



2006 Australian Cleantech Map

Building Australia's Cleantech Future - Tracking the Deals

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Acknowledgements

Author:

Michael Walsh, Corporate Monitor

Research Assistant

Nick Bruse, Clean Technology AustralAsia

Adrian Asfar, Clean Technology AustralAsia

Contacts:

Jeffrey Castellas

Mobile: +61 (0)401 067 252

jeffcastellas@cleantechforum.com

Adrian Asfar

Mobile: +61 (0)416 180 523

adrianasfar@cleantechforum.com

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1 Executive Summary

The Australian Cleantech Map, produced by Clean Technology AustralAsia™, is an annual report that seeks to identify the cleantech investment transaction activity in Australia across a broad range of industries and sources of capital. We define cleantech as a new theme for investing in funds, projects and companies that provide preferred technological solutions for sustainable development, generating value for shareholders, society and the ecosystem.

The 2005 Australian Cleantech Benchmark Study was the first study to map the public investment activity in cleantech in Australia. The objective of this 2006 report is to map the dimensions of cleantech investments in Australia across the range of asset classes and industry categories.

The 2006 Australian Cleantech Map also introduces data for the first time on Cooperative Research Centres, venture capital investments, project finance and investments made by large ASX-listed companies. In total, the study identified 328 Australian investment transactions in cleantech totalling \$6.68 billion¹ in 2005-06.

1.1 Australian Cleantech Investments Climate

For this report, we used largely independent and publicly available data sources, with limited collection of private or proprietary investment data. The data series spanned July 2005 to June 2006.

Research & Development investment transactions include funding from government for universities and Cooperative Research Centres. Early and mid stage commercialisation transactions included other government grants and venture capital. Later stage investment transactions included capital raised by dedicated cleantech ASX-listed companies and pooled investment funds, project finance commitments and new cleantech deals by other listed companies.

1.2 Research & Development Investments

Research & Development investments totalled \$86m. The amount in ARC grant funding to Cleantech projects that was made in 2005-06 and approved from 2003-2005 was \$14.5. New funding approved for 2006 comprised 43 grants totalling \$5.9 million. This represented 4.3% of Australian Research Council (ARC) grants.

Also, 22 Cooperative Research Centres were identified as undertaking cleantech research, which operate on an annual budget of \$71.3m.

In addition, CSIRO discloses an interest in 5 cleantech companies as part of its overall \$80m annual budget for energy research.

1.3 Early Stage to Mid Stage Investments

New Early Stage to Mid Stage investments totalled \$222m. Cleantech companies attracted a total of 67 government grants totalling \$185 million. Twelve government funds totalling \$3.3 billion were also reviewed that will support clean technologies in future years, mainly until 2009.

¹ The Australian dollar is the default report currency used to quote investment figures unless otherwise indicated.

The major focus of this funding is water management, emissions reduction, renewable energy and energy enabling technologies and a significant investment in clean coal technologies. The clean coal segment now has access to total grants funding base of \$1.3billion which includes the \$300m industry coal fund.

The Australian Bureau of Statistics identified that as at 30 June 2005, Australian venture capital investors had \$11.2b committed to venture capital investment vehicles, an increase of 25% on the \$9.0b committed as at 30 June 2004. Investments in 912 investee companies were reported by 210 venture capital investment funds and companies across all industry sectors. The study is currently undertaking an analysis of these transactions to identify how many are Cleantech investments. However, at the time of writing 12 transactions had been identified for a total investment of \$37m in 2005-06

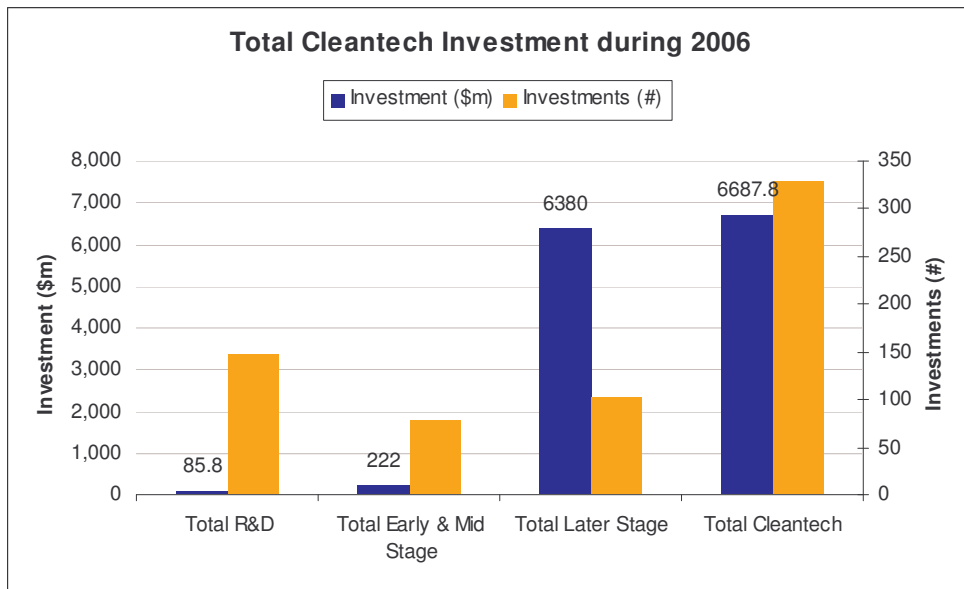


Figure 1 - 2006 Total Cleantech Investment

1.4 Later Stage Investments

Later Stage investments totalled \$6.3billion. This includes new capital raised by dedicated cleantech ASX and NZSX listed companies, investments by partially dedicated ASX listed companies, pooled funds and project finance.

The contribution by dedicated cleantech unlisted pooled funds was more modest this year with 3 funds raising \$91m.

Partially dedicate ASX listed companies, those that are not solely dedicated to cleantech activities rose \$3.7billion of new capital, this figure includes large investments by Babcock & Brown and AGL.

The report found 82 ASX listed companies with distinct cleantech activities. They raised \$1.8 billion (19.1% of their value) by way of new capital in the year. The market capitalisation was an increase of \$3.1billion. In total they had a market capitalisation of \$9.4 billion at end of financial year 2006² an increase of \$3.1billion over the previous year, and increase of 49%.

² The end of the Australian Financial Year 2006 is June 30th 2006

In total market share terms they comprise about 4.2% of ASX listed companies but only 0.8% of the total stockmarket capitalisation. However they accounted for 4.0% of all stock exchange capital raising. Materials recovery, recycling, alternative fuels and alternative energy generation companies dominate this list in terms of size.

Of the 82 companies only 5 are constituents of the benchmark S&P/ASX 200 Index. A further 6 are included in the 500 strong All Ordinaries Index. To put this microcap orientation into focus, 35 per cent (\$3.3 billion) of the market capitalisation of this segment falls outside of the All Ordinaries Index. In the case of ASX listed companies outside the cleantech list a further 7 more diversified companies made new cleantech investments totalling \$3.7billion.

This report also introduces an analysis by UBS of the performance of the ASX cleantech list. This shows they have generally performed on par with Industrials over the last two years and have delivered better returns than Industrials over the last 3 to 5 years. However the sector has not participated in the resources boom as Resources have clearly shown stronger performance than either Industrials or Cleantech over all time periods from 1 through 7 years.

The overall result is that for periods of 3 through 7 years the cleantech segment has generally achieved returns in line with the broader sharemarket.

The biggest player in the sector during the year was investment bank Babcock & Brown who raised capital for new dedicated funds and used its own financing resources to support \$2.1 billion in new cleantech investment, or almost one third of the total for the year.

New investment in the sector is dominated by the \$5.4billion (81%) put into alternative energy and the \$448m (6.7%) in alternative fuels. However, most of this Australian investment went to develop or acquire overseas facilities. Overall it is estimated that approximately 40% of the total Australian investment for 2005-06 went into overseas projects and deployment.

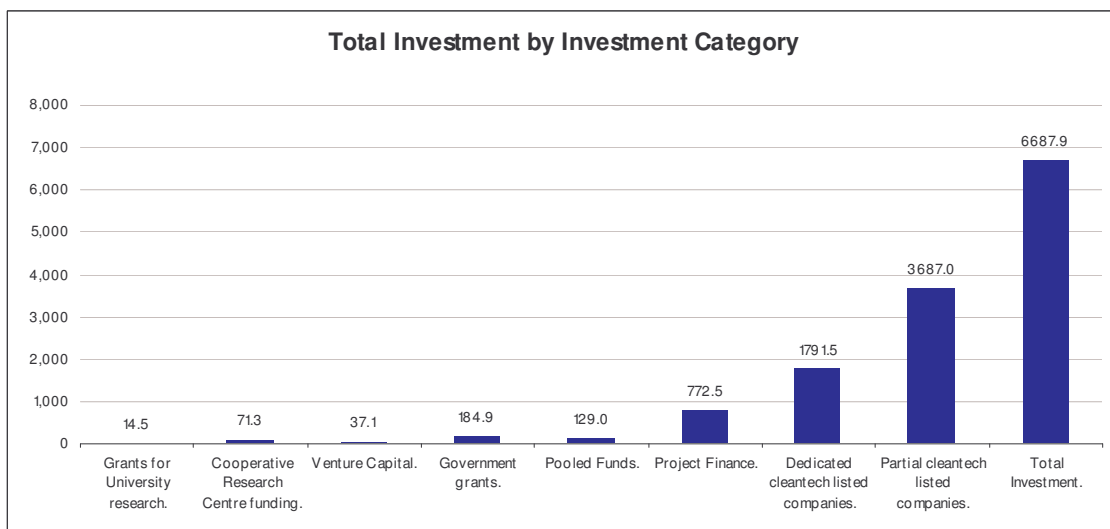


Figure 2 - Total Cleantech Investment by Investment Category

Introduction

1.5 Objective

The objective of this report is to map publicly available information about the cleantech investment sector in Australia to show how the sector is funded and where investment activity is focussed. Australian cleantech investing is defined and segmented and major transactions are identified.

The Australian dollar is the default currency used to quote investment figures unless otherwise indicated.

1.6 Methodology

Data used in this report was predominately obtained from largely independent and publicly available sources as opposed to data from individual companies. The reasoning behind this can be explained in the following observations.

Firstly, unlike the North American market, where cleantech's capital accumulation process is dominated by the venture capital and private equity markets, there is a greater tendency for Australian companies to have a stock exchange listing. Secondly, the process of measuring cleantech investing is more established overseas and so individual companies are more able, and willing, to provide relevant data. In Australia, this process is relatively new and the concept of cleantech as a dedicated investment sector has only recently been introduced.

The limitations associated with this methodology are as follows:

- For ASX-listed companies that are partially involved in cleantech, we were able to identify many of their projects. Additional research was required to qualify their level of cleantech involvement.
- Coverage of private equity and venture investment is limited to the transactions that were publicly disclosed.
- For private companies, we relied on relatively basic analysis and media coverage of their business activities. Data on their asset values and investments was not publicly available.

Within these constraints, we therefore used the following approach:

- Identify each company involved in cleantech;
- Determine and describe their level of involvement;
- Calculate the most recent market value of the business (or fund);
- Calculate the level of new investment into the business for 2005-06;
- Identify dedicated sources of committed funding or current public offers that would support cleantech investing in the near future;
- Categorise companies under various cleantech sub-categories.

A further distinction is made between a *dedicated* cleantech business (and fund) and a business undertaking *partial* cleantech investments. A *dedicated* cleantech business has its activities dominated by investments within the category. The *partial* category may have one or more projects that fall within the definition.

Some pooled investment funds are dedicated to cleantech investing and have been included in this report. Almost all other managed investment funds (including socially responsible investment funds) have more open investment mandates. These funds have an incidental level of cleantech exposure and are therefore excluded from this report.

Apart from identifying dedicated cleantech businesses and funds, this report also identifies cleantech-related transactions. These include equity investments, grants and loans whose purpose is to develop new clean technology or an application of an existing technology. A transaction necessarily involves two or more parties and an exchange of money. Investments made from within an existing cleantech business and the formation of joint ventures or collaboration are not within the scope of this report.

1.7 Cleantech Investment Categories

Cleantech is a new theme for investing in funds, projects and companies that provide preferred technological solutions for sustainable development, generating value for shareholders, society and the ecosystem. Table 1 provides a description of the taxonomy used to classify companies and investment deals into cleantech categories.

Category	Abbreviation	Description
Energy Related	-	
Energy Generation	-	Technologies that are involved in the generation of energy, including renewable generation and fuel cells
Energy Storage	-	Technologies that store or hold energy including battery, capacitor, chemical and mechanical
Energy Infrastructure	-	Technologies that assist in the transmission or distribution of energy
Energy Efficiency	-	Technologies that improve the efficiency of energy use
Alternative Fuels	-	Technologies involved in the production of alternative fuels
Water Purification & Management	-	Technologies that improve the quality of water, help manage its use and minimise water pollution
Air Quality	-	Technologies that improve air quality or minimise air pollution
Transportation & Logistics	-	Technologies that provide efficient and effective transportation of people and objects
Green Buildings	-	Technologies that improve energy and water use and habitation quality in buildings
Materials & Nanotechnology	-	Technologies involved in the creation of new materials that improve structural, thermal electrical or chemical properties, resulting in reduced energy and hazardous chemical use
Manufacturing/Industrial	-	Technologies associated with large-scale manufacturing processes and industrial installations
Agriculture & Nutrition	-	Technologies associated with sustainable agricultural production, food nutrition and forestry
Materials Recovery & Recycling	-	Technologies associated with recovering value from waste materials and refuse
Environmental IT ³	-	Technologies that utilise software management tools to improve environmental management, resource use and energy consumption
Enabling Technologies ³	-	Technologies that enable consumer products to have increased application benefits whilst minimising energy and materials use

Table 1 - Description of cleantech investment categories

³ Environmental IT and Enabling Technologies are sometimes grouped together in data sets.

1.8 Data Sources

Several new data sources are analysed in this 2006 report. It is anticipated that in future benchmarking reports, we will conduct a greater degree of quantification of activity levels, explore gaps in data collection and develop the analysis of trends over time.

The specific data sources used in this report include:

- Internet searches; Press releases, finance reports and company websites.
- Announcements and registers from Australian Stock Exchange (ASX);
- Government websites that detail funding and grants for environmental or commercialisation purposes;
- Australian Research Council (ARC) website that details university grants;
- Annual Report on Co-operative Research Centres (CRCs);
- Data on the environmentally positive activities undertaken by the Top 200 ASX-listed companies contained in the Corporate Monitor database. This information is in turn gathered from a range of public sources, mainly company-specific; and
- News and information services dedicated to reporting on environmental business activities. These include Ethical Investor, Centre for Greenhouse Technologies, EcoInvestor and Environment Management News.

Investment transactions include:

- Funding from government for universities, CRCs and Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) for early stage cleantech development;
- Other government grants and venture capital deals for mid stage commercialisation and facility development projects; and
- Capital raised by dedicated cleantech ASX-listed companies, and pooled investment funds, project finance commitments and new cleantech deals by other listed companies for later stage developments.

The following are not included:

- Investments by unlisted companies;
- Developments undertaken by listed companies using existing capital;
- Projects undertaken by research bodies using their existing resources; and
- Other investments which have not been publicly disclosed.

2 Research & Development Investments

In last year's report, we identified a positive environment for research funding, which bodes well for a healthier cleantech investment sector in future years. In this year's report, we again examined research funding directed towards environmental improvement in a manner that is likely to be commercialised. We also reviewed Australia's CRC framework for organisations involved in projects with commercialisation potential, as well as the cleantech-related ventures being undertaken by the CSIRO.

