

# ECO INVESTOR

**April 2006 Year 2 No 5**

**Helping Commercialize Australia's  
Leading Environmental Ideas**



*Australia's First Solar Energy  
Billionaire  
President Bush Turns to  
Renewables  
Trends in Cleantech Investing  
Major Pension Fund Steps up  
Environmental Checks  
Fund Manager Opposes  
Nuclear Option*

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## CVC Sustainable Investments

### Producing Profits Sustainably

CVC Sustainable Investments is an unlisted private equity fund dedicated to environmental investments. We invest in established Australian businesses that:

- > reduce dependency on non-renewable resources;
- > reduce waste or harmful byproducts of business processes;
- > reduce greenhouse gas emissions;
- > contribute to biodiversity and/or ecosystems protection or recovery; and/or
- > provide commercially sound solutions to other environmental problems.

CVC Sustainable Investments is managed by CVC Managers Pty Limited which also manages CVC Limited, the best performing private equity fund on ASX over 3 and 5 years<sup>1</sup> and the 10th fastest growing member of the BRW Fast 100 in 2005.

If you own or manage an established Australian business that delivers environmental benefits and seeks expansion capital, or if you are interested in learning more about CVC Sustainable Investments, please contact Andrew Post (apost@cvcltd.com.au) or visit our website, [www.cvcsl.com.au](http://www.cvcsl.com.au)

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**Front Cover: Trend Windows' new Xtreme window for bushfire zones**

<sup>1</sup> CVC Sustainable Investments Limited (ABN 35 088 731 837) is managed by CVC Managers Pty Ltd (ABN 12 108 360 372 AFSL 277740) which is also the manager of CVC Limited. CVC Limited's performance relative to its peers was published by ASX in its survey of Listed Management Investments dated 30 September 2005. The survey is available at [www.asx.com.au/LMI](http://www.asx.com.au/LMI).

### Australia's First Solar Energy Billionaire

Forbes magazine calls him the "Sun King" and rates him at number 350 in its list of most wealthy people in the world. Zhengrong Shi, 44, is the chief executive and major shareholder of Chinese solar power giant Suntech Power Holdings which produces solar cells, panels and other solar power generation equipment in Wuxi in eastern China.

According to Forbes, Mr Shi is mainland China's richest man and one of its newest billionaires, worth US\$2.2 billion. But Mr Shi is an Australian citizen who entered solar research at the University of NSW almost by accident in 1989. He was due to return to China after completing a one-year optics research fellowship. Keen to continue research in Australia, he sought a job with the university's solar cell research team led by Professor Martin Green. Green took him on and he completed his PhD while working on solar cells. The University of NSW team is credited with greatly improving the efficiency of solar cells.

In 1995, Messrs Shi and Green and another researcher, Stuart Wenham, became part of a joint venture between the university and Pacific Power to develop new lower cost photovoltaic cells which it called thin-film solar cells.

Mr Shi became an Australian citizen and continued research in Australia but around 2000 he became convinced that the place to commercialise solar power was China. In 2001 he was offered US\$6 million in seed capital to set up a manufacturing plant by the

regional government and a group of state owned enterprises in Wuxi near Shanghai.

Starting with second hand equipment bought from a bankrupt US company, Suntech developed its first products and put them into commercial production. The company now has 1,300 workers turning out solar cells 10 per cent cheaper than they can be produced in the US. But getting to that stage has not been easy. Along the way he bought out the original government investors, had to drastically cut costs to stay in business and has had to improve the products to keep ahead of Chinese rivals. He has been helped in this by the Australian connection. Stuart Wenham is now chief technical officer at Suntech and Mr Green is a consultant.

Last year Suntech nearly doubled its production, making it the world's eighth largest producer of solar cells. Revenue for 2005 was US\$226 million compared with US\$85 million in 2004.

Mr Shi is predicting sales will triple in the next three years. His confidence is not based only on rising worldwide demand for solar devices, the solar industry is facing short supply of silicon wafers, the main component of the cells. Mr Shi, however, has long term contracts in place for volume supplies.

Suntech is continuing to work on developing solar cell efficiency. Mr Shi told Forbes magazine he believed he could increase efficiency to about 18 per cent, which would make the company an industry leader on efficiency.

This is, however, still well behind the efficiency level of 24 per cent which has been achieved in research by Mr Green's University of NSW team suggesting that there are still significant improvements to come in commercial solar power.



**Zhengrong Shi.** *Picture China Internet Information Center*

Mr Shi's new found on-paper wealth comes from Suntech's IPO and listing on the New York Stock Exchange as Suntech Power Co in December.

The IPO raised US\$396 million of which US\$300 million went to the company, some of which will be used to greatly boost the research budget.

US technology magazine Red Herring reported Robert Wilder, president of WilderShares which maintains the WilderHill Clean Energy Index, as saying the strength of Suntech's IPO proved investor interest in clean energy was global.

"This is fantastic," he said. "The strength of their IPO reflects the interest that investors are increasingly showing in the alternative energy sector, specifically in solar and wind. There's keen demand ... there's global appetite for solar. To my mind, the people who are investing in solar are fishing in the right pond."

Offered in the IPO at US\$15 each, Suntech's shares jumped US\$6.20 on listing to US\$21.20. They were recently (Mar 30) trading at around US\$37. It was one of the most successful tech listings on the NYSE in >

## US President's Clean Energy Agenda

The status and future of environmental investment have received a major boost with a commitment by US President George W Bush to reduce the US's dependence on oil, opening the way for greatly increased development of environmentally friendly energy sources and technologies.

In his recent State of the Union address at the Capitol, President Bush said America is addicted to oil and needs to focus on developing cleaner, cheaper, and more reliable energy sources. He committed to replacing more than 75 per cent of US oil imports from the Middle East by 2025 and to developing solar and wind power generation technologies. He nearly doubled the annual spending on developing solar power, although wind power generation was given only a small increase.

It was the moment when renewable energy and clean, green issues were finally seen as being near the top of the agenda for the US Administration.

### From Page 3 2005.

But Mr Shi sees the solar power industry as still only in its infancy. He expects it to really take off in three or four years time. He expects Suntech to take advantage of this but he does not rule out an overseas merger or takeover of the company along the way.

He will, he says, be happy to give up control of the company if it advances solar technology.

Suntech products are available in Australia through Suntech Australia.

Just how green the President was committing the US to becoming remained, however, still a matter for debate. The speech committed the largest funding increases to cleaning up coal powered generation and developing new generation nuclear power plants.

But it was the commitments to oil replacement technology that grabbed attention.

President Bush said "America is addicted to oil, which is often imported from unstable parts of the world. The best way to break this addiction is through technology. Since 2001 we have spent nearly \$10 billion to develop cleaner, cheaper, and more reliable alternative energy sources - and we are on the threshold of incredible advances.

"So tonight, I announce the Advanced Energy Initiative - a 22-per cent increase in clean energy research - at the Department of Energy, to push for breakthroughs in two vital areas. To change how we power our homes and offices, we will invest more in zero emission coal-fired plants, revolutionary solar and wind technologies, and clean, safe nuclear energy."

He went on to make some impressive commitments on oil replacement.

"We must also change how we power our automobiles. We will increase our research into better batteries for hybrid and electric cars, and in pollution-free cars that run on hydrogen. We'll also fund additional research in cutting edge methods of producing ethanol, not just from corn but from wood chips and stalks, or switch grass [a tall native American grass]. Our goal is to make this new kind of ethanol practical and competitive within six years.

"Breakthroughs on this and other new technologies will help us reach another great goal: to replace more than 75 per cent of our oil imports from the Middle East

by 2025.

"By applying the talent and technology of America, this country can dramatically improve our environment, move beyond a petroleum-based economy, and make our dependence on Middle Eastern oil a thing of the past."

The details of the 22 per cent increase in funding for clean energy research (the US has been spending an average of nearly US\$2 billion a year on clean energy research over the last five years) should promote the



 **DEPARTMENT OF ENERGY,  
UTILITIES AND SUSTAINABILITY**  
NEW SOUTH WALES GOVERNMENT

### WATER SAVINGS FUND

Applications invited for Round 2

The NSW Government is now calling for competitive bids for Round 2 of the Water Savings Fund to save and recycle water in Sydney Water's area of operations [Sydney, Blue Mountains and Illawarra].

We are looking for innovative ideas which deliver real savings and contribute to the sustainability of Sydney's future water supply.

