water/wastewater deals suggestive of an emerging water technology cluster there. This is probably due to the fact that Perth (the state's capital) has faced water scarcity issues for many years. Its water supply is groundwater at 56%, reservoirs at 27% and the balance from desalination (The WaterCorporation, 2007).

- **Transportation technologies** are also a greater proportion - 10% in Australia by amount invested, compared to only 0.6% in Europe and 4% in North America (between 2003-2006). Technologies here include efficient engine designs and intelligent transport systems.

- The well established **Water and Wastewater technologies** industry has experienced some VC investment and buyout activity. In fact the three largest buyouts in our dataset were all recycling/waste companies and the publicly listed companies with the largest market caps were all in this segment.

- **Materials and Manufacturing** companies appear to mainly attract follow-on expansion stage investments with earlier stage companies in these segments either finding non-VC capital to grow, or looking offshore.

Figure 18: Australian Clean Energy Generation VC Investments Number of Deals by Sub-Segment, 1999-Q1 2007

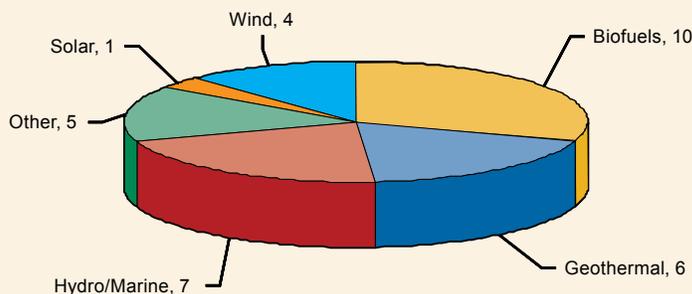


Figure 19a: N. American Breakdown of Cleantech Investments by Segment, 2002-Q1 2007

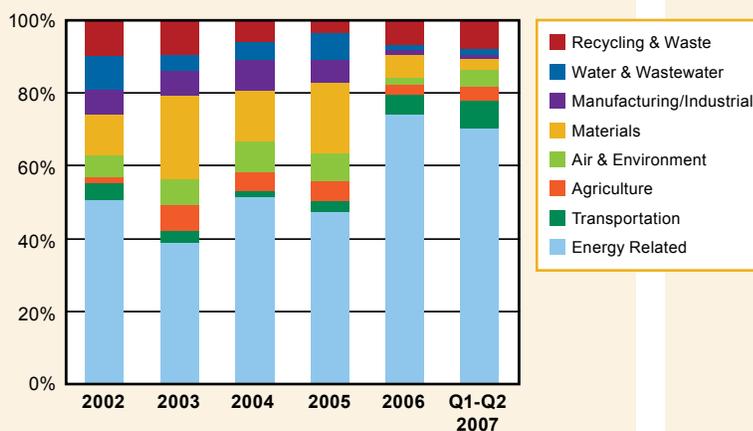
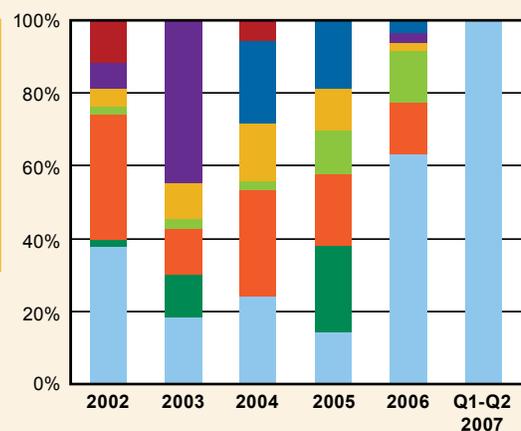


Figure 19b: Australian Breakdown of Cleantech Investments By Segment, 2002-Q1 2007



WHO WERE THE INVESTORS IN CLEANTECH?

A diverse collection of investors populate the cleantech landscape – from specialists in cleantech to generalists; VC investors to investment banks, private equity and corporate/strategic investors; and a mix of foreign and Australian fund managers.