2.1 Summary of Research & Development Investments

Research & Development investments totalled \$86m in 2005-06. The total amount in ARC grant funding to cleantech projects made in 2005-06, as well as approved from 2003-2005, was \$14.5m. New funding approved for 2006 comprised 43 grants totalling \$5.9m. This represented 4.3% of all ARC grants in 2005-06.

In addition, 22 CRCs were identified as undertaking cleantech research in 2005-06, which together operate on an annual budget of \$71.3m. CSIRO also discloses an interest in five cleantech companies as part of its overall \$80m annual budget for energy research.

2.2 Funding for University Research and Commercialisation

A number of university-based researchers are involved in developing clean technologies to the commercialisation stage. The main source of funding for this type of activity is ARC Discovery Grants.

In 2006, 43 new cleantech grants were identified, totalling \$5.9m in funding. This includes three grants from the Queensland Government's Innovation Skills Fund. In total, the ARC approved 917 grants, of which cleantech accounted for 4.3%.

Last year's report indicated \$8.7m in new grants. The reduction is due largely to a \$3.2m grant from Stanford University in 2005 to the University of NSW. No overseas grants to Australian universities were noted for this year's study.

Most ARC Discovery Grants projects were allocated funding for three years. Some 39 cleantech related grants approved by the ARC in 2004 received \$3.9m in funding in 2006. Similarly 44 projects approved in 2003 received \$4.7m in 2006 funding. ARC grants contributed a total of \$8.6m funding into cleantech for 2006.

The overall ARC Discovery Grants statistics for 2005 indicate that 131 projects address environmental sustainability and 340 were for new industry-based technologies. These are broader concepts than cleantech (which involves the commercialisation of environmental technologies), but combined they account for more than half of the total number of approved grants (917). This level of research commitment to environment and technology research is obviously a healthy breeding ground for technologies with commercialisation potential.

The total amount in grant funding to cleantech projects made in 2006, as well as approved from 2003-2005, was \$14.5m for 126 projects.

Examples of projects from universities that received more than two new cleantech grants in 2006 are shown below.

Project	Funds	Category
Artificial Proteins for the Control of Colloid and Surface Properties	\$250,000	Manufacturing/Industrial
The structure of turbulent boundary layers	\$180,000	Air Quality
Towards Nano Assembled Light Emitting Polymer Films	\$165,000	Materials & Nanotechnology

Table 2 - University of Melbourne Cleantech Grants

Project	Funds	Category
Development of conductive buffer layers for RABiTS based coated conductors	\$80,000	Air Quality
Self Assembled Porphyrin Fullerene Photovoltaic Electrodes: Nanostructured Organic Solar Cells	\$153,000	Energy Generation
Assessment and Prediction of Particle Breakage under Cyclic Loading	\$70,000	Transportation & Logistics

Table 3 - University of Wollongong Cleantech Grants

Project	Funds	Category
Beyond discrete landscape metrics: spatial analysis tools and surface textural measures for quantifying gradients.	\$160,000	Environmental IT
A Fundamental Understanding of Methane Driven Denitrification	\$210,000	Water Purification & Management
Charge driven self assembly of nanocomposites of ionic polymers and oxide nanoparticles	\$230,000	Materials & Nanotechnology
Novel Graphitic Mesoporous Carbon Materials for Carbon Catalyst Supports and Carbon Electrodes	\$125,000	Water Purification & Management
Formation, degradation and migration of a yet unidentified POP source	\$100,000	Air Quality
Commercialise a new type of anti-fogging coating technology.		Enabling Technologies
Novel Concept for Wastewater Treatment with Integrated Power Production based on Microbial Fuel Cells	\$300,000	Water Purification & Management

Table 4 - University of Queensland Cleantech Grants

Project	Funds	Category
An integrated approach towards the development of new generation RF/microwave dielectric materials	\$200,000	Materials & Nanotechnology
The Role Of Halide Melts In Platinum Group Element Mobility	\$83,090	Environmental IT & Enabling Technologies
Investigation of P Type Emitters for Future Generation Photovoltaics	\$115,000	Energy Generation
Band gap engineering of novel semiconductors for long-wavelength optoelectronic devices	\$120,000	Environmental IT & Enabling Technologies
Development of robust adaptive and nonlinear control methodologies	\$133,000	Air Quality
Photonic Crystal Enhanced Wavelength Selective, Multi-Colour Quantum Dot Infrared Photodetectors	\$148,000	Materials & Nanotechnology

Table 5 - Australian National University Cleantech Grants

Project	Funds	Category
Multivariate approaches to matching spectra for environmental and forensic purposes	\$94,000	Enabling Technology
Functional complexity of modern marine stromatolites	\$130,000	Water Purification & Management
PType Titanium Dioxide for Hydrogen Generation from Water using Solar Energy	\$150,000	Energy Generation

Low temperature carbothermal reduction of alumina	\$115,000	Energy Efficiency
Membrane Fouling in Submerged Hollow Fibre Membrane Bioreactor Systems	\$120,000	Water Purification & Management

Table 6 - University of NSW Cleantech Grants

Project	Funds	Category
TERRESIM: system for managing the interactions between runoff, vegetation, soils and climate	\$250,000	Agriculture & Nutrition
Induction of Plant Transfer Cells Discovering Regulatory Networks	\$130,000	Agriculture & Nutrition
Effect of Saline Water on Flotation Processes	\$150,000	Manufacturing/Industrial
Self-heating of porous lignocellulosic and coal particles	\$65,000	Air Quality
New System Identification Techniques Utilising Misspecified Models	\$90,388	Manufacturing/Industrial

Table 7 - University of Newcastle Cleantech Grants

An analysis of the cleantech categorisation of each university's grants indicates there is no apparent specialisation within a particular university, with no one university receiving more than two grants per category.

Figure 3 shows the allocation of all universities' grants by category. This shows the breakdown of all \$14.5m in grants made in 2006.

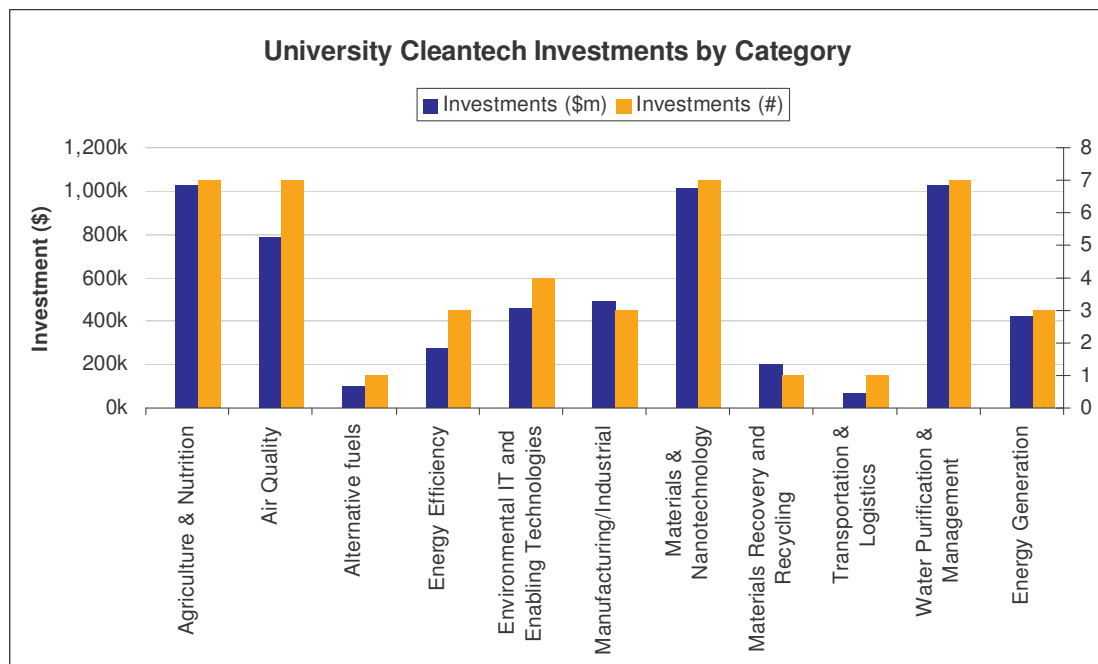


Figure 3 - University Cleantech Investments by Category

This indicates a significant portion of university grants funding is being directed toward Materials & Nanotechnology development equivalent to twice that of any other category.

2.2.1.1 CSIRO

The CSIRO plays a significant role in developing scientific research into commercially successful technologies and environmental technologies are no exception. That said, many of its activities are undertaken confidentially and/or in partnership with other research organisations.

Table 8 lists cleantech investments in which the CSIRO had an interest in 2005-2006. These are part of the organisation's \$80m per annum funding of energy-related research.

CSIRO Cleantech Investments			
Company	Research source		Category
Advanced Polymerik	CRC for Polymers	Commercialisation of polymer IP.	Materials & Nanotechnology
Ceram Polymerik	CRC for Polymers	Commercialise ceramifying polymer technology in non-cable applications.	Materials & Nanotechnology
Windlab	CSIRO	Windscape technology which allows developers to find the best wind farm sites faster.	Environmental IT & Enabling Technologies
ComEnergy	CSIRO and the Australian Coal Association	Electricity generation from coal waste and mine drainage gases.	Energy Infrastructure
Coal Gas Corporation	CSIRO Underground Coal Gasification technology	JV with Metex Resources for the gasification of currently unmineable underground coal deposits for power generation and liquid fuels.	Energy Infrastructure

Table 8 - CSIRO Cleantech Investments

2.3 Cooperative Research Centres

An analysis of the 2006 directory of Australia's 70 CRCs suggests that 22 (30%) undertake research that is aimed to a notable degree towards developing cleantech ventures. These 22 CRCs, listed in Table 9, together have total annual funding of \$71m.

Cleantech-related Co-operative Research Centers			
CRC	Cleantech focus	Funding pa \$m	Category
CRC Wood Innovations	Microwave heating technology, chemistry of wood components and breakdown derivatives; wood surface modification; wood preservation techniques and environmentally friendly preservatives; wood bending; and timber stresses.	2.3	Agriculture & Nutrition
CRC for Forestry	Sustained levels of investment in the establishment of new plantations through demonstrated ability to manage in an environmental and socially sustainable manner.	3.8	Agriculture & Nutrition
CRC for Sustainable Aquaculture of Finfish	Hatchery technology; nutrition; feed development; food technology; environmental management.	2.3	Agriculture & Nutrition
CRC for Australian Weed Management	Biological control, grazing, fires, herbicides, and vegetation management, to protect the integrity of Australia's landscapes and natural ecosystems.	2.9	Agriculture & Nutrition
CRC for Tropical Savannas Management	Developing new technologies for resource-based industries and livelihoods in the savannas, while fostering sustainable natural resource management and conservation.	2.6	Agriculture & Nutrition

Invasive Animals CRC	Solving invasive animal pest problems through development of commercial outputs.	4.2	Agriculture & Nutrition
CRC for Greenhouse Gas Technologies	The storage of carbon dioxide; the capture of carbon dioxide; and geosequestration demonstration and pilot projects.	3.1	Air Quality
CRC for Clean Power from Lignite	Will make possible a substantial reduction in greenhouse gas emissions from power generation.	2	Energy Efficiency
CRC for Coal in Sustainable Development	Will provide the deep cuts in emissions and step change improvements required for improved environmental performance.	2.1	Energy Efficiency
CRC for Greenhouse Accounting	The development of a world-class scientific research capacity in greenhouse accounting to support Australian greenhouse policy, the National Carbon Accounting System, and other national needs.	2.4	Environmental IT and Enabling Technologies
CRC for Sustainable Resource Processing	Mineral processing and extractive metallurgy, and sustainability science, covering cleaner production and total systems analysis.	2.7	Manufacturing/Industrial
Parker CRC for Integrated Hydrometallurgy Solutions	Radically new production technologies for solving challenges that, if overcome, would substantially change the minerals industry's performance with respect to economic, social and/or environmental parameters.	2.9	Manufacturing/Industrial
CRC for Advanced Composite Structures	Fibre composite materials and processes.	2	Manufacturing/Industrial
CRC for Polymers	Four programs that are focused on 'functional' and higher-value materials: biomedical polymers, advanced polymeric materials, polymers for sustainable development, and engineering and design.	4.5	Materials & Nanotechnology
CRC for Contamination Assessment and Remediation of the Environment	A risk-based approach to remediation leading to improved regulatory acceptance of commercially viable and cost-effective solutions to environmental contamination.	4.2	Materials Recovery & Recycling
Environmental Biotechnology CRC	Outputs will include valuable chemicals from waste, improvements in the efficiency of waste treatment, and transforming low value by-products into high value products.	2.8	Materials Recovery & Recycling
CAST CRC	Safer, lighter and more fuel-efficient vehicles, increased recycling, reduced waste, lower energy consumption and fewer GHG emissions.	4.7	Transportation & Logistics
CRC for Advanced Automotive Technology	Improved performance of conventional and hybrid powertrains, with emphasis on reduced consumption and emissions.	5.4	Transportation & Logistics
CRC for Irrigation Futures	Areas of expertise include environmental economics, hydrology, irrigation and agricultural engineering, crop physiology, soil science and extension.	2.3	Water Purification & Management
CRC for Plant-based Management of Dryland Salinity	The management of dryland salinity through the use of profitable, perennial plant-based farming systems.	3.9	Water Purification & Management
CRC for Water Quality and Treatment	Water treatment technologies; sustainability; disinfection by-products; and consumer attitudes.	2.4	Water Purification & Management
eWater CRC	Exploring commercial opportunities to deliver these products and related services to national and international markets.	5.8	Water Purification & Management
	TOTAL	71.3	

Table 9 – Cleantech-related CRCs

Figure 4 displays how these investments (by annual funding of relevant CRC) are spread across the different categories.

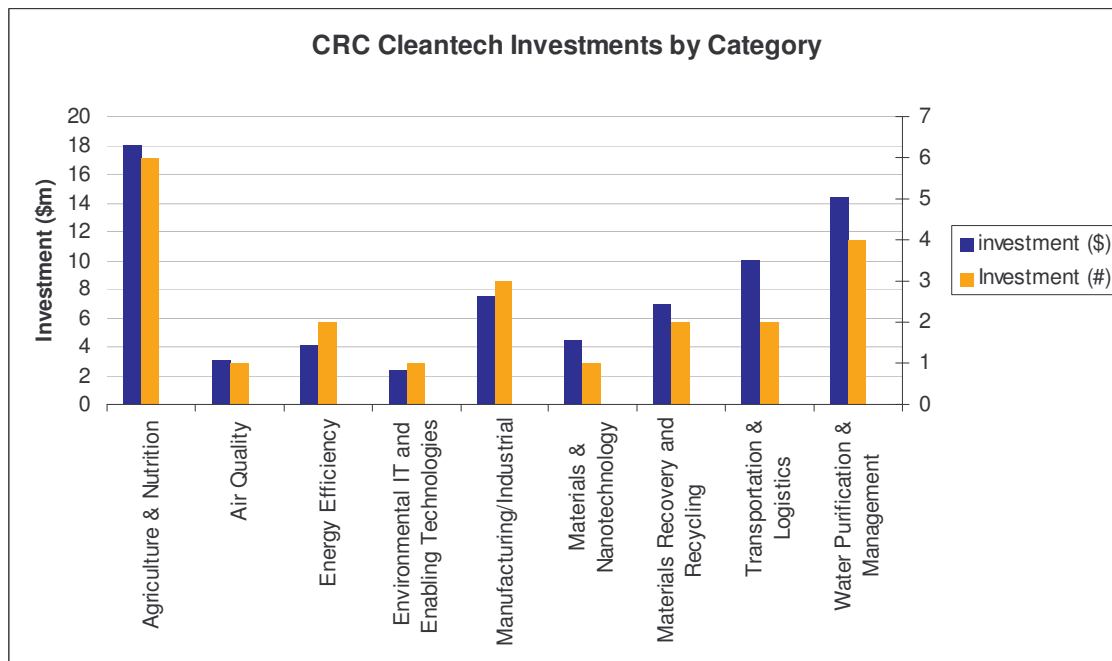


Figure 4 - CRC Cleantech Investments by Category

This indicates a fairly even spread of research across the cleantech categories, with greater emphasis on land use-based areas of Water Purification & Management, as well as Agriculture & Nutrition.