For a copy of the Guide for Applicants, an application form and details on information sessions, visit [www.deus.nsw.gov.au](http://www.deus.nsw.gov.au)

**Applications close on Wed 10th May 2006.**

Water for Life 

development of a number of new technologies - around the world as well as in the US.

Details of commitments to specific areas of research in the 2007 Budget are:

\* Coal research - Like Australia, the US has vast coal resources and uses coal as its main power source for generating electricity. In 2000, President Bush committed US\$2 billion over ten years to speed up research into clean coal technologies. US\$281 million is committed to this objective for the new financial year almost completing the President's 2000 commitment four years ahead of time. The program includes US\$54 million for the FutureGen initiative, a public-private sector partnership to develop innovative technologies for a close to emissions-free coal powered electricity generation plant that will capture and store the carbon dioxide it produces rather than releasing it into the atmosphere.

As coal appears certain to remain the major source of power generation for the immediate future, any technologies which reduce the environmental impact of its use must be seen as progress, however appealing switching to renewable sources of energy might appear.

\* Nuclear energy - The US has more than 100 nuclear power plants making nuclear power the country's second largest source of electricity generation. According to the White House, "nuclear power provides significant benefits to the nation, in the form of cleaner air and low and stable electricity prices. Nuclear power does not emit the air pollutants and greenhouse gases that result from coal-fired and natural-gas-fired generation".

US\$250 million has been allocated for the Global Nuclear Energy Partnership under which the US will work with other advanced civilian nuclear energy nations to develop advanced reactors and new methods

to recycle spent nuclear fuel.

This will be a matter of concern to all those who believe the risks of nuclear accidents and the legacy of nuclear waste far outweigh its lack of emissions.

\* Solar energy - US\$148 million (up US\$65 million on the current year) is to go to the Solar America Initiative. This program is working on developing advanced photovoltaic materials to convert sunlight into electricity with the goal of making this technology cost competitive with other forms of renewable energy by 2015.

\* Wind energy - The allocation of US\$44 million to wind energy research is just US\$5 million up on the current year. Apart from improving the efficiency and lowering the costs of current generation wind turbines, this research will also focus on developing new small-scale wind technologies for use in low wind speed environments.



## BSI Tax Incentives & Government Grants

*"... Many companies are not aware of the resources available to them for growth. We honestly meet new companies every week that have never heard of the R&D assistance programs or consider themselves eligible. Even companies that have tried to access assistance rarely understand their full entitlements and opportunities."*

**Michael Lynch, Executive Director BSI Tax Incentives & Government Grants.**

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## Coal Industry to Fund Emissions Research

Australian coal companies are to provide up to \$300 million over the next five years for research into reducing emissions from power stations.

The coal companies will work with electricity generators to test promising technologies.

So far, 19 black coal producers - about 90 per cent of the industry - have committed to the establishment of the COAL21 Fund. The fund is believed to be the first of its kind world wide.

Executive director of the Australian Coal Association, Mark O'Neill, said the fund will be raised by a voluntary levy on coal producers based on their production levels. He added that the industry will welcome the participation of companies in other sectors, such as power generators.

Mr O'Neill said "The technologies being targeted through the COAL21 Fund are needed to allow energy use to grow in a sustainable way and are part of the transition to new energy systems. The ultimate prize is to achieve substantial reductions in greenhouse gas emissions while maintaining a secure, reliable and affordable energy supply."

He said projects will be carefully selected in areas where Australian technology could make a difference and complement international efforts. The focus would be on projects which could produce practical outcomes and clear goals.

Establishment of the fund extends the industry's existing commitment to reduction of greenhouse gas emissions through its COAL21 program. The program has already brought together the coal and power industries, Federal and state government agencies, key

mining and power section unions and major research organisations to identify the most promising technologies.

"While most of the technological solutions for reducing and eliminating emissions are known, demonstration is necessary to accelerate their implementation. A number of potential demonstration projects are now being assessed for funding support," Mr O'Neill said.

The technologies include:

- \* Capture and geological storage of carbon dioxide.
- \* Coal gasification for either electricity or liquid fuels production (a way of capturing carbon dioxide without first burning coal).
- \* Oxy-fuel combustion (a way to reduce the cost of capturing carbon dioxide at conventional power stations).
- \* Post combustion capture and storage of carbon dioxide including retrofitting of existing power stations (another promising option for capturing carbon dioxide from conventional power stations).
- \* Advanced clean coal preparation.

Mr O'Neill said the fund would initially focus on supporting more mature projects for which funding under the Federal Government's Low Emission Technology development Fund had been sought but less mature projects would be considered as they progressed.

He said funding could also be made available to examine possible synergies between coal and renewable sources of energy, for example biomass and solar thermal technologies.

The Federal Minister for Industry, Ian Mcfarlane, and the Federal Minister for the Environment, Senator Ian Campbell, welcomed the establishment of the fund.

Mr Mcfarlane said it will help coal producers ensure the long term viability of their industry.

Senator Campbell said it was a significant step by the coal industry in the fight to combat climate change.

"While alternatives applied around the world such as efficient energy initiatives, solar power, wind and nuclear energy will all play an important part in reducing global greenhouse gas emissions, the problem of climate change will not be solved without a breakthrough in clean coal technology," he said.

He said the fund would also complement investment in low-emissions technology by the Federal Government: the \$500 million Low Emissions Demonstration Fund and the \$100 million energy fund announced at the Asia-Pacific Clean Development and Climate Partnership meeting.

About 35 per cent of Australia's greenhouse gas emissions are caused by the burning of coal (black coal plus brown coal in Victoria).

## Domestic Wind Generator

A vertical axis wind turbine suitable for installing on the roofs of houses has been awarded a \$64,000 Federal Government Commercialising Emerging Technologies (COMET) grant.

The turbine, under development by Stellar Energy of Adelaide, can generate electricity with the wind blowing in any direction and can feed excess electricity to the power grid.

Stellar Energy plans to use the grant funding for business planning, developing an export strategy, market research, intellectual property protection and to develop an improved prototype.

## Clean Energy Becoming Cost-competitive

For the first time, clean-energy technologies are becoming cost-competitive with their “dirtier” counterparts, according to the latest US Clean-Energy Trends report.

Authors Joel Mackower, Ron Prenick and Clint Wilder of Clean Edge Inc say clean-energy prices are continuing an almost relentless downward march.

In some regions, wind power is now one of the least expensive and most easily deployed sources of new generating capacity. Ethanol has also gained favour for vehicle use in the US and some other countries [although not Australia]. Similarly biodiesel, made from a wide range of animal and vegetable oils, is now priced within striking distance of petroleum-based diesel. Even solar energy, still relatively expensive without subsidies, competes favourably in some places and is often the cheapest choice for power in remote regions.

Suddenly, so-called “alternative” energy technologies are looking pretty mainstream, says the report.

“The growth of clean-energy markets reflects its growing acceptance. Global wind and solar markets reached US\$11.8 billion and US\$11.2 billion in 2005 — up 47 per cent and 55 per cent, respectively, from a year earlier. The market for biofuels hit US\$15.7 billion globally in 2005, up more than 15 per cent from the previous year.

“Multinationals like BP, GE, Sharp and Toyota are partly responsible for promoting the aggressive growth of these technologies, leading the way with billion dollar divisions dedicated to solar, wind power,

ethanol, and hybrid electric vehicles, among other technologies.”

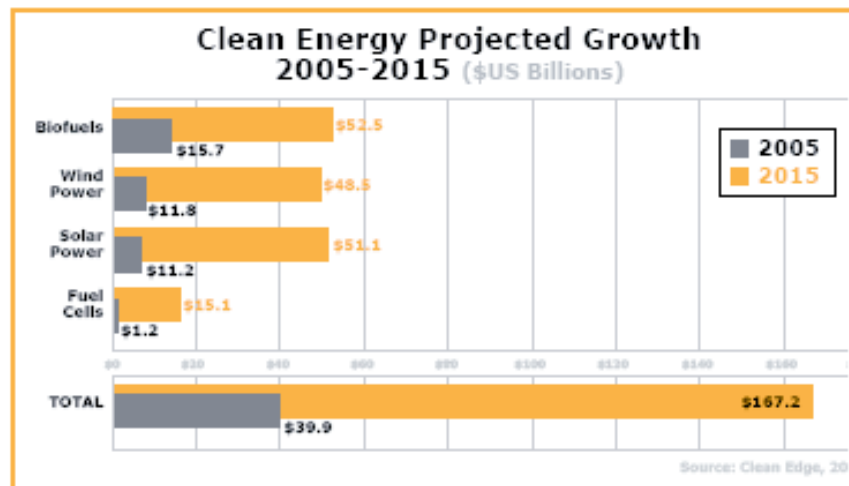
In the US, many state and city governments are playing a key role, too, competing to become clean energy hubs that attract economic development and jobs.