- At least 74 different unique investment houses were identified in our dataset – (not including several ‘undisclosed’ investors).
- 75% of the disclosed investors were based in Australia, the international investors being a mix of venture capital firms, large banks, and corporate/strategic investors. The top 15 investors (ranked by how many investments they had participated in) were all Australian, and several of them are specialist funds.
- Venture Capital firms accounted for almost half of the investors (49% of the total number of disclosed investors) however they participated in over two thirds of the deals. 30 of the 42 venture capital firms identified were Australian. The other VC firms were from Germany, New Zealand, Portugal, Singapore, Switzerland, UK, and the US. Australian venture capital firms were located mainly in Sydney, Melbourne and Brisbane, but tend to invest across the country.
- Australian Corporate/Strategic investors are also the most active in that category, including ARC, Phosogenics, Metasource, Energex and Nido Petroleum. The larger international companies who have been investing include: Intel, General Electric, Mitsui, and Shell.
- Only 9 investment funds were specialising in cleantech for their whole fund, and of these, 2 have since closed and only 5 are based in Australia.
 - > The Australian specialist funds are some of the most active investors in the dataset, as can be seen in Figure 20.
 - > Recent closings of specialist funds include Cleantech Ventures who raised \$50m (\$41m US); Macquarie Funds Management Group’s Clean Technology Fund (a fund of funds) first close of

\$120m in March 2007 (they are expected to invest in between 8 and 10 venture capital funds, mostly in North America); and CVC Sustainable Investments (CVCSI), who is currently raising a \$30m fund.

- Many more investors in the dataset are generalist investors (75%) with no particular focus on cleantech. Consistent with European and North American experience, such investors appear to be delving into cleantech on a case by case basis, particularly in energy segments.
- The other group is ‘partly’ cleantech focused, that is, they list cleantech (or related terms like clean energy) as an industry sector in which they would be interested to invest. Some 6 investors (7%) are oriented this way, such as Starfish Ventures and Southern Cross Venture Partners.
- A number of leading investment houses and corporate/strategic investors worldwide are now developing strategies around the cleantech category. Australian generalist investors are likely to follow suit, which will provide an upbeat fundraising environment for cleantech companies.

Figure 20: Top 15 Investors by Number of Deals (Disclosed)

Rank	Investors	Country	Cleantech Focus?	Type of Investor	Rounds
1	CVC Renewable Energy Equity Fund (CVC Reef)	Australia	Yes	Venture Capital	21
2	Gresham Rabo Management	Australia	No	Non-VC Fund Manager	15
3	CVC Sustainable Investments	Australia	Yes	Venture Capital	13
4	Nanyang Ventures	Australia	No	Venture Capital	13
5	Cleantech Ventures (including CEGT Fund)	Australia	Yes	Venture Capital	12
6	Hawkesbridge Private Equity	Australia	No	Venture Capital	12
7	ABN AMRO Capital Management (Australia)	Australia	No	Non-VC Fund Manager	11
8	Equity Partners Management	Australia	No	Venture Capital	11
9	Innovation Capital Associates	Australia	No	Venture Capital	10
10	Technology Venture Partners	Australia	No	Venture Capital	8
11	AMP Capital Investors	Australia	No	Non-VC Fund Manager	6
12	Uniseed	Australia	No	Venture Capital	6
13	CVC Managers	Australia	No	Venture Capital	4
14	CVC Private Equity	Australia	No	Venture Capital	4
15	Starfish Ventures	Australia	Partly	Venture Capital	4

THE BUYOUT BOOM

Debt-financed buyouts have been surging worldwide, including in Australia where some of the most well known companies (such as Alinta, Coles and Qantas) have received buyout bids from international private equity funds. Leveraged Buyout (LBO) activity in the Asia and Pacific regions has grown substantially in the past 12 months, with Australia accounting for more than half of total activity (Standard & Poors, Feb 2007). According to the Australian Venture Capital Association and Thomson Financial, proposed and actual global leveraged buyouts more than doubled

in 2006, to some \$800bn US, but the growth in Australia has been even more spectacular. Buyouts rose from about \$1.7bn (\$1.3bn US) in 2005 to over \$25bn (\$18bn US) in 2006. The effect has been magnified by the relatively small size of the Australian market. There is an increasing public backlash over taking these companies private and increasing their debt levels, which has dampened buyout activity.