The CSIRO is listed as a core participant in 20 of the 22 CRCs. This number is also about 40% of the 47 CRCs in which the CSIRO is listed as a core participant.

Taken together, the cleantech-related research funding base across universities, the CSIRO and CRCs for 2005-06 totals \$166m.

When looked at as a percentage of overall grants and proportion of CRCs with an eye on cleantech opportunities, there is clearly a significant level of cleantech-related research and early stage development being undertaken, and supported, in Australia.

3 Early Stage to Mid Stage Investments

3.1 Summary of Early Stage to Mid Stage Investments

New early stage to mid stage investments totalled \$222m in 2005-06. Cleantech companies attracted 67 government grants, totalling \$185m. Also reviewed were 12 government funds totalling \$3.3b that will support clean technologies in future years, mainly until 2009.

The major focus of this funding was water management, emissions reduction, renewable energy and energy-enabling technologies, and a significant investment in clean coal technologies. The clean coal segment now has access to a total grants funding base of \$1.3b, which includes the \$300m industry coal fund.

The Australian Bureau of Statistics identified that as of 30 June 2005, Australian venture capital investors had \$11.2b committed to venture capital investment vehicles, an increase of 25% on the \$9.0b committed as of 30 June 2004. Investments in 912 investee companies were reported by 210 venture capital investment funds and companies across all industry sectors. At the time of writing, 12 transactions had been identified for a total investment of \$37m in 2005-06.

3.2 Venture Capital/Private Equity

This year's report introduces data on cleantech-related private equity venture capital investments. A total of 12 investments totalling \$37m were identified, including small capital raisings from sophisticated investors (Rotec Design, Worldwide Coatings, gDiapers and Tec Eco), venture capital firm investments (by StarFish Ventures and Centre for Emerging Greenhouse Technologies) and a pre-IPO capital raising (Petrecycle).

Given the tendency towards privacy in this area, there are undoubtedly many more investments that could not be identified.

Investee	Investor	Investment \$m	Category
Soilwise	CVC Sustainable Investments Fund	0.385	Agriculture & Nutrition
Senviro	Starfish Ventures	1	Agriculture & Nutrition
Aqua-Sciences Pty Ltd	CEGT	0.25	Agriculture & Nutrition
Biodiesel Producers	CVC Sustainable Investments Fund	0.5	Alternative Fuels
MIGfast Pty Ltd	CEGT	0.45	Energy Efficiency
Hardwear Pty Ltd	CEGT	0.25	Energy Efficiency
Tec Eco	Undisclosed	2.5	Green Buildings
Worldwide Coatings	Undisclosed	2	Materials & Nanotechnology
Ceram Polymerik	Starfish Ventures	1	Materials & Nanotechnology
gDiapers		3.3	Materials Recovery & Recycling
Petrecycle	Sophisticated investors	25	Materials Recovery & Recycling
Rotec Design	Sophisticated investors	0.5	Transportation & Logistics
	Total	37.135	

Table 10 - Private Equity Cleantech Investments

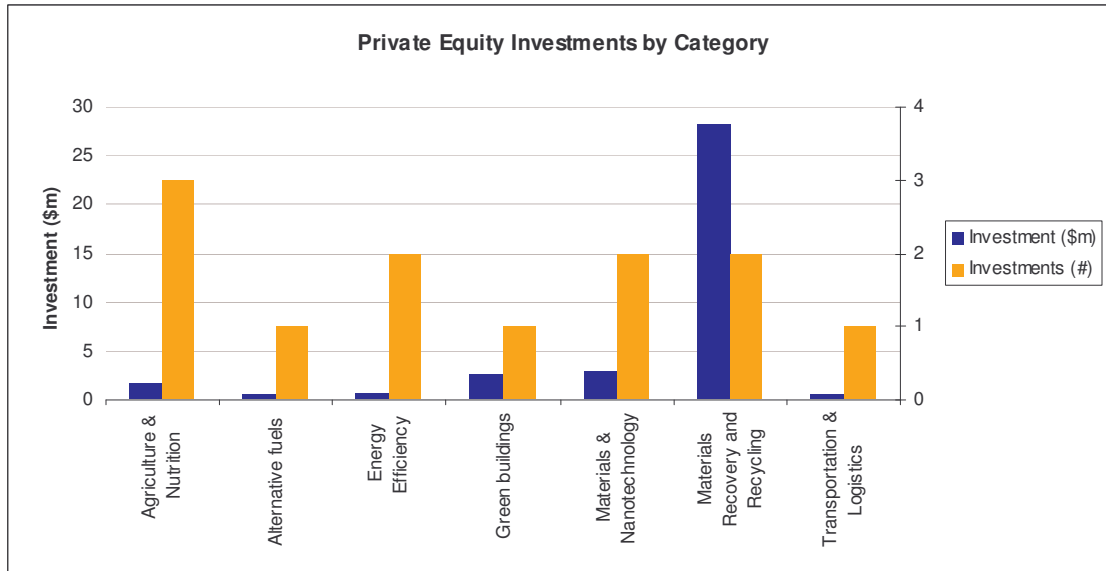


Figure 5 - Private Equity Investments by Category

3.3 Government Grants

Australian government funding, both state and federal, is an important and growing contributor to the cleantech sector. Funding sources include commercialisation grants and established environmental programs. More recently, dedicated environmental schemes have been established that will provide start-up grants mainly to cleantech-related projects.

We identified 67 grants totalling \$185m made in 2006, a similar figure to that reported in last year's report. A detailed list of the relevant programs and their 2006 grants can be found in [Appendix A](#)

It is noteworthy that \$95m of 2006 grants was issued to Ford and GMH for the development of alternative fuel engine technologies. Also worth noting is the closure of the Biofuels Capital Grants Program, where \$38m in grants was recorded in last year's report. The next largest grant was \$15m for UCC Energy to develop its clean coal technology.

Another major grant came via a fund to support the sugar industry when Bundaberg Sugar scored an \$11.6m federal grant to build a flexible feedstock fuel ethanol facility. The next level of grants were relatively small, with three grants of \$5m each from the Renewable Energy Development Initiative to Geodynamics (for its hot-rocks power plant), Origin Energy (for its SLIVER solar power technology) and CSR Sugar (for ethanol production).

Compared to 2005, this report highlights an increasing number of major grants to the cleantech sector from funds not specifically developed for environmental support purposes.

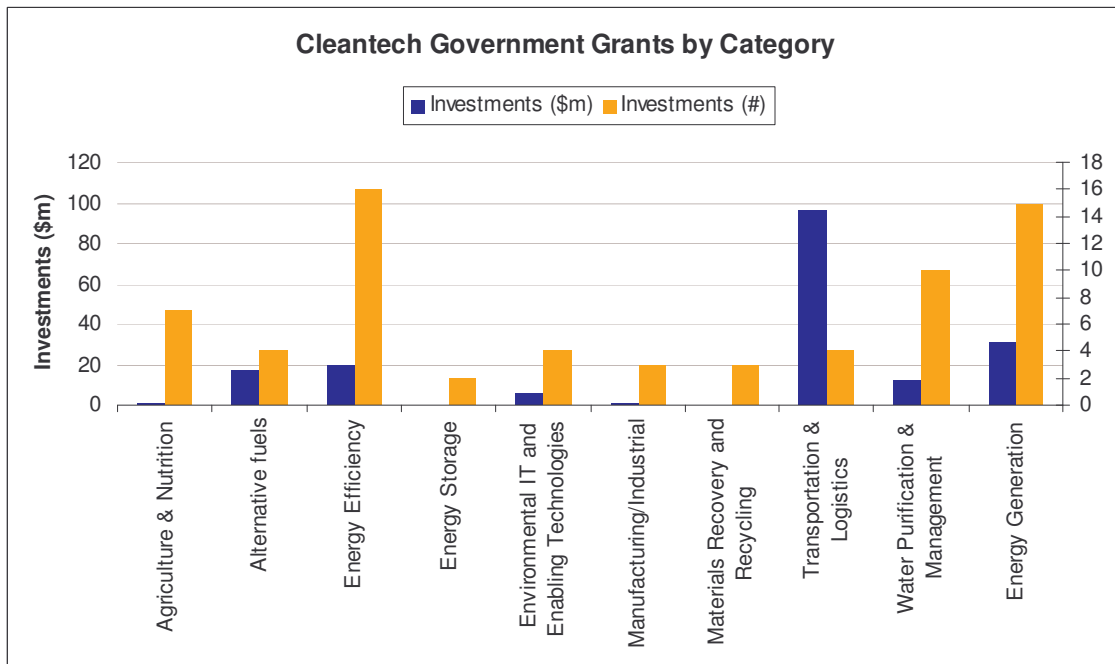


Figure 6 - Government Grants by Category

3.3.1 Future Government Funding Sources

A total of 12 government funds worth \$3.3b are set to focus on environmental initiatives, including clean technology commercialisation, in future years, mainly until 2009.

Fund/scheme	\$m Committed	Until
NSW Water Savings Fund	150	2009
NSW Energy Savings Fund	200	2009
VIC Renewable Energy Support Fund	8	2006
VIC Centre for Energy and Greenhouse Technologies	30	
Victoria Energy Technology Efficiency Strategy	106	2009
Federal Low Emissions Technology and Abatement	27	2009
Federal Low Emissions Tech. Demonstration Fund	500	2020
Federal Renewable Energy Development Initiative	100	2012
Federal Advanced Electricity		
Storage Technologies Programme*	20	2009
Federal AP6 Energy Technology Fund*	100	2007 onwards
Water Smart Australia Programme*	1600	2010
Federal Motor Vehicle Producer		
Research & Development Scheme*	150	2010
Queensland Clean Coal Fund*	300	Estab. July 06

Table 11 - Future government cleantech funds

In addition, recurrent funding is available from sources like AusIndustry - Commercial Ready, Industry Cooperative Innovation Program* and R&D Start Grants; Federal Greenhouse Gas Abatement Program, Queensland Sustainable Energy Innovation Fund, Structural Adjustment Fund for South Australia*, Victoria's Business Energy Innovation Initiative*, Victoria Smart Water Fund* and the Victoria Sustainability Fund*.

**New sources this year.*

A related industry-funded initiative for low emission coal is the COAL21 Fund, which is set to provide up to \$300m until 2010. It is funded by 19 black coal producers and is designed to complement the Federal Low Emissions Technology Demonstration Fund.

Based upon table 12 and combined with the COAL21 fund, low emission coal technologies have the second highest potential grants funding base of approximately \$1.3b. However, funding for water efficiencies & technologies continue to dominate the charts at \$1.75b.

With the new funds announced in the last three years, plus the level of recurrent funding, government funding is set to increase markedly in the next five years. This suggests that the ability of individual cleantech companies to attract future government funding for their respective technology is likely to be an increasingly important success factor to in turn attract private investment.

In dollar terms, the areas of focus for this future government funding are likely to be water management, emissions reduction, renewable energy and energy-enabling technologies.

4 Later Stage/Expansion

4.1 Summary of Later Stage Investments

Later stage investments totalled \$6.3b in 2005-06. This includes new capital raised by dedicated cleantech ASX- and NZSX-listed companies, investments by partially dedicated ASX-listed companies, pooled funds and project finance.

The contribution by dedicated cleantech unlisted pooled funds was more modest than last year, with three funds raising \$91m.

Partially dedicated ASX-listed companies raised \$3.7b of new capital in 2005-06. This figure includes large investments by Babcock & Brown and AGL.

We identified 82 ASX-listed companies with distinct cleantech activities in 2005-06. They raised \$1.8b (19.1% of their value) by way of new capital over the year, with a market capitalisation increase of \$3.1b. In total, these companies had a market capitalisation of \$9.4b at the end of 2005-06, an increase of \$3.1b, and 49%, over the previous year.

In total market share terms, these 82 companies comprise about 4.2% of ASX-listed companies but only 0.8% of the total stock market capitalisation. However, they accounted for 4.0% of all stock exchange capital raising. Materials recovery, recycling, alternative fuels and alternative energy generation companies dominate this list in dollar terms.

Of the 82 companies, only five are constituents of the benchmark S&P/ASX 200 Index. A further six are included in the 500-strong All Ordinaries Index. To put this microcap orientation into focus, 35% (\$3.3b) of the market capitalisation of this segment falls outside of the All Ordinaries Index. Outside of the dedicated ASX-listed cleantech companies, a further seven more diversified companies made new cleantech investments totalling \$3.7b in 2005-06.

In this year's report, we also introduce an analysis by UBS of the performance of the ASX cleantech list which shows they have generally performed on par with industrials over the last two years, and have delivered better returns than industrials over the last three to five years. However, the sector has not participated in the resources boom, as resources have clearly shown stronger performance than either industrials or cleantech over all time periods from one through seven years.

The overall result is that for periods of three through to seven years, the cleantech segment has generally achieved returns in line with the broader share market.

The biggest player in the sector during 2005-06 was investment bank Babcock & Brown, who raised capital for new dedicated funds and used their own financing resources to support \$2.1b in new cleantech investments, almost one third of the total for the year.

New investment in the sector was dominated by the \$5.4b (81%) injected into alternative energy and the \$448m (6.7%) in alternative fuels. However, most of this Australian investment went to develop or acquire overseas facilities. Overall, it is estimated that approximately 40% of the total Australian investment for 2005-06 went into overseas projects and deployment.

4.2 Dedicated ASX Listed Companies

This year, we identified 82 ASX-listed companies (compared to 71 in 2005) with business models dedicated to the cleantech sector (See Appendix 6.2 for company information). In total, the 82 companies had a market capitalisation of \$9.4b as of June 2006. Further, those companies raised 19.1% of the segment's value (\$1.8b) by way of new capital during 2005-06.

New capital raising includes Initial Public Offers (IPOs), share placements, rights issues and share offers. Small issues resulting from the exercise of options are not included.