“The Silicon Valley venture firms that financed the internet and wireless telecom revolutions — among them Draper Fisher Jurvetson; Kleiner Perkins Caulfield & Byers; Mohr, Davidow Ventures; and VantagePoint Venture Partners — have begun placing increasingly bigger bets on clean energy.”

The report says that even Texan “oilman”, President George W Bush, seems to be warming to clean energy. In his 2006 State of the Union address [see story this issue], he declared that the US is “addicted to oil”. His vice president once dismissed energy conservation as merely a “personal virtue”.

“Even without federal intervention, global clean-energy markets will flourish. According to Clean Edge research, biofuels (global manufacturing and wholesale pricing of ethanol and biodiesel) will grow from US\$15.7 billion in 2005 to US\$52.5 billion by 2015.

“Wind power (new installation capital costs) will expand from US\$11.8 billion in 2005 to US\$48.5 billion in 2015. Solar photovoltaics (including modules, system components, and installation) will grow from an US\$11.2 billion industry in 2005 to US\$51.1 billion by 2015. And the fuel cell and distributed hydrogen market will grow from US\$1.2



billion (primarily for research contracts and demonstration and test units) last year to US\$15.1 billion by 2015.

In total, it is projected these four clean-energy technologies, which equalled US\$40 billion in 2005, will grow fourfold to US\$167 billion within the coming decade.”

However, there remains turbulence in the clean-energy sector. “The solar industry is experiencing growing problems, unable to gain access to enough silicon feedstock to keep pace with demand. This will continue to put pressure on upward pricing over the short term. Biofuels, while showing great promise, face obstacles, not the least of which is how to quickly ramp up widespread distribution channels.”

Wind turbine installation, while currently growing at a rapid rate, could flag as well as short-term prices increase due to high steel costs and shifting currency valuations. And mass adoption of fuel cells and hydrogen are decades away.

The report says “We believe many such obstacles

are surmountable through a combination of incremental and breakthrough technology developments, the continued scale-up of manufacturing, and smart investments by corporations, investors, and governments.”

Clean energy is now an important sector for stock market investment in the US. “The three largest technology IPOs of 2005 were for solar companies: Q-Cells, SunPower, and Suntech Power. Combined, they raised more than US\$800 million (on the Frankfurt, NASDAQ, and NYSE exchanges respectively), and by the end of their first trading day, each had market capitalizations exceeding US\$1.5 billion.

“Clean-tech stocks in general are doing well. A number of clean-energy stalwarts were recently trading at or near their 52-week highs.

“At the time of publication, Energy Conversion Devices (ENER), Evergreen Solar (ESLR), Itron (ITRI), and Spire Corp (SPIR) were all trading at roughly double their year-ago levels. But stock prices for other clean technologies, including fuel cells and microturbines, showed less energy.

“US-based venture capital investments in energy technologies increased from US\$716 million in 2004 to US\$917 million in 2005. As a percent of total VC investments, energy tech increased from 3.3 percent in 2004 to 4.2 percent in 2005. Over the last six years, venture investments have more than quadrupled as a percentage of total VC investments, increasing from under 1 per cent of total venture investments in 1999 to last year’s 4.2 per cent,” says the report.

The report is at [www.cleaneedge.com](http://www.cleaneedge.com)

## Major Pension Fund to Step Up Environmental Checks

The Californian Public Employees’ Retirement System (CalPERS), one of the world’s most important institutional investors, has announced it is to keep a closer eye on the environmental credentials of businesses.

The pension fund will be looking particularly closely at how individual companies contribute to the production of greenhouse gases.

Among the first areas to be looked at will be the transport, utilities and oil and natural gas sectors. CalPERS will be seeking to identify companies that fail to meet minimum standards of environmental data disclosure, according to an investment committee report.

The pension fund will also follow a new corporate governance guideline to act on shareowner proposals for the timely, accurate reporting of environmental risks - especially those associate with climate change.

The new initiatives are part of an environmental strategic plan that the CalPERS board adopted a year ago.

“Since then we have closed ranks with other investors toward greater corporate accountability on this important issue,” said CalPERS president Rob Feckner.

“Timely and complete information about the environmental risks will help us make investment decisions that account for the costs of those risks.”

In recent months, CalPERS has supported shareowner resolutions to shed light on environmental liabilities at Ford and General Motors. The car makers have responded to resulting questionnaires about the

potential impacts on climate of their activities. BMW Daimler Chrysler, Honda, and Toyota are to receive similar questionnaires.

CalPERS, the California State Teachers’ Retirement System and other significant investors have asked the world’s largest 1,800 companies to provide environmental impact information through the Carbon Disclosure Project.

“Besides collecting information, we will strongly support shareholder resolutions at individual companies to address environmental impacts,” said Charles P. Valdes, chair of CalPERS investment committee.

“In the long run we believe it’s possible to do well in business by doing what’s good for the environment,” he said.

## Green Products Sought

The Gold Coast City Council has invited suppliers of innovative green products to offer their products for display in its Innovation House 2 (IH2).

IH2 is described as a demonstration project showcasing premier examples of built environment, sustainable living and innovation within an affordable residential dwelling.

IH2 is at the Genesis residential development at Coomera on the Gold Coast.

Genesis developer Heritage Pacific is a partner in the IH2 project.

Suppliers interested in providing products for the display should contact marketing manager for Heritage Pacific, Alison Hedger, on 07 3221 0824, mobile 0411 236 002.



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## Henderson Opposes Nuclear Option

UK based institutional investor Henderson has come down solidly against the proposition that zero carbon output of nuclear power makes it a suitable energy source to combat global warming.

Nick Robins, head of Henderson's SRI Funds, argues that nuclear is neither environmentally nor economically viable despite the fact that it is used to generate 24 per cent of Britain's, and 16 per cent of the world's, electricity.

Following the Three Mile Island and Chernobyl disasters, a number of countries decided to phase out nuclear, including Italy, Sweden and Germany. Britain ceased building new plants a decade ago.

Henderson's Global Care funds and its Industries of the Future fund exclude companies that operate nuclear plants, provide nuclear generation equipment or mine uranium.

Robins says "As the threat of climate change has grown, however, the nuclear industry has argued that it offers a zero carbon energy source. The industry has been joined by some high-profile scientists, notably Sir David King, the [British] Government's chief scientific adviser. "The Government is currently reviewing the country's energy policy with suggestions that this could lead to a nuclear rebuilding program.

"Our investigations have concluded that nuclear is still not economically or environmentally viable - and its revival would hinder rather than help a solution to climate change.

"From an investment perspective, nuclear plants are highly capital intensive and can only be profitable through special state subsidies not available to other

power producers. For example the risks associated with the operation of nuclear plants means that it cannot obtain normal insurance cover for accidents; the state therefore has to pick up the tab. The industry also has a poor track record of delivering projects on time and to budget.

"Sizewell B was the last nuclear power plant to be built in Britain and took 15 years to go from proposal to production and cost more than twice the original estimate. More seriously still, the privatised nuclear operator, British Energy was forced to seek a bailout from the government in September 2002 and underwent a major restructuring following poor financial results. It was therefore no surprise that the UK's Energy White Paper concluded in 2003 that the current economics of nuclear power make it 'an unattractive option for generating new capacity'.

"Beyond the question of economics, no solution has yet been found to the problem of radioactive waste, some of which will need to be stored for hundreds of thousands of years. In the UK it is now projected that it will cost £56 billion for the clean-up of nuclear sites as production ends.

"The heartening thing is that nuclear is simply not needed either to keep the lights on or tackle climate change. Authoritative reports published this year by the Green Alliance and the New Economics Foundation all show that cost-competitive emission reductions can be made through energy efficiency, the roll out of micro-renewables - such as household level solar, wind and combined heat and power systems - as well as large scale wind, wave and tidal power. The estimated £20 billion needed to construct and operate new nuclear plants to replace Britain's existing 23 reactors could be far better spent elsewhere."

## Plantation Investment Industry Welcomes Legislation

The association which represents managed plantation timber investment schemes has welcomed legislation to penalise promoters of schemes which exploit or abuse the tax system.

Investors in agribusiness schemes, including plantation timber investment schemes, have in the past been penalised for tax avoidance.