Cleantech companies have also experienced the march of private equity in the region, with some 18 deals taking place between 1999 and 2006, most in the \$2m-\$10m range (\$1.3m-\$6.7m US). The following large

deals were the exception, occurring in 2005 and 2006 – all are in the recycling/waste industry:

- BIS Cleanaway Australia's leveraged buyout by Kohlberg Kravis and Roberts (KKR) for \$1,346 m (\$1,014m US) in Q2 2006.
- EnviroWaste Services leveraged buyout by Ironbridge Capital for \$2,743m (\$2,067m US) in Q4 2006.
- Sulo MGB Australia Pty Ltd's leveraged buyout for \$39.5m (\$30m US) by Archer Capital and Management in Q4 2005.

Figure 21: Australian Cleantech Investments 1999-Q1 2007
Number of Investors by Type and Extent of Cleantech Focus

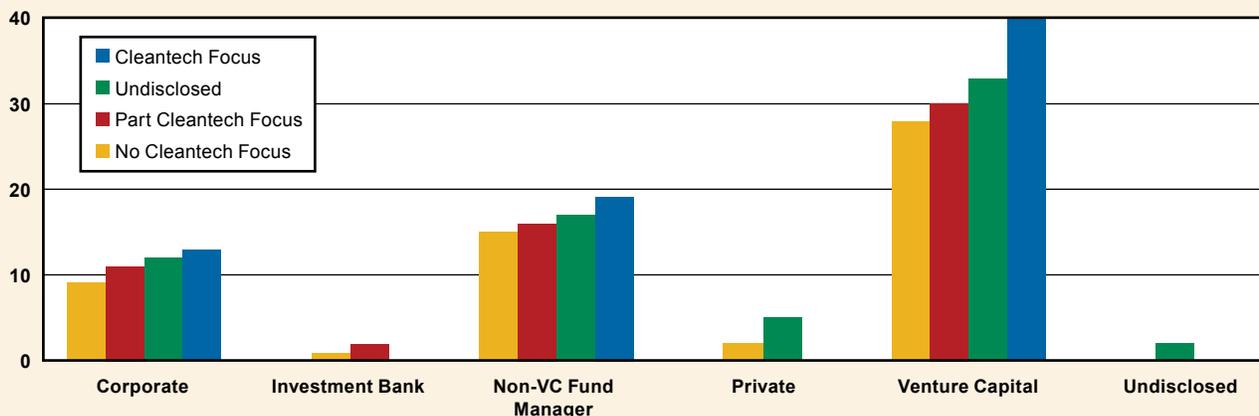
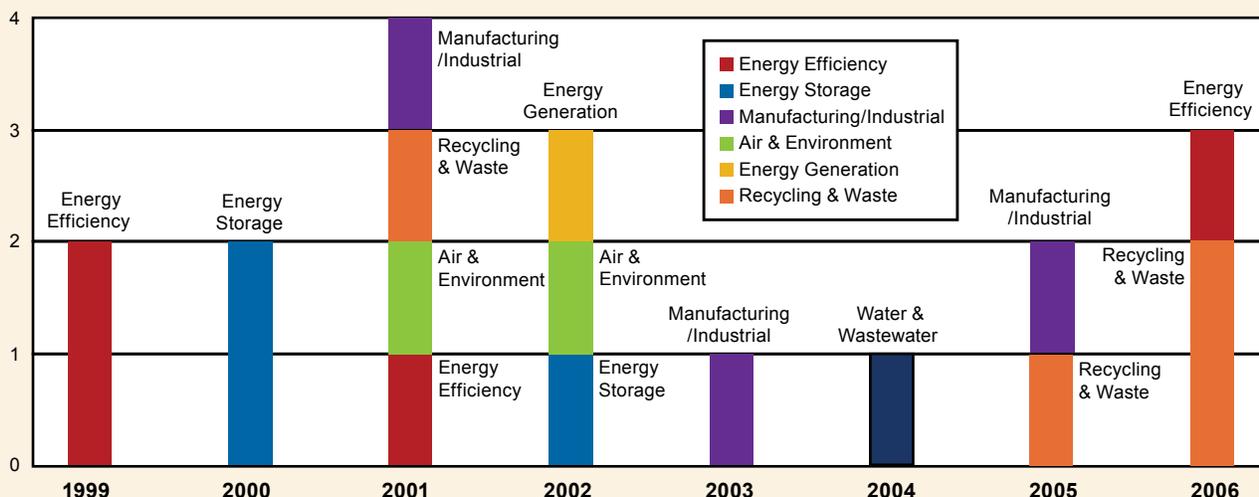