ASX	Company	Category	Description
ANM	Advanced Magnesium	Materials Recovery & Recycling	Technologies that widen the scope of applications for magnesium alloys
ANO	Advanced Nanotechnology	Materials & Nanotechnology	MCP nanopowder manufacturing technology
AEI	Aeris Technologies Limited	Air Quality	Indoor air purification and cooling tower and tepid water treatment
AJL	AJ Lucas & Co Limited	Manufacturing/Industrial	Horizontal directional drilling (HDD) and degasification of coal mines
AMU	Amadeus Energy Limited	Energy Generation - Renewables	Coal seam gas interests
AOE	Arrow Energy Limited	Energy Generation – Renewables	Coal seam gas company
AUX	Ausron Limited	Agriculture & Nutrition	Development of salt tolerant eucalypts and forestry management
AWG	Austral Waste Group	Materials Recovery & Recycling	Waste management technology business
ABJ	Australian Biodiesel Group	Alternative Fuels	Producer of biodiesel fuels
AAE	Australian Ethanol Limited	Alternative Fuels	Biofuels producer
ARW	Australian Renewable Fuels	Alternative Fuels	Producer of biodiesel fuels
AAQ	Australis Aquaculture Limited	Agriculture & Nutrition	Environmentally focused aquaculture of barramundi
BBW	Babcock & Brown Wind Partners	Energy Generation – Renewables	Global portfolio of wind energy generation assets
BEI	Babcock and Brown Env. Invest.	Energy Infrastructure	Biofuels, materials recovery and waste management portfolio
BAX	Baxter Group Limited	Materials Recovery & Recycling	Integrated waste management technologies
BOS	Biosignal Limited	Materials & Nanotechnology	Prevents or disrupts resistant biofilms without antimicrobial agents
BUG	Buderim Ginger	Agriculture & Nutrition	Organic food production
CBD	CBD Energy Limited.	Energy Efficiency	Energy quality and energy management/efficiency systems for buildings
CDX	CDS technologies Limited	Water Purification & Management	Continuous deflective separation technology which removes solids from liquids
CAQ	Cell Aquaculture Limited	Agriculture & Nutrition	EcoCell "Hatch to Dispatch" concept - land based seafood production package
CFU	Ceramic Fuel	Alternative Fuels	Power generation products using Solid Oxide Fuel Cell

ASX	Company	Category	Description
	Cells Limited		technology
CHX	CH4 Gas Limited	Energy Generation - Renewables	Coal seam gas company based in Queensland
CTF	Citofresh International Limited	Manufacturing/Industrial	Citofresh, an organic anti bacterial product
CMV	CMA Corp Limited	Materials Recovery & Recycling	Demolition and remediation contractor and scrap metal and recycling
COZ	CO2 Group Limited	Environmental IT & Enabling Tech	Environmental services including carbon sequestration
COF	Coffey International Limited	Water Purification & Management	Aquaclear Technology specialising in water treatment plants
CAU	Colltech Limited	Environmental IT & Enabling Tech	Production and sale of collagen from animal wastes
COI	Comet Ridge Limited	Energy Generation - Renewables	Coal seam gas company
DMX	Dolomatrix Limited	Materials Recovery and Recycling	Treatment of hazardous and other complex problem waste materials
DYE	Dyesol Limited	Environmental IT & Enabling Tech	Dye Solar Cell ("DSC") equipment and technology
ESG	Eastern Star Gas Limited	Energy Generation - Renewables	Natural gas from coal seam reservoirs in eastern Australia
EDE	Eden Energy Limited	Energy Generation - Renewables	Hydrogen storage & transport fuels, the low emission Hythane® hydrogen-methane blend
EMM	Electrometals	Manufacturing/Industrial	EMEW® cell achieves enhanced performance over a wide range of flows and effluent conditions, and is implemented in many mining and industrial settings around the world
ENB	Eneabba Gas	Energy Generation - Renewables	Coal seam gas company
ENE	Energy Developments Limited	Energy Generation - Renewables	Power generation, co-generation and waste-to energy projects
EVM	Enviromission Limited	Energy Generation - Renewables	Development of solar tower technology
ESI	Environmental Solutions International	Energy Efficiency	Sewage sludge treatment process technology
EVZ	Envirozel Limited	Materials Recovery & Recycling	Technology based on zeolites for waste and water decontamination facilities
GAP	Gale Pacific Limited	Energy Efficiency	Knitted polymer fabrics for solar and water based usage.
GDY	Geodynamics Limited	Energy Generation - Renewables	Development of renewable geothermal energy
GHT	Geothermal Resources Limited	Energy Generation - Renewables	Development of renewable geothermal energy
GRD	GRD Limited	Materials Recovery & Recycling	Waste disposal to energy facility
GPE	Green Pacific Energy Limited	Environmental IT & Enabling Tech	Biomass to energy facility
GRK	Green Rock Energy Limited	Manufacturing/Industrial	Geothermal energy exploration and development
HMC	Hydromet Limited	Materials Recovery & Recycling	Heavy metal decontamination technology and metal based chemical production.
LNC	Linc Energy	Energy Infrastructure	Connects non-commercial gas reserves and potential new energy markets
LNG	Liquified Natural	Energy Generation -	Developing and commercialising on-site, clinical waste

ASX	Company	Category	Description
	Gas Limited	Renewables	conversion technology
MPA	Marine Produce Australia	Agriculture & Nutrition	Specialises in aquaculture technology
MDV	Medivac Limited	Materials Recovery & Recycling	Onsite processor technology sterilizes and granulates clinical and sharps waste
MEL	Metgasco Limited	Energy Generation - Renewables	Coal seam methane gas producer in northern New South Wales
MBT	Mission Biofuels	Alternative Fuels	Biofuels producer
ODY	Odyssey Energy	Energy Generation - Renewables	Coal seam gas company
OEC	Orbital Corporation Limited	Transportation & Logistics	Fuel efficient, low emissions and alternative fuel engine technologies
ORT	ORT Limited	Materials Recovery & Recycling	Waste gasification process for the treatment of municipal organic waste
PPY	Papyrus Aust Limited	Materials Recovery & Recycling	Banana ply based paper technology
PTR	Petratherm	Energy Generation - Renewables	Exploration for sources of geothermal energy
POH	Phosphagenics Limited	Materials & Nanotechnology	Technologies encompassing active ingredients for dietary supplements, functional foods and personal care products
PCE	Pinnacle VRB Limited	Energy Storage	Technology development and evaluation of vanadium redox battery technology
PGS	Planet Gas Limited	Energy Generation - Renewables	Coal Bed Methane company operating in the USA and Australia
PPG	Pro Pac Packaging Limited	Materials Recovery & Recycling	Biodegradable flowable void fill packaging technology
PUR	Purus Energy Limited	Energy Generation - Renewables	Coal seam gas producer in the Otway Basin, Victoria
QGC	Queensland Gas Company Limited	Energy Generation - Renewables	Coal Bed Methane Gas producer in the Surat Basin, Queensland
NSX	Revetec	Transportation & Logistics	Controlled Combustion Engine Technology that improves operating efficiency and power
SAE	Salinas Energy	Materials Recovery & Recycling	Waterwide Gasification technology for waste to energy generation
SLD	ShieldLiner Limited	Materials & Nanotechnology	In-situ repair and rehabilitation of pipes
SGM	Sims Limited	Materials Recovery & Recycling	Global metal recycling and innovative recycling solution
SKY	Skydome Holdings Limited	Energy Efficiency	Skylights and commercial glazing technology
SNF	So Natural Foods Limited	Agriculture & Nutrition	Manufacture of organic soy based foods
SOO	Solco Limited	Energy Generation - Renewables	Solar energy generation products
STP	Stericorp Limited	Materials Recovery & Recycling	Treatment and disposal of medical waste
SYP	Style Plantations Limited	Agriculture & Nutrition	Producer of timber based renewable resource products
SGL	Sydney Gas Limited	Energy Generation - Renewables	Coal bed methane developer in Sydney Basin, NSW
TSR	Techstar	Manufacturing/Industrial	Bentonite-based environmental remediation technologies
EGL	The Environmental Group Limited	Water Purification & Management	Engineering services and gas and vapour emission control systems

ASX	Company	Category	Description
TOX	Tox Free Solutions Limited	Materials Recovery & Recycling	Waste destruction and recycling technologies and services
TTI	Traffic Technologies Limited	Transportation & Logistics	Signal and traffic management technology
TPI	Trans Pacific Industries Limited	Transportation & Logistics	Industrial cleaning and total waste management technologies and solutions
VIR	Viridis Clean Energy Group	Energy Generation - Renewables	Investing in wind and waste to energy assets in Australia and overseas
WGP	Westralian Gas & Power Limited	Energy Generation - Renewables	Coal Seam Methane Gas producer in southern Western Australia
ZBB	ZBB Energy Corp Limited	Energy Storage	Manufacturing energy storage units using Zinc Bromide battery technology
Pre Listing	Pure Energy resources	Energy Generation - Renewables	Coal seam gas producer
Pre Listing	Axiom Energy	Alternative fuels	Biofuels producer; plastic to biofuel technology

Table 12 - Australian ASX-listed cleantech companies

According to the ASX year end statistics for 2005-06, the domestic market capitalisation of the ASX was \$1,207b as of June 2005, comprising 1,930 companies. In 2005, those companies also raised \$22.5b by way of IPOs and \$22.04b in subsequent equity capital. The market share statistics of the cleantech segment are shown in Table 14.

	ASX-Listed Cleantech	Total Market	Percentage
Number of companies	82	1,930	4.2
Market capitalisation (\$billion)	9.4	975	0.8
New equity (\$billion)	1.9	45*	4.0