"Very importantly, the new law specifically does not target contemporary afforestation and agribusiness managed investments schemes that meet the strict compliance regime of ASIC and that receive and abide by product rulings from the ATO," Treefarm Investment Managers Australia executive director Alan Cummine said.

"Indeed it is the ATO's clearly stated opinion that projects with product rulings are not tax avoidance schemes.

"It's vital for people to understand the clear distinction between the 'outlaw' projects that are the target of this legislation and the well established afforestation and agribusiness grower projects now helping to revitalise many regions in rural Australia."

Mr Cummine said the legislation has two parts. The first deals with promoters who abuse the tax laws and promote a project without an ATO product ruling. The second deals with promoters who fail to carry out their projects in accordance with product rulings already issued.

"The second part holds some risks for genuine managed investment projects and it's vital that the ATO be constrained from acting hastily against a legitimate project that could later be proven in the Federal Court to

have been wrongly taken off the market with potentially ruinous commercial consequences for the project and the promoter,” he said.

He called for the ATO to issue a practise statement which would commit it to not act hastily but instead allow a legitimate promoter to respond to ATO concerns rather than being subjected to undeserved injunctions or penalties.

Mr Cummine was speaking after the legislation was introduced into Federal Parliament on February 16.

## Queensland Farmers Urged To Back Sustainability

Queensland Farmers Federation president Gary Sansom has joined with the state’s Environment Minister Desley Boyle to urge agriculturalists and environmentalists to work together to develop more sustainable farming practises.

Mr Sansom told the inaugural Queensland Farmers Federation sustainability conference on the Sunshine Coast that the QFF recognised the need for effective

partnerships between the agricultural industry and government to work towards more sustainable and profitable farming.

“This conference is about demonstrating the “win-win” solutions of more profitable and sustainable farming through better farm practices,” he said.

In a presentation from Ms Boyle shown at the conference, the Minister said climate change was bringing new challenges.

She said farmers are already working with the state Environment Protection Agency through its ecoBiz and Waterwise programs. This is improving both environmental practices and the farmers’ bottom lines.

She referred to success stories including:

\* The Blackboy Ridge Group of three farms in the Lockyer Valley which are using recycled water to irrigate tree and vine fruits such as passionfruit and persimmons. The project began in 2002 as a partnership between the producers, Gattton Shire Council and the EPA with the University of Queensland providing technical support and monitoring soil and water conditions. The EPA helped fund a five kilometre

pipeline to transport recycled water from the council’s wastewater treatment plant to the farms. As a result of using partial root zone irrigation, the sugar content in the fruit has increased and water consumption has been cut by a third, less fertilisers are needed and the crop value has increased by \$15,000 per hectare.

\* Bethonga Pines at Wamuran, north of Brisbane, has implemented a farm management system in response to drought conditions and the long term use of fertilisers and pesticides on production volume and fruit quality. The property is aiming for a 50 per cent reduction in water use, an annual saving of about \$90,000 on chemical fertilisers and pesticides and a 50 per cent increase in pineapple production.

\* Jackson Farming Company is saving 7 million litres of water a year at its Tully banana farm, and helping to protect the Great Barrier Reef. It has installed a water treatment and recycling system for the farm’s washing and packing shed, treating and recycling 100 per cent of the water it uses. The new system has also cut electricity costs by more than \$2000 a year.



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## Energy Savings Fund Grants To Save \$150 million

28 projects with the potential to save energy have been funded in the \$20 million first round of the NSW Government's Energy Savings Fund administered by the Department of Energy, Utilities and Sustainability.

The grants include residential and commercial energy efficiency initiatives, cogeneration and alternative power generation projects and the installation of power factor correction equipment.

The Government said that together they will save an estimated 1.4 million tonnes of greenhouse gas emissions over the next 10 years and 1.3 million megawatt-hours of electricity. They will also lead to an average annual saving in peak demand of 60 megawatts, equivalent to the peak power demand of 20,000 homes.

Ric Brazzale, executive director of the Australian Business Council for Sustainable Energy, said the savings in greenhouse gas emissions and megawatt hours of electricity over the next 10 years at today's prices amount to about \$150 million in energy savings and avoided greenhouse gas emission costs.

Mr Brazzale used the announcement of the NSW Energy Savings Fund grants in March to call on the Federal Government to follow suit and invest in energy saving projects. He recommended other governments throughout Australia to follow the example set by NSW in setting up the Energy Savings Fund. This could, he said, save billions in new supply infrastructure.

The Energy Savings Fund provides \$40 million a year over five years. Round One of the Energy Savings Fund attracted more than 100 applications. Briefing sessions will be held for Round Two of the Energy

Savings Fund when it opens.

A new company which develops systems to use coal seam methane to generate power was awarded a \$2.96 million grant from the Energy Savings Fund.

Executive director of CSM Energy, Duncan van der Merwe, said the grant will assist CSM Energy implement "green" power generation projects at NSW coal mines. Mr van der Merwe said his company acts as a project sponsor and coordinates "best for project" consortia of expert companies in each case.

"Methane that is usually vented or flared will be used to generate electricity on site to power the coal mine and this will result in a reduction of electricity consumed from the distribution network, a reduction of greenhouse gasses, the creation of jobs and a safer working environment for the coal miners," he said.

CSM Energy will design, build, finance, operate and manage the entire mine degasification process for both surface and underground gas management; and implement profitable methane utilisation by transforming the waste methane into either gas pipeline sales, electricity generation, fuel to run wastewater treatment plants or any combination of these processes.

### Project Summaries - Round One

The offers for Round One Energy Savings Fund projects are summarised below.

#### Energy efficiency and demand management

- \* Albury City Council - Murray Region Energy Savings Program
- \* Amcor Beverage Cans - Optimising Compressed Air Costs Using a Holistic Approach
- \* Baiada Poultry Pty Ltd - Chiller Energy Savings
- \* Big Switch Projects Pty Ltd - Northern Wollongong Home Energy Initiative



**Sydney Olympic Park's Aquatic Centre has received a grant for a co-generation plant**

- \* Bulga Coal Management Pty Limited - Motor Upgrade at Bulga Coal Handling and Preparation Plant
- \* Cadbury Schweppes Pty Limited - Refrigeration Plant Upgrade to Incorporate Energy Reduction
- \* Eco\$ave Pty Ltd - Lighting Retrofit and Education Project
- \* EnergyAustralia - Residential Refit Program - Sydney
- \* Energy Conservation Systems - Investa Greenhouse Guarantee Funding
- \* Energy Response Pty Ltd - Demand Side Response Project in Constrained Areas
- \* Impact Employee Communications Pty Ltd - Workplace Energy and Water Savings Communications Program
- \* Integral Energy - Smart Home Audit Program
- \* Low Energy Supplies and Services (Less) - Rural and Regional Energy and Water Retrofit
- \* Next Energy Pty Ltd - 2nd Fridge Buyback Scheme
- \* Simplot Australia Pty Limited - Water and Energy

#### Savings from Process and Utility Improvements

- \* Southern Sydney Regional Organisation of Councils - Street Lighting Improvement Program Energy Efficiency Implementation Project

- \* Sydney Olympic Park Authority - Sydney Olympic Park Carpark P1 Lighting Upgrade

- \* University Of Newcastle - MS & Library Compressor Upgrade to Turbocor & Data Centre Grid Connect Generator

- \* Visy Paper Pty Ltd - Optimise Power Use by Pumps, Agitators and Pulp Screening Equipment

#### Alternative Power Generation

- \* CSM Energy Pty Ltd - Recovery and Use of Coal Mine Methane to Power A 7MW Generator

- \* Rockdale Beef Pty Limited - Bio Gas Generation from Waste Water and Manure Digester

- \* Sydney Olympic Park Authority - Sydney Olympic Park Aquatic Centre Co-Generation Plant

- \* Willoughby City Council - Co-Generation at Willoughby Leisure Centre

#### Power Factor Correction

- \* Capacitor Technologies Pty Ltd - Small-Medium Enterprise Energy Management Project

- \* Cobar Management Pty Limited - CSA Mine Demand Management Using Power Factor Correction

- \* Fletcher International Exports Pty Limited - Reducing Peak Demand through Power Factor Correction

- \* United Collieries Pty Limited - Power Factor Correction Initiative: Beyond Compliance

- \* Visy Paper Pty Ltd - Smithfield Site Power Factor Correction

- \* Albury City Council.