Figure 22: Australian Cleantech Buyouts
Number of Deals by Year and Segment

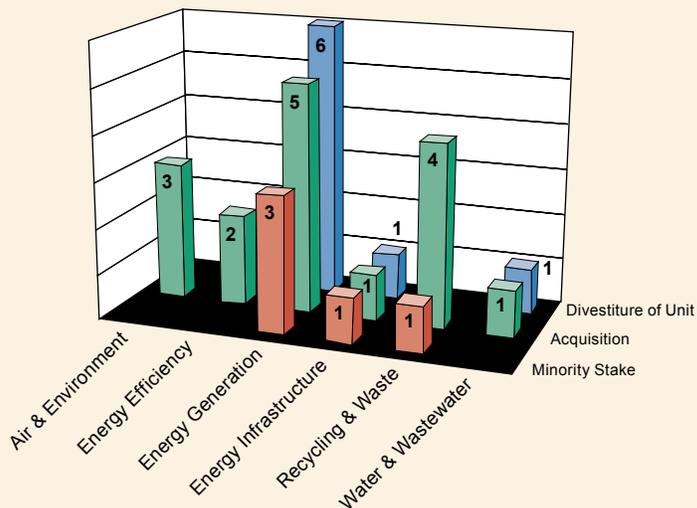


TO MAKE OR BUY? MERGERS & ACQUISITIONS

Data gathered from Mergerstat on Mergers and Acquisitions (M&A) in 2005 through 2006 indicates that there were at least 30 transactions of cleantech companies that had either a buyer or seller (target) who was based in Australia. Although the data does not include all M&A activity due to limited disclosures, analysis of this data suggests the following patterns.

- M&A activity in cleantech was concentrated in the energy generation segment – with 14 of the 30 transactions. Target companies spanned the segment, from solar distributors to biofuel producers, wind farm and geothermal energy developers.
- The majority of the transactions were acquisitions – that is – the sale of the whole company rather than divestiture of business units or mergers.
- Most (over 80%) of the target cleantech companies were Australian companies that were bought or merged with other Australian companies. The other buyers of Australian companies were from Canada, Hong Kong, Malaysia, Spain and the UK. There were several instances of Australian companies buying Asian, European, New Zealand and US companies.
- Interestingly, half of the buyers already had some sort of cleantech focus to their business activity, many staying within their own industry segment. For example, the Bayard Group (who is a supplier of smart energy metering products) bought Cellnet Technology, Inc. (which is a provider of automated meter reading solutions to the utility industry) from GTCR Golder Rauner Ltd in Q4 of 2006 for \$825m (\$705m USD).
- Several buyers were investment funds such as Macquarie Bank Ltd and Babcock and Brown Ltd, who themselves have publicly listed targeted investment funds.

Figure 23: Australian Cleantech M&A Transactions Number of Deals by Sector and Type, 2005 and 2006



AUSTRALIAN IPOs AND THE PUBLIC MARKET

The buzz in cleantech hasn't been limited to new investments. There have been several cleantech company listings on the public equity markets in Australia, the first one we found was in 1974 (Green Pacific Energy Ltd.).

- A systematic search of cleantech company listings on the Australian Stock Exchange (going back to 1974) yielded some 62 companies. In addition, we found 3 Australian cleantech companies listed on the London Stock Exchange's Alternative Investment Market (AIM) and the 1 on the National Stock Exchange (NSX - formerly the Newcastle Stock Exchange).
- 2005 and 2006 saw an up-tick of 13 and 10 new cleantech listings respectively.
- For the 51 IPOs for which the information was disclosed,
 - > The total amounts raised were \$1,222m (\$815m US). The amounts raised in each IPO ranged between \$1m (\$0.74m US) (CDS Technologies Ltd in 1997) and almost \$400m (\$305m US) (Babcock and Brown Wind Partners in Q4 2005).
 - > The average amounts raised was \$24m (\$16m US). However the median amount raised was only \$6m (\$4m US), so the data is skewed by a few of the larger listings.
- The largest market caps of public cleantech companies were found in the Recycling/Waste segment, followed by Energy Generation. Some 40% of the combined market cap of the 13 companies in the Recycling/Waste segment was taken up by TransPacific Industries (TPI) which listed on the Australian Stock Exchange in Q3 2005. A new avenue is opening up in 2007 for listings of cleantech companies. The National Stock Exchange of Australia with Financial & Energy

Exchange Limited launched the FEX-SIM (Sustainable and Cleantech Investment Market) in September of 2007. According to the sponsors, the FEX-SIM will focus on "companies dedicated to identifying and promoting innovative solutions that support the transition to a clean, secure and sustainable future".