Table 13 - Summary of Listed Cleantech Investments

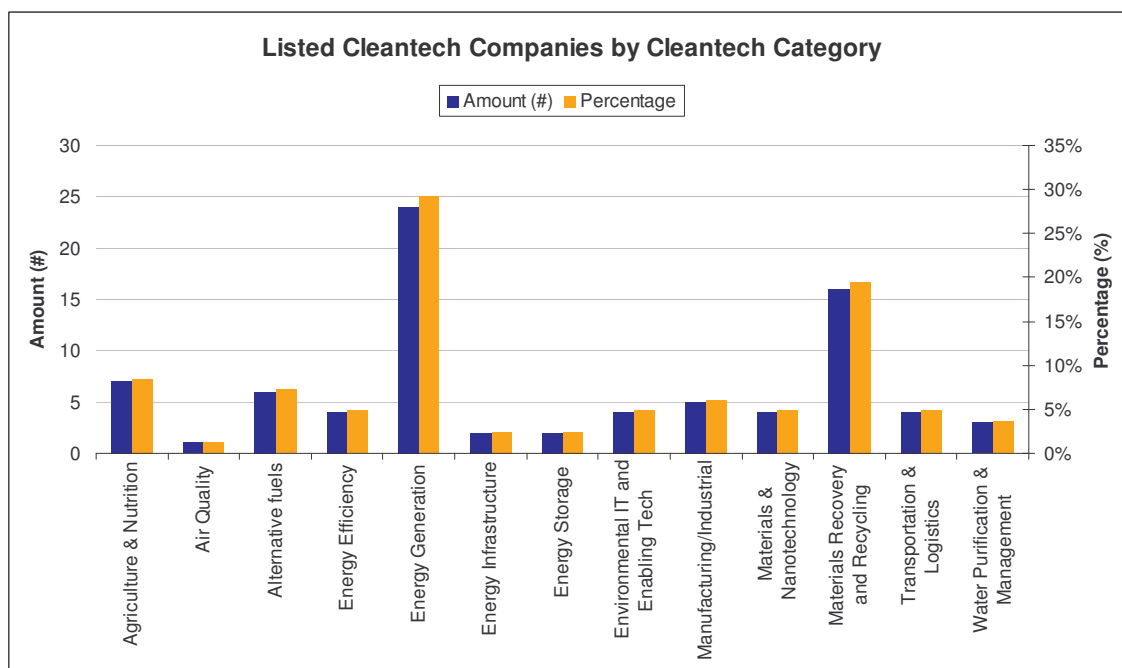


Figure 7 - Listed Cleantech companies by Category

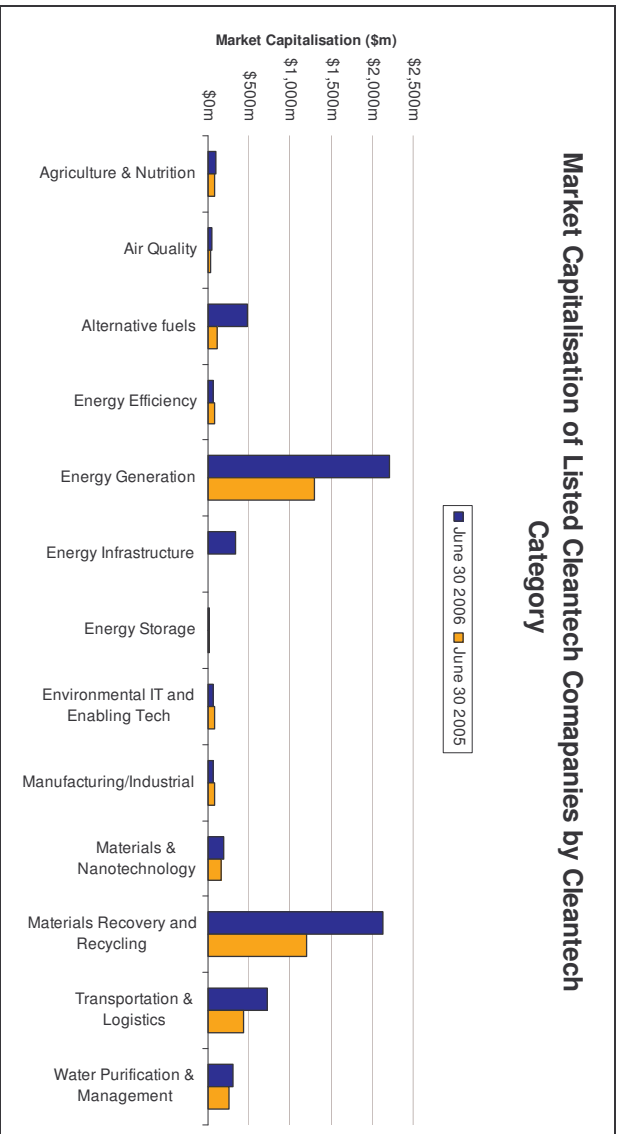


Figure 8 - Market Capitalisation of Listed Cleantech Companies by Category

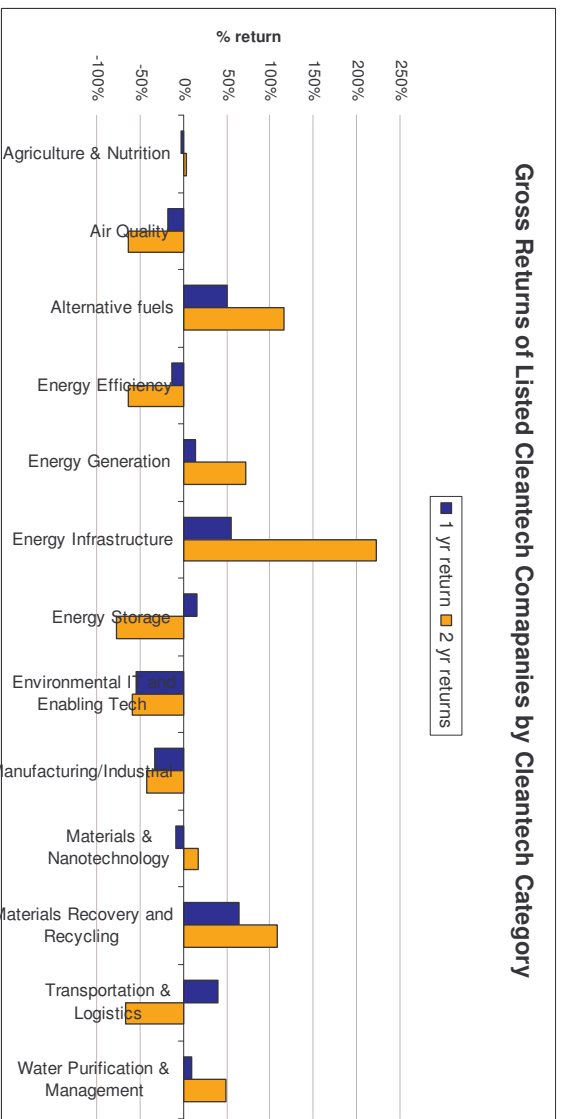


Figure 9 - Gross Returns of Listed Cleantech Companies by Category

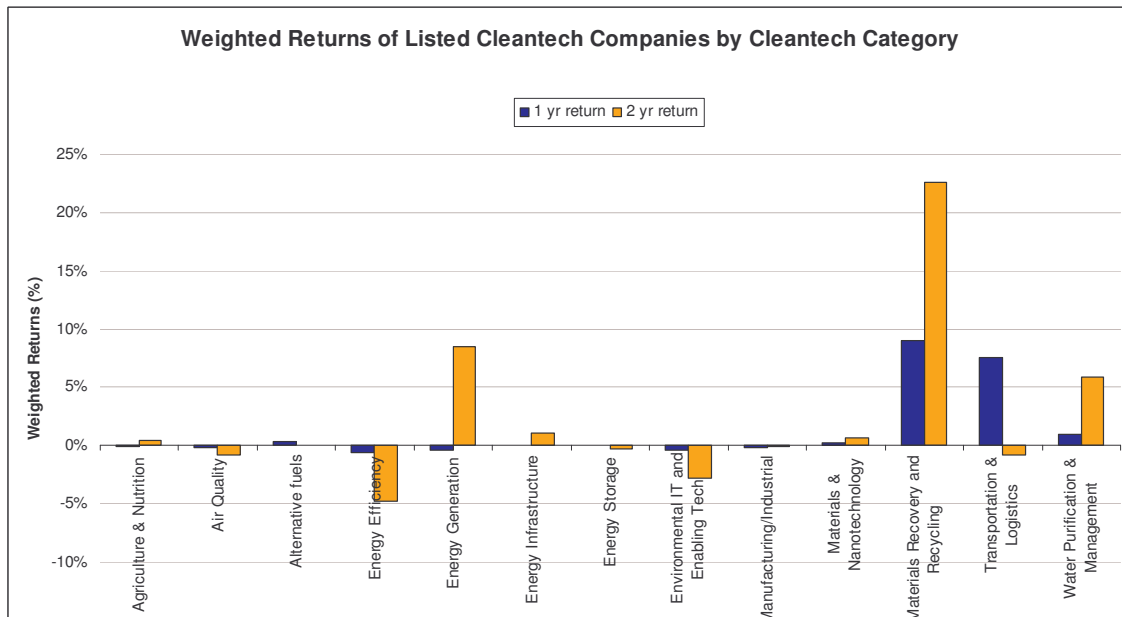


Figure 10 - Weighted Return of Listed Cleantech Companies by Category

4.3 IPO Activity

Since last year's report, nine new cleantech companies have listed on the ASX, raising \$158.5m by way of IPOs (see Table 14).

ASX Code	Company	\$m IPO Raising	Category
ABJ	Australian Biodiesel Group	50.7	Alternative Fuels
LNC	Linc Energy	33.2	Alternative Fuels
MBT	Mission Biofuels	27.0	Alternative Fuels
PGS	Planet Gas Limited	12.0	Energy Generation
EDE	Eden Energy Limited	10.0	Energy Generation
CMV	CMA Limited	9.0	Materials Recovery & Recycling
ENB	Eneabba Gas	8.3	Energy Generation
AWG	Austral Waste Group	5.3	Materials Recover & Recycling
GHT	Geothermal Resources Limited	3.0	Energy Generation
	TOTAL	\$158.5	

Table 14 - Cleantech IPO listings

In dollar terms, the most significant areas of activity were in biofuels and clean fuel producers (Australian Biodiesel Group, Mission Biofuels and Linc Energy), coal seam gas companies (Planet Gas, Eden Energy and Eneaba Gas) and waste management specialists (CMA Ltd and Austral Waste). The company with the smallest IPO was a newcomer to the hot-rock energy fraternity (Geothermal Resources).

Accordingly, the majority of this capital was raised for the purpose of establishing new plants and facilities, and to a lesser extent, for new exploration and the provision of working capital.

A few companies also left the ASX since last year's report. Novera Energy was delisted from the ASX following its successful transition to London's Alternative Investment Market, closer to its European renewable energy operations. Advanced Energy Systems remains suspended from the ASX, seemingly still working on a recapitalisation plan. HydroAuditing's

IPO did not succeed. Axiom Energy also withdrew its IPO, but is understood to have an imminent new proposal so remains on the list.

Another upcoming IPO that has been included in the ASX cleantech listing is Pure Energy Resources, raising \$5m.

4.4 Capital Raising

Overall, 29 companies raised \$10m or more in 2005-06.

ASX	Company	Capital Raised \$m
BBW	Babcock & Brown Wind Partners	514.6
ARW	Australian Renewable Fuels Limited	138.9
VIR	Viridis Clean Energy Group	126.0
BEI	Babcock & Brown Environmental Investments	118.3
CFU	Ceramic Fuel Cells Limited	94.4
AOE	Arrow Energy Limited	57.6
ABJ	Australian Biodiesel Group	67.8
GDY	Geodynamics Limited	51.4
QGC	Queensland Gas Company Limited	50.5
SGL	Sydney Gas Limited	50.0
MBT	Mission Biofuels	40.6
GAP	Gale Pacific Limited	33.9
LNC	Linc Energy	33.2
TTI	Traffic Technologies Limited	25.6
AMU	Amadeus Energy Limited	23.0
CMV	CMA Corp Limited	18.0
POH	Phosphagenics Limited	17.6
OEC	Orbital Corporation Limited	15.0
ANM	Advanced Magnesium	15.0
SGM	Sims Limited	15.0
ESG	Eastern Star Gas Limited	14.7
AAE	Australian Ethanol Limited	13.5
MEL	Metgasco Limited	12.0
ESI	Environmental Solutions International	12.0
PGS	Planet Gas Limited	12.0
PPG	Pro Pac Packaging Limited	12.0
ZBB	ZBB Energy Corp Limited	11.8
LNG	Liquified Natural Gas Limited	11.5
EDE	Eden Energy Limited	10.0

Table 15 - Cleantech Listed Capital raisings over \$10m

The most accretive was investment bank Babcock & Brown, whose two green infrastructure funds together raised \$633m or 35% of the segment as a whole. Babcock & Brown Environmental Investments initially raised \$39m to restructure Earthpower Technologies in July 2005. Then in December 2005 it raised a further \$75m to acquire US-based ethanol producer Denco. The other fund, Babcock & Brown Wind Partners, raised \$369m in its October IPO, followed by a further \$119m capital raising to purchase wind farms in the US and France.

In dollar terms, next is biofuels leader Australian Renewable Fuels, which completed two deals of \$112m and \$27m respectively to fund new biodiesel plants in Australia, the US and Europe.

Viridis Clean Energy Group has also been busy since its \$126m IPO in August 2005. It completed two deals in 2005-06 - a \$70m wind farms acquisition in Germany, and a UK-based landfill gas portfolio. But so far these have been financed with debt issues of about \$180m.

In contrast, Ceramic Fuel Cells has gone to the market three times this year, finding \$94m to help fund its European manufacturing and commercialisation plans. After two smaller local placements, the company raised \$82m in the UK prior to its additional listing on the AIM.

Another company to use stock market capital for facilities and expansion is coal seam gas specialist Arrow Energy. Its total capital raising at \$85m includes acquisitions of smaller ASX-listed company CH4 and gas interests owned by another, Comet Ridge.

Two larger cleantech companies that completed a merger this year were Transpacific Industries and Waste Management New Zealand. Transpacific Industries then announced capital raising plans in July-August 2006 of \$430m (via a preference share issue and placement) to fund further acquisitions. This will be included in next year's cleantech capital raising figures.

Another post-June capital raising worth noting is the \$24m private placement by White Energy, which has now completed a transition to a coal upgrading technology company.

4.5 Market Coverage

Of the 82 ASX-listed companies, only five (Sims Group, Babcock & Brown Wind Partners, Energy Developments, Transpacific Industries and GRD) are institutions of the S&P/ASX 200 Index. A further six companies are included in the 500-strong All Ordinaries Index. To put this in context, 35% of the market capitalisation of this segment falls outside of the All Ordinaries Index and 39% falls outside the leaders-based S&P/ASX 200. Thus the cleantech sector is predominantly microcap and most of the companies involved would simply fall outside the focus of the great majority of stockbroker analysts and institutional investors.

From the above, the following observations are offered:

- Cleantech is a small, but growing sector of the stock market.
- The sector is dominated by small companies (although large diversified companies also make cleantech investments).
- In market capitalisation terms, the sector is raising proportionately more capital, given its size.

New Zealand listed companies

As an introduction to cleantech activity in New Zealand, we examined the SciTech Index of 20 companies involved in technology development listed on the New Zealand Stock Exchange.

Three companies were identified (and another related company), with a total current market capitalisation of NZ\$131m. These companies raised nearly \$21m in new equity in 2005-06, or around 16% of their current value.

NZSX Code	Company Name	Description	Category	Market Cap. NZ \$m
ATM	A2 Corporation Limited	A2 premium milk producer and processor	Agriculture & Nutrition	15.1
WDT	Wellington Drive Technologies	New form of electronically commutated (EC) motor	Enabling Technologies	89.8
WTL	Windflow Technology Ltd	Wind power turbine design, development and manufacturing	Energy Generation	17.1
NWF	New Zealand Wind Farms	Wind farm developer	Energy Generation	9.0
			TOTAL	\$131.0

Table 16 - New Zealand Listed Companies

4.6 Listed Company Investment Performance

UBS Australia's Infrastructure & Utilities team calculated the performance of 58 ASX cleantech companies that have been listed for more than 12 months at June 2006.

Returns are generally weighted by the market capitalisation of each company at the beginning of each performance period. However, the four largest companies (Sims Group, Transpacific Industries, Babcock & Brown Wind Partners and Energy Developments) were 50% weighted due to their dominant weighting in the group.

Code	Company	Category (Abrv)	Gross Annualised Return to June 2006 (%)				
			1yr	2yr	3yr	5yr	7yr
TOX	TOX Tox Free Solutions Limited	MatRec	275	1025	463	23	
EVZ	EVZ Envirozel Limited	MatRec	222	-19	-12	-27	-81
COI	COI Comet Ridge Limited	EnGen	195	195			
DMX	DMX Dolomatrix Limited	MatRec	179	-7	-29	-75	
AAE	Australian Ethanol Limited	AltFuel	125	117	95	-33	-98
LNG	LNG Liquefied Natural Gas Limited	EnGen	106				
STP	STP Stericorp Limited	MatRec	100	74	-56	-78	-8
PPY	PPY Papyrus Aust Limited	MatRec	87				
TPI	TPI Trans Pacific Industries Limited	TransLog	77				
PCE	PCE Pinnacle VRB Limited	EnStor	75	-77	-58	-96	-90
QGC	QGC Queensland Gas Company Limited	EnGen	57	283	273	185	
AOE	Arrow Energy Limited	EnGen	57	206	720	439	
TTI	TTI Traffic Technologies Limited	TransLog	55	-97	-97	-97	-99
BEI	Babcock and Brown Environmental Investments	EnInf	55	223	60	58	-54
AUX	Ausron Limited	AgriNut	45	95	40	-36	
SGM	SGM Sims Limited	MatRec	38	78	132	256	206
AMU	Amadeus Energy Limited	EnGen	36	119	1167	942	726
SNF	SNF So Natural Foods Limited	AgriNut	28	4	-32	-13	-50
GRD	GRD GRD Limited	MatRec	26	52	153	119	416
COF	COF Coffey International Limited	Water	23	208	360	574	986
ARW	Australian Renewable Fuels Limited	AltFuel	17				
MEL	MEL Metgasco Limited	EnGen	13				
CFU	Ceramic Fuel Cells Limited	AltFuel	11				
POH	POH Phosphagenics Limited	MatNano	10	70	90	37	164
EGL	EGL The Environmental Group Limited	Water	8	-60	-55	11	14

SYP	SYP Style Plantations Limited	AgriNut	7	-20				
CBD	CBD Energy Limited.	EnEff	6	-91	1774	87		-83
PTR	PTR Petrathern	EnGen	4					
CHX	CH4 Gas Limited	EnGen	3	77				
BOS	Biosignal Limited	MatNano	2	-35	-40	-93		
CDX	CDS Technologies Limited	Water	-3	2	8	37		86
ENE	ENE Energy Developments Limited	EnGen	-9	37	122	-56		-14
CTF	CTF Citrofresh International Limited	Manulnd	-10	-38	9	-87		
ANO	Advanced Nanotechnology Limited	MatNano	-11					
SOO	SOO Solco Limited	EnGen	-12	13	30	-4		
SKY	SKY Skydome Holdings Limited	EnEff	-13	-34	28	-5		-20
BAX	Baxter Group Limited	MatRec	-13	-1	136			
OEC	OEC Orbital Corporation Limited	TransLog	-13	-35	-27	-88		-78
AEI	Aeris Technologies Limited	Air	-18	-63	145	311		
ESG	ESG Eastern Star Gas Limited	EnGen	-25	-25	4	-22		
HMC	HMC Hydromet Limited	MatRec	-26	29	13	11		79
MDV	MDV Medivac Limited	MatRec	-28	-75	-87	-94		-94
PPG	PPG Pro Pac Packaging Limited	MatRec	-30					
GAP	GAP Gale Pacific Limited	EnEff	-32	-63	-38	145		
AJL	AJ Lucas & Co Limited	Manulnd	-33	-39	-26	3		
SLD	SLD ShieldLiner Limited	MatNano	-37					
AAQ	Australis Aquaculture Limited	AgriNut	-40					
CAU	Colltech Limited	Envlt	-40	-48				
ZBB	Energy Corp Limited	EnStor	-42					
COZ	COZ CO2 Group Limited	Envlt	-43	-33	93	113		143
SGL	SGL Sydney Gas Limited	EnGen	-48	-67	-7	-34		-67
EVM	EVM Enviromission Limited	EnGen	-50	-17	-9			
MPA	MPA Marine Produce Australia	AgriNut	-52	-65	-36	-70		
WGP	WGP Westralian Gas & Power Limited	EnGen	-53					
GDY	GDY Geodynamics Limited	EnGen	-55	-30	28			
GRK	GRK Green Rock Energy Limited	Manulnd	-56	-47				
ORT	ORT ORT Limited	MatRec	-57	-72	-71	-3		-61
GPE	GPE Green Pacific Energy Limited	Envlt	-79	-96	-88	-98		0

Data to June 2006 Source: UBS Infrastructure & Utilities Research

Table 17 - Individual Company Performance

Returns are presented on an accumulation basis with any dividends assumed to be reinvested.

Cleantech Category/Index	Gross Annualised Return to June 2006 (%)				
	1 year	2 years	3 years	5 years	7 years
Cleantech Categories					
Agriculture & Nutrition	-0.05	0.24	0.07	-0.26	-0.11
Air Quality	-0.15	-0.40	0.13	0.08	0.00
Alternative Fuels	0.36	0.00	0.00	0.00	-0.25
Energy Efficiency	-0.64	-2.44	0.15	0.35	-0.01
Energy Generation	-0.43	4.14	8.01	-1.46	-0.72
Energy Infrastructure	0.00	0.52	0.21	0.03	-0.06
Energy Storage	0.02	-0.14	-0.06	-0.36	-0.06
Environmental IT & Enabling Tech	-0.42	-1.39	-0.46	-0.07	0.00
Manufacturing/Industrial	-0.13	-0.06	0.00	-0.03	0.00
Materials & Nanotechnology	0.23	0.33	0.54	0.14	0.15
Materials Recovery & Recycling	9.06	10.74	15.97	12.30	10.45
Transportation & Logistics	7.51	-0.43	-1.19	-2.88	-1.24
Water Purification & Management	0.98	2.92	3.57	1.96	2.08
Total Cleantech Index	16.34	13.82	24.14	10.86	10.45
Comparison Indices:					
ASX300 Resources Accumulation Index	53.73	49.24	47.29	25.32	23.39
ASX300 Accumulation Index	24.02	25.02	23.91	12.31	12.71
ASX300 Industrials Accumulation Index	17.17	19.73	19.22	9.63	10.66
Total Cleantech Index	16.34	13.82	24.14	10.86	10.45
UBS Transmission & Distribution	9.90	21.30	17.40	25.20	0.00
UBS Integrated Utilities	8.90	28.90	29.30	33.00	0.00
UBS Utilities	8.10	28.60	27.90	28.80	0.00
UBS Generation	-13.80	27.00	19.80	-0.20	0.00
Data to June 2006	Source: UBS Infrastructure & Utilities Research				

Table 18 - Comparison of Cleantech Returns vs Market

Table 19 shows that cleantech companies have generally performed on par with industrials over the last two years and have delivered better returns than industrials over the last three to five years. However the sector has not participated in the resources boom, as resources have clearly shown stronger performance than either industrials or cleantech over all time periods from one through to seven years.