## Government Backs Firmer Action on Energy Efficiency

The Federal Government has issued a series of recommendations in response to the report of the Productivity Commission inquiry into the Private Cost Effectiveness of Improving Energy Efficiency. The recommendations indicate backing for firmer action at state and territories level.

The Federal Government has noted that the cooperation of state and territory governments will be critical to achieving improved energy efficiency across the whole economy and said it looks forward to their continued cooperation in developing and implementing the National Framework for Energy Efficiency.

Key recommendations in the response back the introduction of more energy efficient building standards and control of energy inefficient use of vehicles - which would seem likely to result in tolls on private vehicles entering central areas of major cities.

The first says "The Australian Building Codes Board should, as a matter of urgency, commission an independent ex post evaluation of building energy efficiency standards to determine: how effective the standards have been in reducing actual (not simulated) energy consumption; and whether the financial benefits to individual producers and consumers have outweighed the associated costs.

"This evaluation should include the standards for residential buildings in NSW (BASIX), Victoria (5 star) and ACT (ACTHERS), as well as the national standards in the Building Code of Australia."

The second recommendation says "Australian Governments should investigate the feasibility of introducing congestion pricing where it is likely to

improve the economic efficiency of road use (including greater energy efficiency). It may be appropriate for such a study to be incorporated in a wider examination of efficient road pricing or in a review of passenger transport reform as a whole."

The recommendation notes congestion management requires a range of complementary measures.

Meanwhile, the Federal Government's Energy Efficiency Opportunities Bill was introduced into Parliament in late February. Industry Minister Ian Macfarlane says the bill shows that the Government remains committed to adopting cost effective improvements in energy use, which will have both greenhouse and economic benefits.

The legislation will require the nation's 250 largest energy users to regularly identify, assess and publicise any energy efficiency opportunities in their operations.

## Fuel From Plastic

An environmental technology development company that can convert waste plastics into diesel fuel has won a \$190 million order from a Dutch company.

Melbourne based Ozmotech Pty Ltd has signed a contract to supply 31 of its ThermoFuel converters to renewable energy company EnvoSmart Technologies B.V. over the next four years.

The ThermoFuel technology complies with international fuel and environmental protection agency standards.

Ozmotech chief executive Garry Baker said signing the contract was the culmination of almost two years of work and firmly establishes the company as an innovative contributor to the production of alternative fuels on a world scale.

## Record Investments In Cleantech

A record US\$502 million of venture capital was invested in cleantech ventures in North America during the final quarter of 2005, according to the Cleantech Venture Network LLC.

This investment represented an 18.1 per cent increase over the previous quarter and a 59.8 per cent increase over the equivalent quarter in 2004.

A total of 73 separate deals were done over the quarter at an average value of US\$6.88 million, 11.5 per cent up on the previous quarter's average. The total North American cleantech venture capital investment over 2005 totaled more than US\$1.6 billion, an increase of US\$423 million - 34.9 per cent - over 2004.

"Cleantech investment accounted for 9.9 per cent of all North American venture capital in Q4 compared to 7.8 per cent in Q3 2005 and 5.5 per cent in Q4 2004, said Nicholas Parker, chairman and co-founder of Cleantech Capital Group LLC.

He said this was the sixth consecutive quarter of increasing venture investment in the cleantech sector moving it to the fifth largest VC investment sector behind biotechnology, software, medical and telecommunications."

Chief executive and co-founder of Cleantech Capital Group, Keith Raab, said "Cleantech is an increasingly attractive investment sector with latter stage deals continuing to receive the bulk of investment capital accounting for US\$361.4 million of the US\$502 million total. The five largest investments in Q4 accounted for 32.3 per cent of the total and were made in Nanosys US\$40 million; Cellfor US\$32 million; Lilliputan Systems US\$30.2 million and US\$0 million

each in Advent Solar and Synthetic Genomics.

The Cleantech Venture Network LLC is a membership group set up to bring together investors and cleantech entrepreneurs. It runs a series of events and claims a worldwide network of over 900 affiliated investors.

## WA issues Renewable Energy Handbook

The Western Australia State Government, along with its Sustainable Energy Development Office (SEDO), has released a practical guide to developing renewable energy projects in the state.

The Government believes Western Australia is ideally suited for the generation of electricity from renewable sources given its large size and number of remote locations where renewable energy is commercially competitive with fossil fuels.

"The state is also blessed with a plentiful supply of natural resources - abundant sunshine and wind - which provide opportunities for renewable energy," according to the Renewable Energy Handbook.

The handbook includes an introduction by Premier Alan Carpenter, who is also Minister for Energy, in which he points to WA's natural advantages for renewable

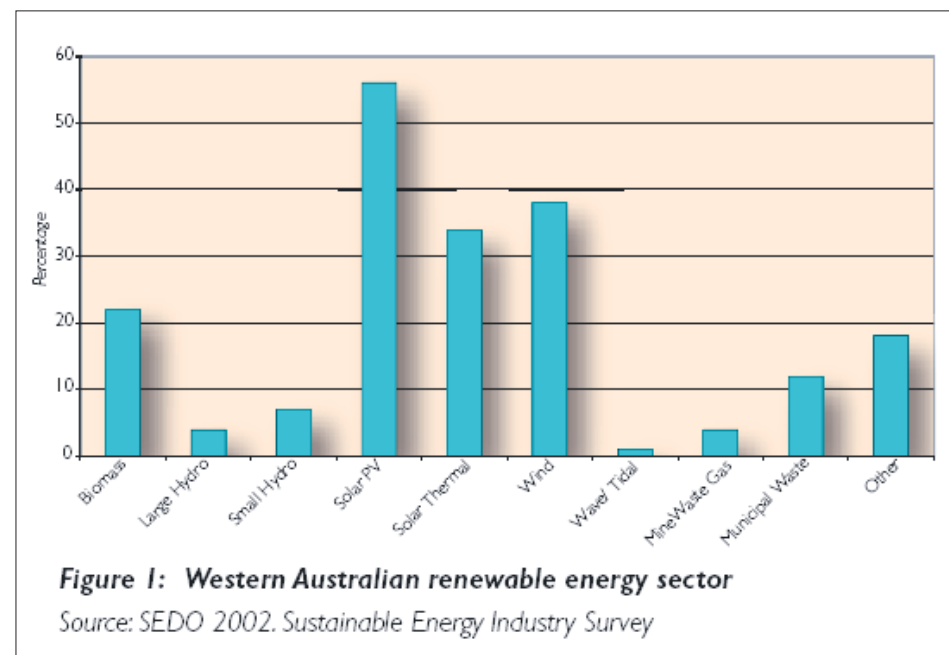
energy projects.

In addition, the State Government believes that the current break up of electricity utility Western Power and transfer of generating and distributing power to a series of smaller State-owned corporations offers additional opportunities for the introduction of more renewable energy projects.

The guide says that a 2002 survey showed that the WA sustainable energy industry accounted for 17 per cent of the nationwide industry in terms of sales and employment and half of these businesses were involved with renewable energy.

All renewable energy sectors are represented in WA with solar and wind the most developed.

The 73 page Renewable Energy Handbook is available on CD from the WA Sustainable Energy Development office on 1300 658 158.



## ICIP Innovation Grants

Ecologically friendly projects are included in Round 1 grants under the Federal Government's Industry Cooperative Innovation Program.

Queensland company Eco Barramundi Pty Ltd has been granted \$128,942. The company has trialed an innovative method of growing marine prawns in earthen pots using re-circulated water. Funding will enable the company to find a suitable site or sites and develop a detailed concept plan to establish a research facility to develop the method and improve prospects for uptake in the industry. The company says technology from this project will enable land based marine aquaculture industries to expand in an environmentally sustainable manner.

Sydney based operation the National Aquaculture Council has been granted \$150,000. The funds will be used to develop an innovation and technology road map for the farmed barramundi supply chain. Outcomes from the project will, however, have relevance to other aquaculture products. The road map is intended to plan for the integration of world's best technologies as well as addressing environmental and social concerns.

Victorian company MRI (Aust) Pty Ltd has been granted \$472,817. The funding is to be used to develop the Australian component of the international IMS PROMISE (Product Embedded Information System for Service and End of Life) Project. This is intended to set up a system for tracking all parts of products, from computers to motor vehicles, through all phases of their life cycles to enable safe disposal of components at the end of their lives. It is planned that an internet accessible database will be set up that will enable recyclers and manufacturers to identify, for example,

precise plastics blends in particular components of car parts.