More IPOs can be expected in the coming years as venture funding remains active, cleantech companies

mature and as public markets and institutional investors become increasingly informed about and enamored with the concept of cleantech. The question remains as to whether listings of companies are a surrogate for raising capital rather than for active stock trading – especially when the capital raises are modest. Cleantech stocks worldwide tend to be thinly traded, and sometimes turn to private markets for additional capital where required.

Figure 24: IPOs of Australian Cleantech companies (on the ASX, AIM and NSX)

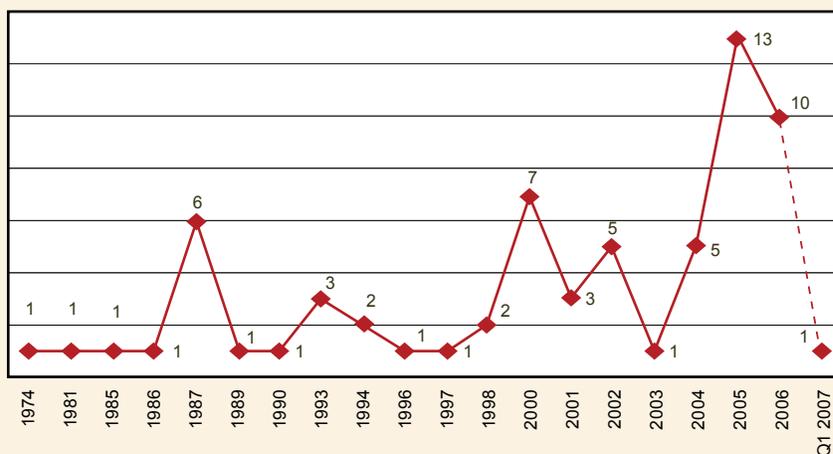
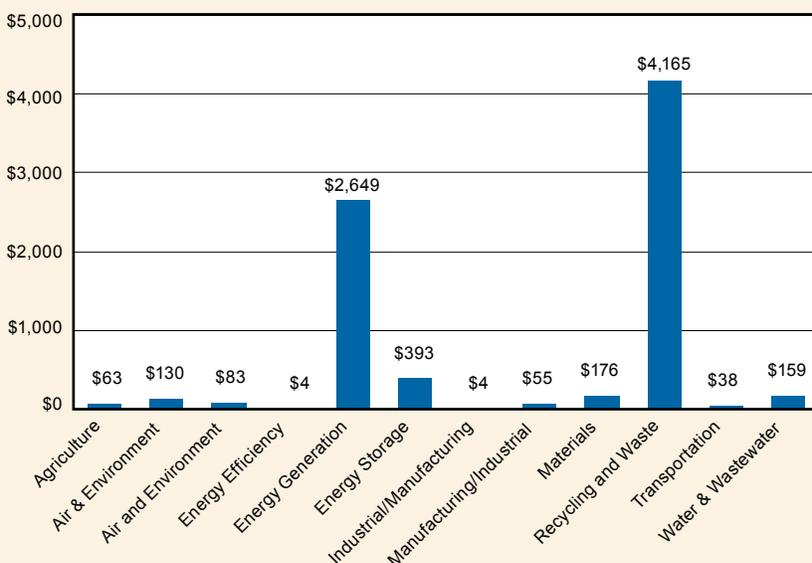


Figure 25: Australian Cleantech IPOs Total Disclosed Market Cap by Segment in July 2007 (AUDm)



DISCUSSION: FUTURE EXITS AND BARRIERS TO GROWTH

Future Exits

Due to its broad range of applications and different end-markets, exit activity in cleantech will differ greatly in terms of the buyers, sellers, timing and valuation. We anticipate that several factors will determine future exit routes for venture capital investors in Australian cleantech companies, including:

- Fundraising by venture capitalists – will enough capital be available for future rounds or will companies have to look elsewhere?
- Access to public markets – in the region and also internationally.
- Consolidation in the cleantech industry segments – to what extent existing cleantech companies will seek to vertically integrate and create exit opportunities for investors.
- The extent to which large companies will continue to expand into cleantech markets and do so via acquisition or in-house development, or both.