The overall result is that for periods of three through to seven years, the cleantech segment has generally achieved returns in line with the broader share market.

A comparison of cleantech returns profiled with (energy-dominated) utilities suggests that returns for established energy technologies has generally exceeded those of emerging technologies associated with cleantech. Time will tell whether clean technologies eventually produce a greater return to compensate for the additional risk being taken.

The most established ethical investment fund whose portfolio has been dominated by smaller Australian cleantech companies, the Australian Ethical Equities Trust, achieved a total return for seven years to June 2006 of 11.16% per annum, slightly under the return on it's

benchmark S&P/ASX300 Index of 12.24%. It's return for the last three years has been 15.59% per annum.

4.7 Project Finance

This year, we have introduced data on financing arrangements made by smaller cleantech companies to leverage their investment in the segment. A total of nine deals were identified, providing finance of \$773m.

Cleantech Financing Deals 2006			
Financier	Recipient	Amount \$m	Category
Investec	Windlab Systems/Stanwell Corporation	500	Energy Generation
Bayerische Hypo-Und Vereinsbank and NAB	Viridis Clean Energy Fund	130	Energy Generation
Nord LB. Facility	Viridis Clean Energy Fund	50	Energy Generation
ANZ Infrastructure Services	Biodiesel Producers	30	Alternative Fuels
Perpetual Diversified Infrastructure Fund	ORT	20	Materials Recovery & Recycling
Undisclosed	Dolomatrix	15	
SunTrust Banks Inc (USA)	Orbital Group	15	Transportation & Logistics
Macquarie Bank	Planet Gas	8	Energy Generation
Babcock & Brown	Jackgreen	5	Energy Generation
	Total	\$773	

Table 19 - Cleantech Project Finance Deals

The largest deal was a \$500m commitment from the Investec investment bank to fund a joint venture between Windlab Systems and Queensland energy utility Stanwell Corporation to find, secure and develop new wind energy projects.

Two other major deals totalling approximately \$180m were organised by Viridis Clean Energy Group to help it acquire significant European renewable energy assets.

4.8 Large listed companies with some cleantech investments

A large number of major companies now undertake some level of environmentally responsible activity, like energy conservation, waste management or recycling. But the majority of these have not developed or invested in the technology or services that help these processes to be achieved. As 'buyers', they are not in the cleantech investment business.

That said, we identified \$3.7 billion in seven cleantech investments by major companies during 2005-06.

The largest was the \$1.47m acquisition by Babcock & Brown of Enersis, one of the largest integrated renewable energy companies in Europe.

Next was the \$1.43 billion purchase of Southern Hydro from Meridian by AGL, which brought an additional 11 hydroelectric plants to its portfolio. AGL also spent \$93m to acquire a 50 per

cent share in Australia's largest single producing coal seam methane project - the Moranbah Gas Project (MGP) - from BHP Billiton.

Santos also built a stake in coal seam methane with the \$612m acquisition of Tipperary Corporation, which provided Santos with an approximate 75% working interest in the producing Fairview Coal Seam Methane ("CSM") field, located north of Roma in Queensland, as well as coal seam methane acreage in the US.

Origin Energy also invested in this segment, with a \$70m investment into the Argyle coal seam gas project in SouthWest Queensland.

ASX Code	Company Name	Description	Category	Investment (\$m)
BNB	Babcock & Brown	Acquisition of Enersis	Energy Generation	1470
AGL	AGL	Purchase of Southern Hydro 50% acquisition of Moranbah Gas Project	Energy Generation	1425 93
STO	Santos	Acquisition of Tipperary Corp	Energy Generation	612
ORG	Origin Energy	Investment in Argyle coal seam gas project	Energy Generation	70
TSE	Transfield	15% stake in the Australian Biodiesel Group	Alternative Fuels	17
			TOTAL	3687

Table 20 - Partially dedicated ASX investments in cleantech

4.9 Pooled Funds

Pooled funds targeting (at least some aspect of) cleantech investing have been a more modest contributor to the growth of the segment during 2006.

New capital raised by those funds in the period was \$. The main areas that attracted funds were green buildings, sustainable forestry and private capital funds.

Pooled Cleantech Funds		
Fund Name	Capital raised \$m	Fund objective
CVC Sustainable Investments	5	PDF investing in mid-stage env. enabling business
Australian Sustainable Investments Fund	N/A	Sustainable forestry and renewable energy
Timbercorp	N/A	FSC certified forestry schemes
ITC	47	FSC certified forestry schemes
CVC REEF	0	Venture capital fund investing in renewable energy and enabling technologies
Macquarie Clean Technology Fund	39	Targeting clean technology generally.

Table 21 - Pooled Cleantech Funds

Note that some other pooled investment vehicles, such as green infrastructure funds, are listed on the ASX. These have been included in the ASX-listed cleantech section of the report.

5 Discussion and Conclusions

This report identifies 328 Australian cleantech investment transactions totalling \$6.68b for 2005-06. For the first time, the report introduces data on CRCs, venture capital investments, project finance and investments made by large ASX-listed companies.

Figure 11 shows how these are spread over the broad investment stages. Predictably, we see the total investment amount rising, whilst the number of investments drops.

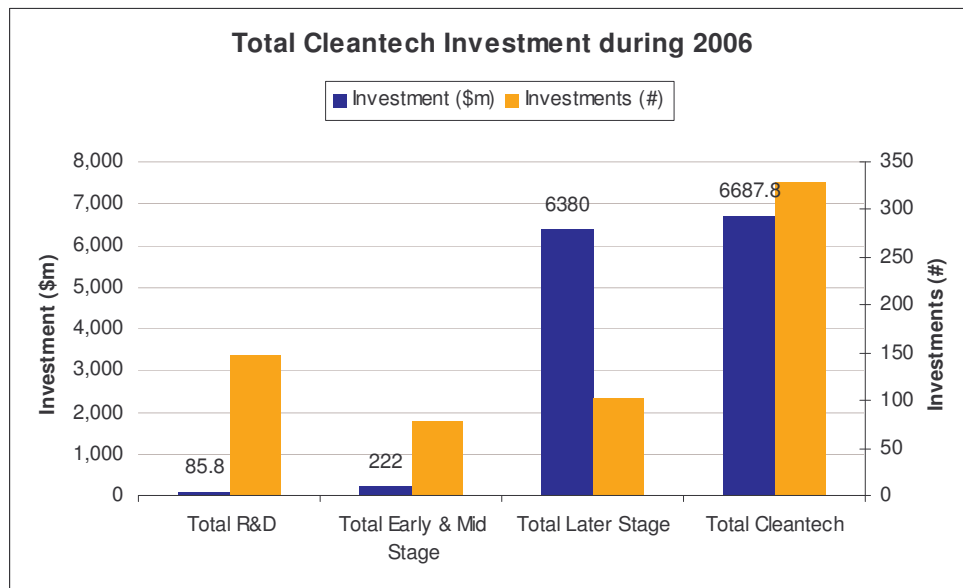


Figure 11 - 2006 Total Cleantech Investment by investment stage

In this report, we have categorised investments by investment segment and cleantech category in order to highlight the activity at various phases in the investment pipeline and in the various cleantech sectors. This data is summarised below in Table 22 and **Error! Reference source not found..**

This indicates that corporate investment far exceeds the level of government support. It also shows that later stage activity dominates, as does equity funding over financing activity.

Early and mid stage investments probably form the most interesting figures for the development of Australia's cleantech industry. Although there were limitations in the number of investments able to be identified in the funding by private organisations and VC companies was significantly less that that provided by government grants.

Typically we would expect that private investments would be equivalent to government commitments. It is hard to draw a definitive conclusion, given this report's limitations, but there are a number of possibilities as to why this is occurring:

1. Investment by the venture capital community in Australia is still at a nascent phase in the cleantech sector
2. Investment information on venture capital deals not available

3. Investment at early stage is occurring through partnership investments by industry participants, and was therefore not detected in this report

Total by investment segment	\$m	% of total
Research & Development		
CRC funding	71.30	1.07%
Grants for university research	14.53	0.22%
Early & Mid Stage		
Government grants	184.90	2.76%
Venture capital	37.14	0.56%
Later Stage		
Dedicated cleantech listed companies	1791.49	26.79%
Partial cleantech listed companies	3687.00	55.13%
Project finance	772.50	11.55%
Pooled funds	129.00	1.93%
Total	6687.85	100.00%

Table 22 - Total Cleantech investment by segment

Later stage investments are dominated by one category, the partially listed cleantech company investments (see Figure 12). Investments by these companies have predominantly been in the energy sector.

This is mainly represented by wind farms, coal seam gas and waste to energy generation. The only other category to attract large levels of investment is biofuels. This concentration of investment into two categories, due largely to more later stage investment by listed companies and financiers, is of some concern, as a portfolio approach of clean technologies is widely accepted as a means of addressing climate issues.

In the authors view, this investment is due to a number of factors, firstly that of all the cleantech sectors it is the most mature and has an established investment focus already. Consolidation and regulation pressures have resulted in it being an attractive space to operate, with future energy pressures in both security and market dynamics looking at driving up the revenue potential.

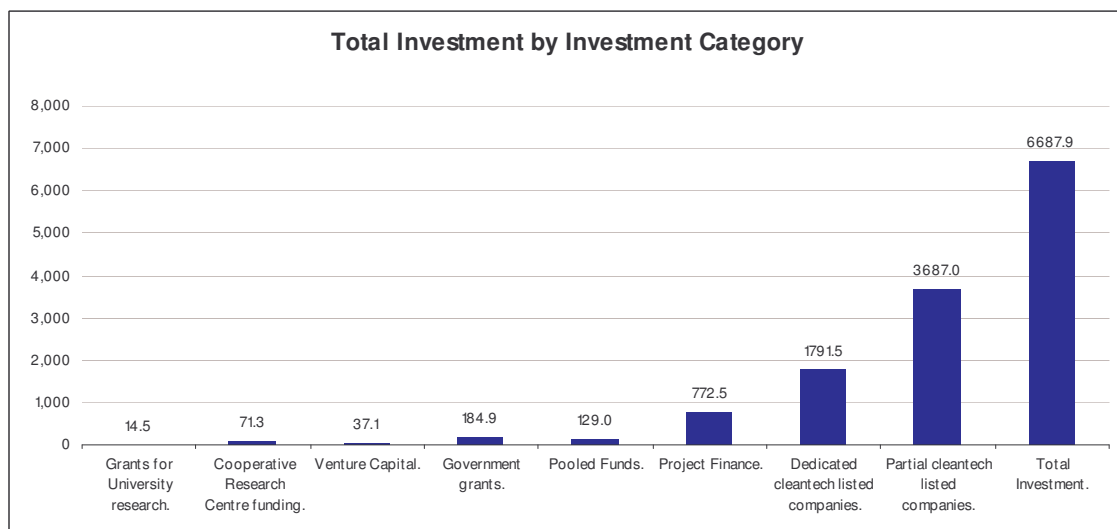


Figure 12 - Total Investment by Investment Category

Cleantech Category	\$m	% of total
Agriculture & Nutrition	137.7	2.1%
Air Quality	4.2	0.1%
Alternative Fuels	448.1	6.7%
Energy Efficiency	71.5	1.1%
Energy Generation	5402.4	80.8%
Energy Infrastructure	120.4	1.8%
Energy Related	0.0	0.0%
Energy Storage	13.7	0.2%
Environmental IT & Enabling Technologies	62.4	0.9%
Green Buildings	2.5	0.0%
Manufacturing/Industrial	14.3	0.2%
Materials & Nanotechnology	33.0	0.5%
Materials Recovery & Recycling	177.0	2.6%
Transportation & Logistics	171.3	2.6%
Water Purification & Management	29.5	0.4%
Total	6687.9	100.0%

Table 23 - Total Cleantech Investment by cleantech category

Table **24** shows the same cleantech categories but with the \$3.67b of partially listed cleantech company investments removed to provide a better understanding of the investments occurring in other cleantech sectors.

In the research and development stage, agriculture and nutrition (22.9%), water purification and management (19.3%), and transportation and logistics (12.0%) account for the largest proportion of investments, followed by manufacturing/industrial (10.3%), materials and nanotechnology (9.9%) and materials recovery and recycling (9.4%). Interestingly, energy efficiency research (5.6%) does not show significant investment, even though it forms such an important component of emissions reduction. This may be based around its behavioural and service-intensive nature.

At the early to mid investment stage, transportation and logistics (43.7%), energy generation (17.6%), and materials recovery and recycling (12.8%) feature strongly, with investment in water purification and management (5.6%) decreasing significantly.

At the later stage, even with the substantial investments in energy generation by partially listed cleantech companies removed, energy generation (62.8%) still accounts for the highest proportion of investments. In contrast, alternative fuels attract approximately four times less investment (15.5%).

Category	R&D	Early&Mid	Later Stage (non-dedicated cleantech company investments removed)
Agriculture & Nutrition	22.9%	1.0%	4.3%
Air Quality	4.9%	0.0%	0.0%
Alternative Fuels	0.4%	5.6%	15.5%
Energy Efficiency	5.6%	9.4%	1.7%
Energy Generation	1.5%	17.6%	62.8%
Energy Infrastructure	0.1%	0.0%	4.5%
Energy Related	0.0%	0.0%	0.0%
Energy Storage	0.1%	0.0%	0.5%
Environmental IT & Enabling Technologies	3.6%	1.3%	2.1%
Green Buildings	0.0%	1.1%	0.0%
Manufacturing/Industrial	10.3%	0.5%	0.2%
Materials & Nanotechnology	9.9%	1.4%	0.8%
Materials Recovery & Recycling	9.4%	12.8%	5.2%
Transportation & Logistics	12.0%	43.7%	2.4%
Water Purification & Management	19.3%	5.6%	0.0%
Total	100.0%	100.0%	100.0%

Table 24 – Dedicated Total Cleantech Investment by segment – partial later stage investments removed \$3.670B

The most concerning aspect of these figures is the lack of investment in water purification and management. No doubt this will change somewhat as funding programs directed at water technology increase. But the extent to which this results in a new commercialisation process for water management remains to be seen.

Investment going overseas

A review of the investment transactions for 2005-06 show that while most were for technologies and facilities in Australasia, approximately 40% of the total new cleantech investments went overseas. These include investments in assets such as wind farms, waste to energy facilities, coal seam gas deposits and plants and general overseas expansion.

The following companies made cleantech investments that included a significant portion of overseas investment:

- Australian Renewable Fuels
- Australian Ethanol
- Babcock & Brown
- Ceramic Fuel Cells
- Environmental Solutions International
- Mission Biofuels
- Santos
- Viridis Clean Energy Group

Final Remarks:

This report is intended to provide a broad picture of cleantech investment in Australia and due to its methodology, avoids drawing detailed conclusions. However our broad findings show that investment is occurring in some areas of cleantech and not others. This pattern is driven by economic responses to market, regulation and societal pressures.