Sydney company Typower Pty Ltd has been granted \$395,000. This funding is to be used to develop, in conjunction with the Copper Development Centre, a system to enable control signals and responses to be sent via electricity power supply systems. The project is intended to demonstrate the effectiveness of Energy Smart Gateway cards to enable electricity suppliers to control domestic air conditioners (ie to switch them off and on, control thermostat settings etc) during periods of peak demand with little, if any, customer intervention.

## Government Backs Gas Boost

Federal Minister for Resources Ian Macfarlane has put forward a strategy which would see up to 70 per cent of new power generation in Australia fueled by natural gas within 10 years.

Mr Macfarlane told an Australian Petroleum Production and Exploration Association (APPEA) conference in Perth that the strategy would also aim to double the use of natural gas as a fuel for resource processing.

The strategy would require increasing LNG production to more than 50 million tonnes a year but this was well within capacity as Australia had vast reserves, Mr Macfarlane said.

He said the underlying objective was to boost exports of liquid natural gas and this could best be achieved by developing a solid domestic usage program.

"The key is industry - particularly APPEA - enthusiasm for this strategy because it will have to

involve changing business and community attitudes about energy production which are currently closed, but not locked, to natural gas options...

"It's not pie in the sky policy, it's industry-led ambitions which will secure our national energy future as much as the future of our LNG exporters and producers," Mr Macfarlane said.

APPEA has committed to leading the government-industry strategy.

## Queensland Recycling

Recycling in Queensland increased by 11,000 tonnes in the 2003-04 financial year over the previous year taking the total of recycled materials to 169,000 tonnes.

Figures compiled by the Queensland Environmental Protection Agency from local government statistics show that the most recycled material was paper of which 95,335 tonnes was recycled.

Other well recycled materials were steel and aluminium cans, 6,533 tonnes; glass, 48,406 tonnes; and plastics, 10,189 tonnes.

The figures indicate that on average each Queenslander generated over the year:

- \* 186 kg paper
- \* 34.9 kg glass
- \* 32.1 kg newsprint
- \* 10.3 kg cans

During 2003-04 the Queensland Government allocated a total of \$1.3 million to 10 councils to help them encourage recycling. A further \$748,500 has been allocated to six councils so far in the current financial year.

## Industry Focus

### Waste Management's New Players Offer Opportunities

By Adrian Herbert

Waste management is an essential service which is little affected by economic fluctuations while offering ample opportunities for rate increases.

Already an industry that generates billions of dollars a year, waste management is consequently attracting new capital.

Environmental concerns, imposition of government levies and more stringent legislation on storage, transport and disposal are providing strong incentives for industries to seek improved methods of processing their wastes.

On top of this, volumes of domestic waste are steadily growing. Australian households are, unfortunately, among the largest generators of waste in the world. This is providing opportunities for operators to build significant businesses providing waste disposal services to local authorities.

Meanwhile, landfill sites in or near major cities are rapidly running out, greatly increasing the cost of this form of disposal. Financial incentives to reduce the volumes of solid waste going to landfill are now greater than ever and are only expected to increase.

Social pressures and legislation have also made the reduction of water and air pollution important objectives for industries.

The waste management industry is dominated by

well entrenched major private companies such as Collex, SITA and Theiss Services, particularly in the area of solid waste removal, but a number of new players have entered the sector in recent years, including a number of businesses which are listed on the ASX.

The largest of these businesses are growing quickly by acquisition and are jostling for position as dominant players. Transpacific Industries recently announced a planned takeover of Waste Management New Zealand which will create a powerful new Australasian force in the sector. Meanwhile, mining and development company GRD has indicated that it plans to greatly increase its activity in the area and reduce its involvement in mining.

More changes, including further mergers or takeovers, are likely.

A key factor in reshaping the sector this year should be the acquisition of the Brambles' businesses, Cleanaway and Brambles Industrial Services, which Brambles plans to divest.

Transpacific is well placed to acquire these businesses having set up a partnership with private equity firm CHAMP to make a bid; however other players are also interested.

Most of the listed companies in the sector can be split into the categories of general waste management businesses and smaller specialised businesses. Those in the general waste management category are striving to quickly build the critical mass to become dominant players. The specialised businesses, many of which are based on new and developing technologies, will succeed or fail depending on the application of their technologies.



**Global Renewables' waste management and recycling facilities at Eastern Creek, Sydney.**

Business risks in the two areas are clearly very different but both may be of interest to those seeking to invest in businesses which offer both environmental benefits and potential for significant profits.

Among the new technologies, water treatment processes that enable waste water to be re-used for industrial purposes have attracted a lot of attention recently. Other technologies, such as reclaiming metals and chemicals from industrial waste, converting dangerous wastes into material which can be safely disposed of and remediating contaminated soils are also potentially highly profitable. Investment returns from the technology based companies are, however, likely to depend heavily on selecting companies that position themselves in the most profitable business areas rather than those that offer the most impressive ecological or social benefits, or even the most innovative technologies.

Other listed companies in the sector are involved in consulting, engineering and construction.

Potential investors should carry out their own detailed research into the environmental credentials of individual companies in this highly sensitive sector. Some are involved in a range of activities not all of which may be environmentally beneficial.

ASX-listed companies in the waste management sector include:

**Austral Waste Group:** Listed on the ASX in February after previously being listed on the Newcastle Stock Exchange (as Growth Platform Ltd). Austral Waste is an integrated waste management business which focuses on resource recovery and currently has operations in Victoria and Western Australia. The company says it plans to expand throughout Australia and has already made some acquisitions.

Austral raised \$52.9 million from an IPO before listing on the ASX.

On 6 March the company announced it had acquired a landfill site in Stawell, Victoria, for \$4.75 million.

Other businesses include a domestic waste collection and recycling operation in Wangara, Perth, and a similar business, Statewide Waste, in Warnambool, Victoria.

The company had planned to establish a waste transfer station in Melbourne but this fell through. It has, however, reiterated its intention to move into the Melbourne suburban area.

Austral Waste has also acquired a small business which recycles waxed cardboard boxes as fuel blocks for open fires and slow combustion heaters.

2004-05 (pre ASX float) financials:  
Revenue \$618,016

Total assets \$1.79m

Net assets \$1.33m

Dividend: no dividend

The company's shares listed in February at 20 cents and were trading at around 26 cents in March.

**Baxter Group Ltd:** A Melbourne integrated waste management business which listed in 2004 and has since acquired a number of smaller industry operators and several landfill sites. In 2003, the company entered into a recycling joint venture with Visy Paper Pty Ltd, part of the privately owned Visy Group, one of the biggest recyclers in Australia. Although Baxter expects the BaxVis joint venture to be profitable in the long term it is currently running at a loss.

Interests associated with the Pratt Group hold more than 11 per cent of Baxter Group.

2004-05 financials:

Revenue \$33.4m

Total assets \$62.97m

Net assets \$50.85m

Dividend: 8.5 cents per share interim, 8.75 cents final; 2005-06 interim 6 cents.

Baxter Group's shares were trading at about \$5.70 in September 2005 and at about \$4.80 in March 2006.

**Coffey International Ltd:** Provides engineering, scientific and project management services involving earth sciences, water and natural resources. Services include environmental planning, geotechnical engineering, hydro geology, hydrology and geophysics.

One of Coffey's business units, Aquaclear Technology Pty Ltd, provides project management expertise in the design and installation of water

treatment plants.

Coffey has grown significantly in recent years and now turns over about \$100 million a year.

The NSW-based company operates in Australia and overseas.

2004-05 financials:

Revenue \$170m

Total assets \$68m

Net assets \$34m

Dividend: 3.5 cents per share interim, 9 cents final; 2005-06 interim 5 cents.

Coffey International's shares were trading at about \$3.30 in September last year and around the same level in March.

**Environmental Group Ltd:** Based in NSW, EGL provides technology to deal with the specific environmental problems of industrial clients. The company offers both its own technology and overseas technologies under licence. Technology licensed from EGL is used by Sydney Water.

The company entered the environmental services area in 1987 initially concentrating on servicing the oil and petrochemical industries then moved into air pollution control and water treatment in the late 1990s.

2004-05 financials:

Revenue \$18.19m

Total assets \$13.95m

Net assets \$7.15m

Dividend: no dividend

EGL's shares were trading at about 14 cents last September and at about 9 cents in March.

**Environmental Solutions International:** Provides wastewater and sludge management equipment for the





**An Environmental Group ozone/GAC water treatment plant that can produce high quality re-usable water from treated sewage.**

water industry. The company also offers a hazardous waste destruction service.