Given the international demand for cleantech companies by public and private investors as well as by existing corporations, we can expect a healthy exit market for Australian cleantech companies in the coming years.

Barriers to Cleantech Expansion

The findings of the study indicate that there is still much room for growth in Australian cleantech investing, especially compared with growth rates in the category internationally. In addition, we have seen several instances of Australian companies leaving Australia – choosing to develop their company in larger more supportive markets, especially in Europe and the US.

The risk is that Australia loses its competitive advantage in a key growth industry for the coming century. What has been holding things back?

Capital Barriers

- Australia faces a distinct scarcity of angel investors and pre-seed and seed stage capital, especially compared with the US. Other non-US countries facing the same gap (such as Canada and the UK) have overcome this with extensive governmental-sponsored incubators and bigger resources for university tech transfer programmes.
- The lack of angel investing in Australia is exacerbated by little corporate venturing money being put to work by large Australian companies, especially in the technology/ industrial/ manufacturing sectors. The corporate venturing we did see in the study was from energy companies, or international conglomerates.
- Cleantech is still a relatively new term to Australian investors. It will take some time to build understanding and credibility beyond those investors already actively participating. This applies to investors right through the value chain – from institutional investors to venture capitalists and individual investors.
- Australian Superannuation funds are large by global comparisons, yet asset allocations to alternative investments, private equity and infrastructure are relatively low. This has meant that venture capital investors have been slow in raising funds – especially specialists.

Barriers for Companies

- Several venture capital investors we spoke to mentioned that a key problem for Australian VC investors is finding the good, serial entrepreneurs and management teams in which to invest. There is a perceived need to improve

the quality of the management teams overall in the sector – in the US this was partly overcome by experienced entrepreneurs transferring over from other sectors such as semi-conductors or software into cleantech. The pool of such talent in Australia is smaller, so there is an opportunity to structure remuneration packages to attract people with sector and business experience to take the challenge of steering cleantech start-ups to success. Also, perhaps, to lure all those expatriate Australians back home.

- For Australian companies, large scale growth prospects nearly always means international expansion. Extra resources are needed for these companies to develop international partners and channels, especially if they are thinking of manufacturing abroad. Some companies have simply moved their whole operation abroad instead – a loss for the Australian economy. Others have developed joint ventures and alliances to better access markets. In this context, international investor syndicates and corporate venturing are thus especially valuable.



Policy Barriers

- State and Local governments have instituted a variety of programmes which aim to support the creation of cleantech industries and markets. However, rules change and the regulations are fragmented, hampering investment and growth due to this regulatory uncertainty.
 - Many of the Federal policies and programmes outlined earlier in the report are relatively recent and will take a while to generate new technologies and businesses.
 - Likewise, the recent announcement of a federal greenhouse gas trading scheme will be a positive driver for cleantech investment over time. Federal Government policy signals on the Kyoto Protocol and Mandatory Renewable Energy
- Targets may have slowed the growth of the clean energy market in Australia, many of which need policy support to grow to scale so they can compete with Australia's relatively low-cost fossil fuel sources.
- Clear and comprehensive policy signals and programmes to support clean technology development and commercialisation in Australia could have a profound impact.

CONCLUSIONS

Cleantech is at a critical juncture in Australia. It is going to follow international trends or remain a niche investment activity? What will tip it over the edge? In Australian cleantech investing, perhaps the largest barrier so far has been inexperience – magnified by weak information on market size, investment history and opportunities.

Cleantech in Australia clearly has much potential. However as an investment category we consider it somewhat under-exploited at present, especially compared to international markets. While North America is starting to become deal constrained, Australia appears to be somewhat capital constrained. Several financing gaps were found – in particular in both very early and much later stage equity financing and in institutional investors' asset allocation. In addition, the level of strategic investment, joint ventures and alliances (i.e. by large companies) in cleantech is less pronounced than in other regions of the world.

These gaps might soon be exploited by international investors given the popularity of the category in other regions of the world and the otherwise good investment climate in Australia. By partnering with local investors, international investors can offer capital, experience and access to global markets needed for Australian cleantech companies' growth.