We would expect that as regulatory frameworks are established around all aspects of sustainable development that commercialisation and investment activity will follow.

Appendix A Tables and Data

5.1.1 Government Grants Detailed List

Grant	Renewable Energy Development Initiative	
Purpose	Will provide matching competitive grants worth between \$50,000 and \$5 million to Australian businesses developing renewable energy projects with significant greenhouse gas abatement potential. This can be derived from the sun; wind; geothermal; biomass (not fossil fuels); hydro systems; wave, tidal and ocean energy; or any other renewable energy source approved by the Australian Greenhouse Office.	
Status	NA	
Grants in 2005-06	16 grants	@ \$33.9m
Company	Description	Category
Geodynamics Ltd	Innamincka Hot Fractured Rock Power Plant. For a project that integrates sustainable heat mining from a Hot Fractured Rock (HFR) geothermal reservoir to produce zero-emission electricity.	Energy Generation
Origin Energy Solar Pty Ltd (South Australia)	World-Leading Reduced-Silicon Solar Photovoltaic Technology - For development of its Solar Photovoltaic SLIVER technology that is significantly more efficient, and will assist with fostering the uptake of solar power.	Energy Generation
Solar Heat and Power Pty Ltd (NSW)	5MW Solar Concentrating Array at Liddell Power Station - For construction of a proof-of-concept solar-concentrating array, to provide pressurised hot water connecting to a coal fired power plant and to produce an additional 5MW of output solely from solar energy.	Energy Generation
Scopenery Limited (South Australia)	Geothermal Power in the Limestone Coast (SA) - For a proof-of-concept project on the Limestone Coast which will lead to a 50MW geothermal power plant.	Energy Generation
Solco Ltd (Western Australia)	Solco low-cost, split, solar hot water system - To enhance a low-cost, plastic, high-pressure solar hot water system which will be suitable for frost/corrosive locations, providing pressurised or pump-boosted hot water, with a low environmental impact.	Energy Generation
Western Power Corporation (Western Australia)	High-Penetration Wind/Diesel Product - To deliver a flexible, reliable, Australian-produced wind/diesel product to the world market, capable of meeting the siting requirements of any location and the reliability and quality requirements of any technical standard.	Energy Generation
Renewable Australia Pty Ltd (NSW)	Strategic Well Location Procedure for landfill gas extraction - For a project to further develop strategic well location procedures.	Energy Generation
Wizard Power Pty Ltd (ACT)	Big Dish Solar Thermal Concentrator - To develop a 2nd generation Big Dish with a 50 per cent solar-to-electricity conversion performance improvement and potentially a threefold reduction in overall manufacturing and maintenance costs.	Energy Generation
V-Fuel Pty Ltd (NSW)	Vanadium Bromide Redox Cell Stack Design - For a project to research and develop improved membranes, electrolytes and electrode manufacturing processes.	Energy Storage
Katrix Pty Ltd (Victoria)	Fluid expander - small-scale solar thermal power generation. - To develop a new high-efficiency fluid expander to enable small-scale residential and commercial solar thermal power and heat systems.	Energy Generation
Australian Renewable Fuels Pty Ltd	Microalgal feedstock biodiesel production. Develop, evaluate and optimise bioreactor systems for use in the intensive production of microalgal feedstock for commercial biodiesel production.	Alternative fuels

CSR Sugar Pty Ltd	Ethanol Energy Production using SugarBooster Technology. To develop a novel, high-yielding sugarcane feedstock technology for environmentally and economically sustainable production of ethanol biofuel.	Alternative fuels
Geothermal Resources Limited	Heat generating capacity of buried hot radiogenic granite. to identify, and ultimately map, the composition of granites in the Curnamona Craton region of South Australia.	Energy Generation
New Energy Partners Pty Ltd	Low-cost Parabolic Trough Solar Collector. The project will complete the development of New Energy Partners' novel composite material low cost concentrating solar collector.	Energy Generation
Powercorp Pty Ltd	Renewable energy grid interconnection. The problem of power fluctuations in the grid is felt most acutely on weak lines, often where wind farms connect to the national electricity grid.	Environmental IT and Enabling Technologies
SQC Pty Ltd	Production of Hydrocarbon from Algae. The project will develop a commercially viable rural industry for obtaining renewable hydrocarbons from algae.	Energy Generation

Table 25 - Renewable Energy Development Initiative Receipts

Grant	Low Emissions Technology Demonstration Fund
Purpose	To demonstrate the commercial potential of new energy technologies or processes or the application of overseas technologies or processes to Australian circumstances to deliver long-term large-scale greenhouse gas emission reductions. Small number of large matched grants, with the minimum grant size being in the order of \$20 million. The Fund will cover renewable and fossil fuel supply technologies as well as energy efficiency, and can be for either stationary or transport energy. The technology must be commercially available by 2020 to 2030 and have the potential to reduce Australia's energy sector emissions by at least two per cent per annum over the longer term.
Status	Round one closed in March 2006. The applications will be assessed over the coming months with funding offers in the 2007 financial year.
Grants in 2005-06	Nil

Table 26 - Low Emissions Technology Demonstration Fund

Grant	AusIndustry Commercial Ready Grants	
Purpose	A competitive merit-based grant program supporting innovation and its commercialisation. It aims to stimulate greater innovation and productivity growth in the private sector by providing around \$200 million per year in competitive grants to small and medium-sized businesses (SMEs) between 2004-05 and 2010-11. A wide range of project activities can be supported, extending from initial research and development (R&D), through proof of concept, to early-stage commercialisation activities.	
Status		
Grants in 2005-06	2@ \$1m	
Company	Description	Category
TSS Construction Pty Ltd	Oil and Diesel Fuel Blending Unit with a multi-stage waste oil refinery for remote areas of Australia.	Manufacturing /Industrial
The Active Reactor Company Pty Ltd	An electronic ballast type device that reduces energy consumption and prolongs lamp life.	Energy Efficiency

Table 27 - AusIndustry Commercial Ready Grants

Grant	AusIndustry R&D START Grants	
Purpose	A competitive, merit based grants and loans program that supports businesses to undertake research and development and its commercialisation.	
Status		
Grants in 2005-06	1@ \$15M	
Company	Description	Category
UCC Energy	Ultra Clean Coal from which virtually all the material impurities have been	Energy

	chemically removed.	Efficiency
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Table 28 - AustIndustry R&D Start Grant Recipients

Grant	Low Emissions Technology and Abatement Program
Purpose	LETA Fossil Fuel aims to reduce greenhouse gas emissions in the fossil fuel electricity generation sector by addressing barriers to investment in greenhouse-related projects and promoting new technologies that will reduce the greenhouse intensity of electricity generation. Projects are expected to achieve measurable emission reductions and increase diffusion of emission reduction technologies and practices. The LETA Renewables sub-programme will complement existing climate change measures by supporting broad industry development projects and national projects as set out in the Commonwealth/State Renewable Remote Power Generation Programme (RRPGP) Partnership Agreements. Projects supported under this sub-programme may be proposed by eligible State and Territory Government agencies, renewable energy industry associations or related institutions.
Status	First round of grants scheduled to be announced in August.
Grants in 2005-06	Nil

Table 29 - Low Emissions Technology and Abatement Program

Grant	AusIndustry Commercialising Emerging Technologies (COMET) Program	
Purpose	A competitive, merit based program that supports early-growth stage and spin off companies to successfully commercialise their innovations. COMET has been extended until June 2011 as part of the Australian Government's Innovation Statement, Backing Australia's Ability - Building Our Future through Science and Innovation. This will provide an additional \$100 million in funding providing assistance to more than 1,000 firms	
Status		
Grants in 2005-06	13@ \$0.77m	
Company Name	Description	Category
Redflow Energy Pty Ltd	Advanced flowing electrolyte battery and energy storage system.	Energy Storage
Airstream Recycling Forces Pty Ltd	Air-flow based screening process for beneficiating recycled construction and demolition materials	Materials Recovery and Recycling
Booma Hyland Aquaculture Limited	Aquaculture production of eastern freshwater cod using new husbandry techniques.	Agriculture & Nutrition
Australian Weed Management Pty Ltd	A furrow opening system enabling seeds to be sown in soil protected by the stubble remaining from the previous years' crop.	Agriculture & Nutrition
Thamesford Pty Ltd	Solar water purification technology for relief remote agri and mining.	Water Purification & Management
Titan Research And Innovations Pty Ltd	Developed a diesel 'after engine cooling system' to reduce diesel engine fuel consumption and exhaust emissions.	Energy Efficiency
Smeff Pty Ltd	Water storage system that integrates into domestic and commercial slab concrete building foundations.	Water Purification & Management
Fabcom Pty Ltd	Production of low cost and highly effective organic fertiliser from a wide range of organic waste.	Agriculture & Nutrition
Renewed Resources Pty Ltd	Convert waste products and organic biomass into safe pathogen free high performance horticulture and landscaping products.	Materials Recovery and Recycling
Aglab Pty Ltd	Holistic farm management software that improves on-farm efficiency in the areas of grazing, pastoral, nutrient, cropping, and occupation health and safety standards.	Environmental IT and Enabling Technologies
Cr Biosciences Pty Ltd	Biodegradable controlled release coatings for therapeutic and vaccine treatment compliance.	Manufacturing/Industrial
Dga (lp) Pty Ltd	Liquid petroleum gas (lpg) fumigation for light commercial and 4 wheel drive (4wd) diesel engines.	Transportation & Logistics
Akhil Technologies Pty Ltd	Organic soil fumigant for fruit and vegetable crops.	Agriculture & Nutrition

Table 30 - Comet Grant Recipients

Grant	Victoria Business Energy Innovation Initiative		
Purpose	Provides financial support for Victorian businesses that invest in new and innovative energy efficient solutions, or in solutions that combine energy efficiency with other sustainable business practices.		
Status			
Grants in 2005-06	1@ \$50,000		
Company Name	Description	Category	
Hunt Boilers	Energy efficiency technology with the potential to cut costs and and greenhouse pollution across industry.		

Table 31 - Victoria Business Energy Innovation Initiative

Grant	NSW Energy Savings Fund		
Purpose	Provides incentives to encourage effective and innovative investments in energy savings measures. It provides funding for projects which stimulate investment in innovative energy savings measures.		
Status			
Grants in 2005-06	10@ \$8.9m		
Company Name	Description	category	
Amcor	To install new equipment to save energy and reduce emissions. To sustain the savings, web-based metering will also be installed and used to raise awareness and engage staff in reducing unnecessary compressed air use.	Energy Efficiency	
Baida Chickens	Baiada poultry new equipment will replace the existing ice machines, currently used to chill the chickens.	Energy Efficiency	
Big Switch projects	The project proposes a range of energy saving packages, including fuel-switching (i.e. electric to gas cookers) and purchase price discounts through dual fuel (gas and electricity) supply agreement incentives.	Environmental IT and Enabling Technologies	
Bulga Coal	Replace 45 motors at their Bulga Coal Handling & Preparation Plant (CHPP) with high efficiency alternatives.	Energy Efficiency	
Cadbury Schweppes	Reduce the energy use of the refrigeration plant by 40% by modifying existing equipment, improving efficiency and installing variable speed drives.	Energy Efficiency	
Energy Response	This project will make more efficient use of existing infrastructure by bringing electricity users together with the networks, not only reducing peak demand but promoting network reliability at low cost.	Environmental IT and Enabling Technologies	
Simplot Australia	Simplot plan to improve energy efficiency at their food processing plant in Bathurst by installing new technology, using heat recovery and modifying existing pipeworks and controls.	Energy Efficiency	
Visy Aust.	This proposal for the Visy's Smithfield Mill involves installing variable speed drives, feedback controllers and changing piping to improve efficiency of the pulp agitators used in making paper.	Energy Efficiency	
CSM Energy	The company will partner with with a coal mine to establish coal mine methane recovery and on-site energy generation projects	Energy Generation	
Rockdale Beef	Excess electricity generated from the new biogas plant will be fed back into the grid and the upgrades to	Energy Efficiency	

	equipment and existing wastewater treatment plant will save both water and money by avoiding manure disposal costs.	
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Table 32 - NSW Energy Savings Fund

Grant	NSW Water Savings Fund	
Purpose	Provide incentives to business, local councils and communities to save recycled water in Sydney, the Blue Mountains and the Illawarra.	
Status		
Grants in 2005-06	3@ \$2.4m	
Company Name	Description	category
University of Western Sydney	Smart irrigation technologies for saving potable water on vegetable farms.	Water Purification & Management
DPK Australia Pty Ltd	Technology to remove fabric dyes from wastewater and clean it to a standard that can be reused in the manufacturing cycle.	Water Purification & Management
Amcor Packaging (Australia) P/L	Reverse osmosis technology will replace all potable water currently used in the paper recycling process.	Water Purification & Management

Table 33 - NSW Water Savings Fund

Grant	Queensland Sustainable Energy Innovation Fund	
Purpose	Promotes innovation in energy efficiency, renewable energy and water-saving technologies and practices.	
Status		
Grants in 2005-06	5 @ \$0.8m	
Company	Description	Category
Mathers Hydraulics	Energy-saving hydraulic power steering pump.	Energy Efficiency
Loklite Pty Ltd	Replacement of petroleum-based polymers. Developing floor panels made from fibre composite materials.	Manufacturing/Industrial
Dowmus Pty Ltd	Refining an energy-efficient wastewater treatment filter, Biolytix to provide a low cost alternative to rural household septic systems.	Energy Efficiency
Senviro Pty Ltd	Wireless, low-cost soil moisture sensor for plant nurseries, which will detect and prevent over-watering.	Water Purification & Management
Hydrogen Power Industries Pty Ltd	Developing a fully-submersible generator, a pontoon-mounted water current turbine and a buoyancy control system.	Energy Generation (renewables)

Table 34 - Queensland Sustainable Energy Innovation Fund

Grant	Automotive Competitiveness and Investment Scheme's Motor Vehicle Producer Research & Development Scheme	
Purpose	To provide transitional assistance and to encourage competition and innovation in the Australian automotive industry	
Status		
Grants in 2005-06	3 @ \$96.4m	
Company	Description	Category
Ford Motor Company of	The new Ford Territory model powered by alternative fuel engine technology; and the E8 Platform Expansion	Transportation & Logistics

Australia Ltd		
GM Holden Ltd	Hybrid power train development; fuel economy and alternate fuels; human machine interface development; and a global smart architecture and design process;	Transportation & Logistics
Mitsubishi Motors Australia Limited	For the power train optimisation project to improve fuel consumption, performance and emissions while cutting cost and weight.	Transportation & Logistics

Table 35 - Automotive Competitiveness and Investment Scheme's Motor Vehicle Producer Research & Development Scheme

Grant		Water Smart Australia Programme	
Purpose	Accelerate the development and uptake of smart technologies and practices in water use across Australia.		
Status			
Grants in 2005-06	2@	\$4.7m	
Company	Description	Category	
SKM Groundwater-Surface Water Interaction	Undertake pilot projects to validate an approach leading to the implementation of a wider scale programme in 30 to 40 regional catchments. A tool in understanding the connectivity between surface and groundwater resources and connected systems.	Water Purification & Management	
Redevelopment of the Dalby Water Supply through the Integrated Use of Coal Seam Methane Water, Recycling and Demand Management, Dalby, Queensland	The use of coal seam methane water for potable water supply. Construction of a pipeline and a preliminary treatment and reverse osmosis plant to treat the coal seam methane water.	Water Purification & Management	