Previously listed on the ASX, the company went into receivership and was delisted in November 2004. In December 2004 it was bought by Tenix Alliance, a member of the Tenix Group. ESI was re-listed in January after raising \$2.39 million in an IPO.

Since then the company has made a number of significant moves.

ESI owns a patented sewage sludge treatment process technology known as Enersludge which it says will enable transportable units to be moved from site to site to process sewage sludge.

It has entered into an alliance with Australian Native Landscapes (ANL) to share the value add of treating sewage waste on site. ANL specialises in the handling of sewage waste on a large scale for use in agriculture and horticulture. It currently transports large volumes from treatment plants to disposal sites.

ESI has also reached agreement to acquire Asia Pacific Coal and Steel which owns a highly effective dewatering technology. The company says this technology will enable the water in sewage waste to be reduced from the present typical level of 80 per cent to 10 per cent, improving the economics of disposal. It also plans to use the technology to de-water Victorian brown coal which will allow it to be pelletised with iron ore and exported for use in steel making.

2004-05 (pre-float) financials:

Revenue \$19.47m

Total assets \$9,000

Net assets (\$1.05m)

Dividend: no dividend

The company's shares listed at 33 cents in January and were trading at about 90 cents in March.

**GRD Limited:** A West Australian construction, minerals processing and mining company which made

a significant move into the waste management industry with the acquisition of Global Renewables at the end of last year.

Global Renewables operates a largely mechanised domestic and industrial waste sorting plant at Eastern Creek, Sydney which it claims to be a world leader.

The plant reduces the volume of the waste it receives by about 70 per cent by removing recyclable materials and organics. The recyclable materials, paper, glass, steel, plastics and aluminium, are sorted and sold to industry for reuse. The organics are used to create methane gas to generate electricity which is used to run the plant with any excess being fed into the power grid. After being used for methane production, organic material is then composted to produce fertiliser. The company generates most of its income from fees charged to dispose of waste and has a long term contract to service NSW Government privatised business WSN Environmental Solutions.

Global Renewables developed its waste sorting facility with an investment of \$60 million from Hastings Funds Management in 2000. The plant was commissioned in 2004. GRD Australia acquired Global Renewables in December 2005 for \$65 million on a deferred settlement scheme which involves market rate interest payments until June 2010.

The Eastern Creek facility ran at a loss of \$2.6 million in 2004-05 but Global Renewables is the preferred bidder to build and operate a similar facility in Lancashire in the UK which GRD says would generate three times as much revenue.

In 2004-05 the Eastern Creek facility received government revenue of \$10.4 million, made \$500,000 from the sale of recycled materials and cost \$13.5 million to run.

According to GRD, the capital cost of the Lancashire plant would be \$500 million but it would come with a 25-year \$6 billion contract.

GRD is also looking for other opportunities to utilise the Global Renewables technology overseas and in Australia. Global Renewables is the preferred tenderer to build and operate a plant for Victoria's Western Region Waste Management Group.

GRD recently put up for sale its 56 per cent stake in New Zealand gold producer Oceana Gold.

2004-05 financials:

Revenue \$306m

Total assets \$568m

Net assets \$208m

Dividend: Interim dividend of 3 cents per share, no final dividend to be paid because of capital commitments to Lancashire project.

GRD's shares were trading at around \$2.90 in September and around \$2.53 in March.

**Hydromet Corporation Ltd:** Provides services to heavy industries to decontaminate their wastes and in the process produces metal based chemicals which it sells for agricultural, mining and industrial uses.

The company has treated smelter residues from the former Southern Copper operation at Port Kembla, NSW, to extract a pure zinc sulphate product, for which it has a ready market. The resulting lead residue was safe to dispose of in landfill. Hydromet has also been involved in tin hydrate recovery from steel making operations at Port Kembla and treatment of wastes from zinc smelting at Risdon, Tasmania.

The company is based in Wollongong, NSW, and has operations in Wollongong, Newcastle and Hobart.

2004-05 financials:

Revenue \$16.5m

Total assets \$17.8m

Net assets \$10.9m

Dividend: no dividend

Hydromet's shares were trading at about 6 cents last September and about 4 cents in March.

**ORT Ltd:** Organic Resource Technologies is a subsidiary of ORT Ltd and its main operating entity. Organic has been developing its patented DICOM solid waste processing technology since 1999. This has included the construction and operation of a demonstration plant at Jandakot, Perth. Organic says the DICOM process provides a breakthrough in integration of existing waste segregation and bio-processing methods. It says the process is suitable for relatively small operations.

Organic also has an agreement to construct the first commercial scale facility for the Western Metropolitan Regional Council (WMRC) at Shenton Park, Perth. The WMRC project involves the construction of a plant capable of treating 55,000 tonnes of municipal solid waste a year.

Institutional investor Perpetual has agreed to invest up to \$12 million in this project from its Diversified Infrastructure Fund.

ORT now plans a demerger under which Organic will become a separate unlisted public company and ORT will continue as an ASX-listed entity. The boards of both companies have agreed that significant funding will be required for the commercialisation of the DICOM technology and expansion of Organic's waste management business. ORT says private equity and institutional investors have indicated strong interest in investing directly in Organic rather than through the

parent company.

Under the demerger proposal, ORT shareholders will be entitled to one Organic share for every 1.243 ORT shares they hold.

Shareholders are to vote on the proposal this month (April 2006).

2004-05 financials (ORT):

Revenue \$736,181

Total assets \$6.55m

Net assets \$5.97m

Dividend: no dividend

ORT's share were trading at around 4 cents in September and at around 13 cents in March.

**QED Occtech:** A water and waste water treatment company that has plants at numerous sites in Australia and overseas. The company uses a tangential flow separation system to separate wastes from reusable water. The solid wastes can then be processed and directed for reuse or disposal. The company's plants are used in agriculture, the food industry, manufacturing, mining and minerals processing and also by some municipal authorities. Primary treatment can be followed up by secondary and tertiary treatment including desalination.

2004-05 financials:

Revenue \$1.18m

Total assets \$1.89m

Net assets \$1.44m

Dividend: no dividend

QED's shares were trading at around 5 cents in September and at around the same level in March.

**SteriCorp Ltd:** Specialist clinical waste company which provides collection and disposal services to

hospitals, medical, dental, and veterinary practices plus pharmaceutical industries.

Melbourne based SteriCorp operates throughout Victoria, NSW, ACT, Queensland and Western Australia and claims to hold about 37 per cent of the national medical waste market.

SteriCorp raised \$6.3 million in a rights issue in April 2005 and a further \$6.7 million in October from the exercise of options from the rights issue. The company achieved a maiden profit in 2005.

SteriCorp is 47.6 per cent owned by Catilina Nominees Pty Ltd.

2004-05 financials:

Revenue \$26m

Total assets \$24m

Net assets \$8.7m

Dividend: no dividend

SteriCorp's shares were trading at about 7 cents in September and around 10.5 cents in March.

**Tox Free Solutions Ltd:** Works in hazardous waste management including remediation and recycling of contaminated soils, removal of organochlorine compounds plus hazardous waste treatment, including dealing with acids, alkalis and heavy metals. The company also has some involvement in water treatment.

Tox Free Solutions achieved a positive operating cash flow in 2004. The company was then restructured during 2005 including a \$2.1 million capital raising.

Based in Perth, Tox Free Solutions operates treatment plants at Kwinana and Port Hedland. The Port Hedland plant treats industrial waste from mining operations in the Pilbara region.

2004-05 financials:

Revenue \$6.7m

Total assets \$24.6m

Net assets \$8.8m

Dividend: no dividend

Tox Free Solution's shares were trading at about 6 cents in September and at about 13 cents in March.

**Transpacific Industries Group:** Provides comprehensive waste management and environmental services focusing on liquid and hazardous waste. The company, which listed on the ASX in May 2005, now has operations at 130 sites in Australia and New Zealand.

The company in late March announced it had reached agreement to take over Waste Management NZ.

Since listing, Transpacific Industries had already acquired liquid and industrial waste business Nuplex Industries Ltd for \$53 million and made a number of smaller acquisitions. The company is working with CHAMP Private Equity on the possible acquisition of Brambles Industries' Cleanaway and Brambles Industrial Services businesses in Australia.

Transpacific has bridge funding in place to fund the takeover of Waste Management NZ. This is to be partly refinanced by an equity and hybrid equity raising later this year after the potential acquisition of the Brambles assets has been determined. Macquarie Bank is to organise the capital raising.

The company has another business unit which imports trucks and engines.