This situation is starting to turn around with heightened public, super fund

and governmental awareness of the many large scale ecological problems Australia faces and as the scale of the entrepreneurial opportunity unfolds. Our analysis indicates that the following factors will be needed in Australia to build a truly world-class cleantech industry and investment category:

- More seed and early stage funding for tech transfer, proof of concept/prototypes and early commercialisation.
- Expanded support for local markets for clean technologies; especially in clean energy generation technologies that compete with an entrenched fossil fuel industry.
- Stronger connections being made between global markets and Australian cleantech companies.
- More engagement of large Australian and international corporations with cleantech ventures and fast growth companies.
- Improved quality of the entrepreneurial management teams to successfully bring these technologies to scale.
- Increased expansion stage funding, particularly to enable companies to access international markets.
- Some big successful exits via M&A or IPO to draw more corporate and public investors into the space.

The health of public markets will also influence whether and in what stages venture capital is invested in cleantech companies. The global trend towards listing on AIM has also caught on in Australia, as has the use of a public listing as a means to raise capital rather than exit equity investors. There is concern that cleantech stocks – on AIM and the ASX - are too thinly traded, so that companies listed there will turn back to private markets to raise additional capital in order to grow. If the IPO market slows, available venture capital may become further constrained because VC funds will be forced to place additional capital into their portfolio companies in lieu of new investments. The demand for M&A in cleantech by large established companies will also play an important role in how much and what type of VC gets invested in Australian cleantech companies.

Likewise other sources of capital – project finance, buyouts and other debt will complement new venture financing. But if exit opportunities become less certain, and VC funds have a hard time fundraising, venture investing activity into cleantech companies might decelerate.

Australia's cleantech industry will undoubtedly grow in the coming years. But with some serious growth capital behind it – we expect it to grow faster and stronger, generating some significant environmental and financial returns in the process.

ABOUT THE CLEANTECH NETWORK™, LLC

The Cleantech Network™ LLC is an organization that catalyzes investment, business opportunities and relationships driving the growth of cleantech globally. The Cleantech Network™ popularized the term cleantech in 2002 and defined the category, providing investors, executives, government agencies and media accurate and consistent data dating from 1999. The network has over 8,000 cleantech investors and 9,500 companies worldwide that take advantage of the global Cleantech Forums™, comprehensive market research services and reports, online proprietary deal flow, and an investor directory. In addition, the Cleantech Network™ provides information services, including the weekly market intelligence newsletter Inside Cleantech™ and the quarterly Cleantech Investment Monitor™ report that tracks and analyzes all cleantech investments, M&As and IPOs in North America, Europe, China and Australia.

CLEANTECH GROUP™, LLC

The Cleantech Group™ LLC provides insight, opportunities and builds relationships that catalyze and accelerate the growth of cleantech markets globally. The Cleantech Group™ family of companies are the founders of the cleantech investment category and bring investors, executives, thought leaders, policy makers, and entrepreneurs together to facilitate the growth of cleantech globally through six business units; the Cleantech Network™, Cleantech Advisors™, Cleantech Indices™, Cleantech Search™, Cleantech China™, and Cleantech Media™. Since introducing cleantech as a viable investment thesis in 2002, the efforts of the Cleantech Group™ companies have spawned a new investment class with an annual growth rate exceeding 50%, with more than \$3.5 billion in venture capital invested in North America and Europe in 2006, a 45% increase over 2005.

For further information, please visit us at www.cleantech.com

ABOUT CLEANTECH VENTURES, AUSTRALIA

The team at Cleantech Ventures are career cleantech professionals however it was only quite recently, in 2003, that we commenced investing funds in high potential cleantech opportunities from Australia's first solely "sustainable energy" focused early stage fund – the Victorian Government funded A\$30 million 'Centre for Energy and Greenhouse Technologies Fund' (CEGT).

It was the significant untapped cleantech opportunity we saw in Australia that underpinned the subsequent successful raising of Cleantech Ventures' second fund, the A\$50 million 'Cleantech Australia Fund'. The investors in this fund are the Commonwealth Government of Australia and VicSuper.

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- 13 It should be noted that Cleantech Ventures Pty Ltd (Australia) categorises fuel cells separately to energy storage technologies. Investments in fuel cell companies make up almost half of this segment due to significant investments into Ceramic Fuel Cells which listed on the Australian Stock Exchange in Q3 2004 and subsequently on AIM in Q1 2006.