Table 36 - Water Smart Australia Programme

Grant		Victoria Smart Water Fund	
Purpose	The Smart Water Fund provides funding for innovative water conservation projects to individuals, community groups, businesses and research bodies in metropolitan and regional urban Victoria.		
Status			
Grants in 2005-06	\$5m	- details not disclosed	

Table 37 - Victoria Smart Water Fund

Grant		Victoria Sustainability Fund	
Purpose	Support projects and initiatives that will foster the environmentally sustainable use of our resources and best practices in waste management.		
Status			
Grants in 2005-06	2@	\$0.4m	
Company	Description	Category	
Asia Pacific Coal & Steel	Large scale water recovery from newbrown coal drying process. .	Water Purification & Management	
Australian Sustainable Industry Research Centre	To evaluate the use of recycled waste in cement production and other manufacturing processes	Materials Recovery and Recycling	

Table 38 - Victoria Sustainability Fund

Grant		AusIndustry Cooperative Innovation Program	
Purpose	A merit based grants program aimed at encouraging business-to-business cooperation on innovation.		
Status			

Grants in 2005-06	3@	\$0.7m
Company	Description	Category
Eco Barramundi Pty Ltd	Closed water recirculation method for pond-based marine aquaculture. .	Agriculture & Nutrition
National Aquaculture Council	Development of an innovation and technology roadmap for the Australian farmed barramundi supply chain.	Agriculture & Nutrition
Typower Pty Ltd	Will develop a special purpose system designed to translate control signals and responses between the electricity supplier or distributor and customer appliances, especially airconditioning systems.	Energy Efficiency

Table 39 - AusIndustry Cooperative Innovation Program

Grant	Structural Adjustment Fund for South Australia	
Purpose	Assist businesses, both domestic and international, to invest in Adelaide.	
Status		
Grants in 2005-06	1@	\$2m
Company	Description	Category
Origin Energy Solar Pty Ltd	To further develop and commercialise its 'SLIVER' photovoltaic technology.	Energy Generation

Table 40 - Structural Adjustment Fund for South Australia

Grant	<i>AP6 - Energy Technolgy Fund</i>
Purpose	\$25m exclusive for renewable energy technologies. Developing a suite of new energy and technological solutions to the challenge of abating greenhouse gas emissions Assist businesses, both domestic and international, to invest in Adelaide.
Status	Report to ministers this year want focus will be. Projects nominated at 2007 AP6 meeting.
Grants in 2005-06	Nil

Table 41 - AP6 Energy Technolgy Fund

Grant	Advanced Electricity Storage Technologies Programme
Purpose	To develop advanced storage technologies for electricity applications include, but are not limited to, batteries, electro-mechanical, chemical and thermal storage technologies in either on-grid or off-grid situations
Status	\$19m in Grants to be announced in early 2007. Received appn's for 30 projects worth \$60m
Grants in 2005	Nil

Table 42 - Advanced Electricity Storage Technologies Programme

Grant	Queensland Ethanol Conversion Initiative	
Purpose	Conversion of existing fuel storage tanks to support E10; the establishment of E10 storage and blending facilities; the conversion of fleet vehicles for the use of diesel ethanol blends	
Status		
Grants in 2005	1@	\$0.3m
Company	Description	Category
Freedom Fuels	Convert Freedom Fuels service stations to E10 ethanol blend fuel	Alternative Fuels

Table 43 - Queensland Ethanol Conversion Initiative

Grant	Regional and Community Projects	
Purpose	Help the sugar industry and/or its dependant communities by providing funding for a range of regionally based targeted projects	
Status		
Grants in 2005-06	1@	\$11.7m
Company	Description	Category
Bundaberg Sugar	Contruotion of flexible feedstock fuel ethanol facility.	Alternative Fuels

5.2 Dedicated Cleantech Listed Company Data

ASX	Company	Category	MC Jun 06	MC Jun 05	Change 05-06 %	New capital	Type
ANM	Advanced Magnesium	Materials Recovery and Recycling	20,000,000			15,000,000	
ANO	Advanced Nanotechnology	Materials & Nanotechnology	18,792,235	21,047,304	-10.71%	0	
AEI	Aeris Technologies Limited	Air Quality	45,071,545	32,501,183	38.68%	0	
AJL	AJ Lucas & Co Limited	Manufacturing/Industrial	45,188,580	66,479,488	-32.03%	0	
AMU	Amadeus Energy Limited	Energy Generation - renewables	210,330,000	130,244,318	61.49%	23,000,000	
AOE	Arrow Energy Limited	Energy Generation - renewables	141,949,707	52,491,727	170.42%	85,430,000	
AUX	Ausron Limited	Agriculture & Nutrition	17,134,033	18,813,840	-8.93%	0	
AWG	Austral Waste Group	Materials Recovery and Recycling	7,069,500			7,421,259	Listing
ABJ	Australian Biodiesel Group	Alternative fuels	80,787,670			67,770,245	Listing
AAE	Australian Ethanol Limited	Alternative fuels	45,492,891	6,041,479	653.01%	13,480,000	
ARW	Australian Renewable Fuels	Alternative fuels	95,480,001	52,800,000	80.83%	138,900,000	
AAQ	Australis Aquaculture Limited	Agriculture & Nutrition	16,017,598	24,420,997	-34.41%	1,400,000	
BBW	Babcock & Brown Wind Partners	Energy Generation - renewables	858,079,643	843,000,000	1.79%	514,600,000	
BEI	Babcock and Brown Env. Invest.	Energy Infrastructure	317,099,280	178,000,000	78.15%	118,330,000	
BAX	Baxter Group Limited	Materials Recovery and Recycling	186,180,000	200,523,572	-7.15%	0	
BOS	Biosignal Limited	Materials & Nanotechnology	11,336,481	8,079,984	40.30%	3,900,000	Listing
BUG	Buderim Ginger	Agriculture & Nutrition	15,000,000	15000000		827,160	
CBD	CBD Energy Limited.	Energy Efficiency	2,610,390	2,469,288	5.71%	0	
CDX	CDS technologies Limited	Water Purification & Management	72,746,762	72,938,439	-0.26%	394,000	
CAQ	Cell Aquaculture Limited	Agriculture & Nutrition	17,569,938	25,000,000	-29.72%	5,200,000	
CFU	Ceramic Fuel Cells Limited	Alternative fuels	191,893,447	58,149,342	230.00%	94,350,000	
CHX	CH4 Gas Limited	Energy Generation - renewables	125,479,124	121,937,375	2.90%	0	
CTF	Citrofresh International Limited	Manufacturing/Industrial	6,003,995	5,269,665	13.94%	1,312,600	
CMV	CMA Corp Limited	Materials Recovery and Recycling	39,887,302	94,000,000	-57.57%	18,000,000	Listing
COZ	CO2 Group Limited	Environmental IT and Enabling Techn	33,674,197	58,750,053	-42.68%	0	
COF	Coffey International Limited	Water Purification & Management	231,601,000	172,773,245	34.05%	830,000	
CAU	Colltech Limited	Environmental IT and Enabling Tech	9,197,964	9,155,750	0.46%	6,170,000	
COI	Comet Ridge Limited	Energy Generation - renewables	22,921,678	4,936,731	364.31%	2,560,000	
DMX	Dolomatrix Limited	Materials Recovery and Recycling	27,157,732	4,441,109	511.51%	6,000,000	
DYE	Dyesol Limited	Environmental IT and Enabling Tech	22,769,261	5,000,000	355.39%	6,172,135	
ESG	Eastern Star Gas Limited	Energy Generation - renewables	38,040,529	36,450,946	4.36%	14,668,000	

ASX	Company	Category	MC Jun 06	MC Jun 05	Change 05-06 %	New capital	Type
EDE	Eden Energy Limited	Energy Generation - renewables	8,733,089			10,000,000	Listing
EMM	Electrometals	Manufacturing/Industrial	6,000,000			0	
ENB	Eneabba Gas	Energy Generation - renewables	12,906,241			8,300,000	IPO
ENE	Energy Developments Limited	Energy Generation - renewables	545,795,908	451,768,055	20.81%	1,150,000	
EVM	Enviromission Limited	Energy Generation - renewables	12,770,564	23,039,155	-44.57%	1,458,500	
ESI	Environmental Solutions International	Energy Efficiency	128,000,000			12,000,000	
EVZ	Envirozel Limited	Materials Recovery and Recycling	20,060,696	3,791,230	429.13%	5,330,200	
GAP	Gale Pacific Limited	Energy Efficiency	52,316,324	75,263,498	-30.49%	33,850,000	
GDY	Geodynamics Limited	Energy Generation - renewables	80,417,731	160,387,082	-49.86%	51,446,410	
GHT	Geothermal Resources Limited	Energy Generation - renewables	2,280,000			3,000,000	Listing
GRD	GRD Limited	Materials Recovery and Recycling	472,516,800	255,174,934	85.17%	8,014,019	
GPE	Green Pacific Energy Limited	Environmental IT and Enabling Tech	3,283,432	15,760,475	-79.17%	0	
GRK	Green Rock Energy Limited	Manufacturing/Industrial	5,323,992	7,803,386	-31.77%	2,600,000	
HMC	Hydromet Limited	Materials Recovery and Recycling	13,288,391	18,003,027	-26.19%	0	
LNC	Linc Energy	Energy Infrastructure	23,219,282			33,170,000	Listing
LNG	Liquified Natural Gas Limited	Energy Generation - renewables	65,044,081	22,230,039	192.60%	11,500,000	
MPA	Marine Produce Australia	Agriculture & Nutrition	7,574,334	11,410,475	-33.62%	6,738,284	
MDV	Medivac Limited	Materials Recovery and Recycling	3,872,493	3,940,155	-1.72%	1,700,000	
MEL	Metgasco Limited	Energy Generation - renewables	12,688,600	8,653,213	46.63%	12,030,000	
MBT	Mission Biofuels	Alternative fuels	63,000,000			40,600,000	Listing
ODY	Odyssey Energy	Energy Generation - renewables	14,935,000	6,000,000	148.92%	7,930,000	
OEC	Orbital Corporation Limited	Transportation & Logistics	37,427,580	43,112,567	-13.19%	15,000,000	
ORT	ORT Limited	Materials Recovery and Recycling	2,279,864	5,343,090	-57.33%	1,347,000	
PPY	Papyrus Aust Limited	Materials Recovery and Recycling	7,779,522	5,000,000	55.59%	5,200,000	
PTR	Petratherm	Energy Generation - renewables	6,817,500	5,200,000	31.11%	1,470,000	
POH	Phosphagenics Limited	Materials & Nanotechnology	153,092,373	127,469,626	20.10%	17,599,860	
PCE	Pinnacle VRB Limited	Energy Storage	4,086,075	1,230,900	231.96%	1,788,000	
PGS	Planet Gas Limited	Energy Generation - renewables	79,000,000			12,000,000	Listing
PPG	Pro Pac Packaging Limited	Materials Recovery and Recycling	11,745,505	16,932,231	-30.63%	11,997,236	
PUR	Purus Energy Limited	Energy Generation - renewables	3,751,688			9,000,000	
QGC	Queensland Gas Company Limited	Energy Generation - renewables	256,181,299	154,760,793	65.53%	50,453,200	
NSX	Revetec	Transportation & Logistics				0	
SAE	Salinas Energy	Materials Recovery and Recycling	20,000,000	20,506,435	-2.47%	0	

ASX	Company	Category	MC Jun 06	MC Jun 05	Change 05-06 %	New capital	Type
SLD	ShieldLiner Limited	Materials & Nanotechnology	2,509,390	3,722,400	-32.59%	0	
SGM	Sims Limited	Materials Recovery and Recycling	2,489,212,980	1,351,717,516	84.15%	14,980,000	
SKY	Skydome Holdings Limited	Energy Efficiency	2,534,910	2,897,040	-12.50%	0	
SNF	So Natural Foods Limited	Agriculture & Nutrition	22,687,355	17,794,004	27.50%	9,300,000	
SOO	Solco Limited	Energy Generation - renewables	17,198,957	18,166,877	-5.33%	3,654,868	
STP	Stericorp Limited	Materials Recovery and Recycling	32,327,114	10,643,849	203.72%	7,300,160	
SYP	Style Plantations Limited	Agriculture & Nutrition	11,674,190	4,050,966	188.18%	7,400,000	
SGL	Sydney Gas Limited	Energy Generation - renewables	91,654,399	112,263,502	-18.36%	50,000,000	
TSR	Techstar	Manufacturing/Industrial	10,000,000			500,000	
EGL	The Environmental Group Limited	Water Purification & Management	7,500,442	6,959,173	7.78%	0	
TOX	Tox Free Solutions Limited	Materials Recovery and Recycling	70,304,899	14,478,522	385.58%	3,094,000	
TTI	Traffic Technologies Limited	Transportation & Logistics	23,194,083	8,271,443	180.41%	28,461,000	
TPI	Trans Pacific Industries Limited	Transportation & Logistics	1,332,958,238	754,000,000	76.78%	5,560,000	
VIR	Viridis Clean Energy Group	Energy Generation - renewables	110,880,088	190,000,000	-41.64%	126,000,000	
WGP	Westralian Gas & Power Limited	Energy Generation - renewables	1,433,440	2,699,030	-46.89%	0	
ZBB	ZBB Energy Corp Limited	Energy Storage	11,820,824	19,881,099	-40.54%	11,750,000	
Pre Listing	Pure Energy resources	Energy Generation - renewables	8,000,000			0	
Pre Listing	Axiom Energy	Alternative fuels	10,000,000			0	
	Total		9,364,642,156	6,281,041,622	49.09%	1,790,388,136	

5.3 Totals Investment Summary

Category	% of total	Category Total	Dedicated cleantech listed companies	Government grants	Cooperative Research Centre funding	Grants for University research	Project Finance	Partial cleantech listed companies	Venture Capital	Pooled Funds
Agriculture & Nutrition	2.1%	137.7	30.9	0.5	18.1	1.5	-	-	1.6	85.0
Air Quality	0.1%	4.2	-	-	3.1	1.1	-	-	-	-
Alternative fuels	6.7%	448.1	388.3	12.0	-	0.3	30.0	17.0	0.5	-
Energy Efficiency	1.1%	71.5	45.9	20.2	4.1	0.7	-	-	0.7	-
Energy Generation	80.8%	5,402.4	999.7	39.0	-	1.3	692.5	3,670.0	-	-
Energy Infrastructure	1.8%	120.4	120.3	-	-	0.1	-	-	-	-
Energy Related	0.0%	-	-	-	-	-	-	-	-	-
Energy Storage	0.2%	13.7	13.5	0.1	-	0.1	-	-	-	-
Green buildings	0.0%	2.5	-	-	-	-	-	-	2.5	-
Manufacturing/Industrial	0.2%	14.3	4.4	1.1	7.6	1.3	-	-	-	-
Materials & Nanotechnology	0.5%	33.0	21.5	-	4.5	4.0	-	-	3.0	-
Environmental IT & Enabling Technologies	0.9%	62.4	12.3	3.0	2.4	0.7	-	-	-	44.0
Materials Recovery and Recycling	2.6%	177.0	105.4	0.2	7.0	1.0	35.0	-	28.3	-
Transportation & Logistics	2.6%	171.3	49.0	96.5	10.1	0.2	15.0	-	0.5	-
Water Purification & Management	0.4%	29.5	<u>0.4</u>	<u>12.5</u>	<u>14.4</u>	<u>2.2</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total	100.0%	<u>6,687.9</u>	1,791.5	184.9	71.3	14.5	772.5	3,687.0	37.1	129.0
% of total		100.0%	26.8%	2.8%	1.1%	0.2%	11.6%	55.1%	0.6%	1.9%