2004-05 financials:

Revenue \$483m

Total assets \$430m

Net assets \$122m



**Stericorp's yellow containers for infectious clinical waste**

Dividend: During 2004-05 a special fully franked dividend totaling \$18.5 million was paid to pre-IPO shareholders. A fully franked interim dividend of 4.2 cents per share has been announced for the 2005-06 year.

TPI's shares were trading at around \$4.23 last September and at around \$6.35 in March. They rose to around \$8.70 after the announcement of the planned takeover of Waste Management NZ.

**Waste Management NZ:** A New Zealand Stock Exchange listed company which is also listed on the ASX. The company is well established in New Zealand and expanded to Australia as part of its growth strategy.

Waste Management NZ took over existing businesses in Melbourne and Adelaide and made its first foray into NSW in March 2005 through the purchase of Haztech Industries - a waste storage facility which specialises in chemical wastes.

The company also invested \$1.6 million in establishing services in Gladstone and during 2005 won a three-year total waste management contract at a Gladstone aluminium smelter.

Based in, Auckland, Waste Management NZ is growing strongly in its home market primarily by the acquisition of commercial waste collection businesses.

The board of Waste Management NZ in late March agreed to a takeover proposal from Transpacific Industries. The takeover offer implies a market capitalisation of approximately A\$769 million and an enterprise value of approximately A\$867 million.

2004-05 financials:

Revenue NZ\$252m

Total assets NZ\$356m

Net assets NZ\$191m

Dividend: 14.0423 (Aust) cents per share interim, 13.9847 cents final; 2005-06 interim not announced at research date.

The company's Australian shares were trading at around \$5.50 in September and around \$6 in March. They rose to around \$7.20 after the announcement of the planned takeover by Transpacific Industries.

## Listed Companies

### Environmental Funds Support Australian Ethanol Raising

Two specialist environmental investment funds, CVC REEF and CVC Sustainable Investments, participated in a \$12.45 million capital raising by ASX-listed Australian Ethanol Limited in March. CVC REEF invested \$2.63 million in the raising and CVC Sustainable Investments \$1 million.

Australian Ethanol (AAE) now plans to raise a further \$12.45 million later in the year through a similar placement of 41.5 million shares to key institutional shareholders.

The company's board is also considering further fund raising options including listing on the Alternative Investment Market (AIM) in London.

Shareholders will vote on the planned placement and other matters, including new incentives for directors and staff, at a meeting on April 27.

Funds from the March raising will principally be used to complete the first stage of construction of an ethanol production plant at Swan Hill, Victoria, and begin development of a biodiesel project in the US. Both projects are to be 100 per cent owned by Australian Ethanol.

The company has allocated \$9.3 million to the first stage of the Swan Hill project which will be the first purpose built grain fuel ethanol plant in Australia.

The plant is planned to annually convert more than 300,000 tonnes of cereal grain (corn, barley, wheat and sorghum) to about 100 million litres of ethanol.

The ethanol is intended to be sold to the Australian

fuel industry for blending with petrol.

The company is currently working with the industry and government bodies to determine fuel industry commitments for ethanol.

The company has completed three seasons of successful cropping trials to ensure the high starch grains needed for ethanol production can be produced in the Swan Hill area. Supply agreements have been negotiated for 30 per cent of the initial grain requirements for the plant and for further grain to be supplied by local distillers.

Australian Ethanol has committed \$2 million from the capital raising to complete an initial payment for the acquisition of Beatrice Biodiesel LLC and to buy land and begin building a biodiesel production facility near Lincoln, Nebraska.

According to Australian Ethanol chief executive Peter Anderton "The commercial leadership shown by AAE will go a long way to kick-starting the Australian ethanol industry and to bridge the expanding void between the Australian ethanol industry and the enormous progress to date on the international front.

"The international ethanol industry has matured over the past decade and all stakeholders are currently reaping enormous benefits for the hard decisions and commercial courage of the pioneers of the late 1990s.

"The Australian industry will move forward rapidly from here," he added.

### Ceramic Fuel Cells raises \$82 million on AIM

Ceramic Fuel Cells Limited (CFCL) has listed on the AIM market of the London Stock Exchange after raising just over \$87 million (£37 million) via a

placement with UK and European institutional investors.

The planned placing of \$82.25 million (£35 million) was over subscribed and CFCL accepted an additional £2.18 million. The shares were issued at 50 cents (21.25) pence.

CFCL is already listed on the ASX. From a low of under 44 cents in January, the Australian shares rose to about 64 cents after the announcement of the UK placement on 22 February. They then settled back to just under 60 cents.

Chairman Julian Dinsdale said the placement included 90 new institutional investors in the UK and Europe including many specialist socially responsible funds.

CFCL also invited existing shareholders to indicate interest in receiving shares in the placement at the same price. As a result, the company is shortly to lodge an Australian prospectus under which shares are to be issued to raise a further \$2.75 million.

CFCL plans to invest a significant portion of the proceeds in developing manufacturing facilities in Europe.

## **IPO for Water Purification Maker**

One of the most recent enviro-tech businesses to list on the ASX has appointed a consulting ecologist as an executive director.

Cumminscorp Ltd, which listed in March, has developed a water purification system - C-Wash - which can be used to remediate polluted water or treat waste water.

The company says its compact C-Wash units are

suitable for recycling the wastewater from commercial car wash facilities without the use of harmful chemicals.

The company also produces a plastic box water re-circulation unit - the C-Box - for use by the land-based aquaculture industry.

Cumminscorp raised \$2.9 million at 20 cents a share in its IPO. The shares listed at 16 cents but had slipped to around 11 cents by early April.

In February, Cumminscorp delivered a C-Box to Queensland company Seafood Biz which then sent it to Nevada in the US where it had set up a subsidiary business to raise Australian barramundi for Las Vegas hotels. The first box is being used in a pilot scheme to prove the concept. The fish are to be flown in from Australia as fingerlings and grown to eating size. Seafood Biz has ordered six more C-Boxes ready to expand the production line as soon as the scheme is proven.

The company anticipates eventually expanding the production line to 50 C-Boxes which would give capacity to produce 50 tonnes of barramundi a year.

Seafood Biz Nevada Inc has long term plans to float on a US stockmarket.

Cumminscorp's new board appointee, US-born Dr Tom Riggert of Riggert Consulting Ecologists Pty Ltd, has over 40 years experience as an ecological scientist.

Managing director of the Queensland-based company, Ian Cummins, said "There are few people as qualified as Dr Riggert to promote our mission of taking Australian enviro-technology to the world."



**Cummins Corp's C-Wash system for treating and recycling waste water from commercial car wash operations**

Dr Riggert said "I've been consulting to the company now for 12 months and I've had the opportunity to look at it in very close detail. I believe it has excellent prospects, particularly in the field of water remediation where our unique technology can play an enormous global role in cleaning up lakes, rivers and ponds. This can lead to better food stocks and healthier lives for communities living in the most appalling circumstances.

"The biology of wetlands has been my life's work and there is no doubt in my mind that Cumminscorp has made extraordinary steps forward in addressing pollution of the world's waterways. This positions the company to take advantage of numerous major opportunities currently on offer in South-East Asia."

## Methane-free Pig Raising

An Australian pig farmer has started using a Chinese developed chemical free pro-biotic technology which is claimed to completely eliminate the production of methane gas in pig farming.

The technology has been developed to reduce losses of new born piglets but has the side effect of eliminating the production of methane from pig faeces, according to its developers.

Wally Perneck, director of WSL Investments, has introduced the proprietary technology to the company's farm at Young, NSW, after seeing it demonstrated in China.

Mr Perneck says he is confident the technology will eliminate scouring (diarrhoea) in new born and weaning piglets which, on average in Australia, results



Mr Perneck inspecting a Chinese pig farm using the JBC Biological proprietary pro-biotic technology.

in the death of 14 per cent in their first 20 days of life. He also expects it to reduce the incidence of other bacterial disease leading to faster growth of young pigs.

Mr Perneck is using the proprietary LETU lacto bacillus within a holistic pig raising regime in an experiment which is being followed by the owners of the technology, Guangdong JBC Biological Company Pte Ltd, a wholly owned subsidiary of New York Stock Exchange listed Yang Yang China Holdings Limited.

Yang Yang China Holdings Limited is also listed on the Newcastle Stock Exchange and was formerly listed on the ASX.

The technology has other add on benefits. According to JBC Biological, tests on Chinese pig farms over the past three years have shown that the technology can produce completely chemical free pork as pigs should not need to be treated with antibiotics.

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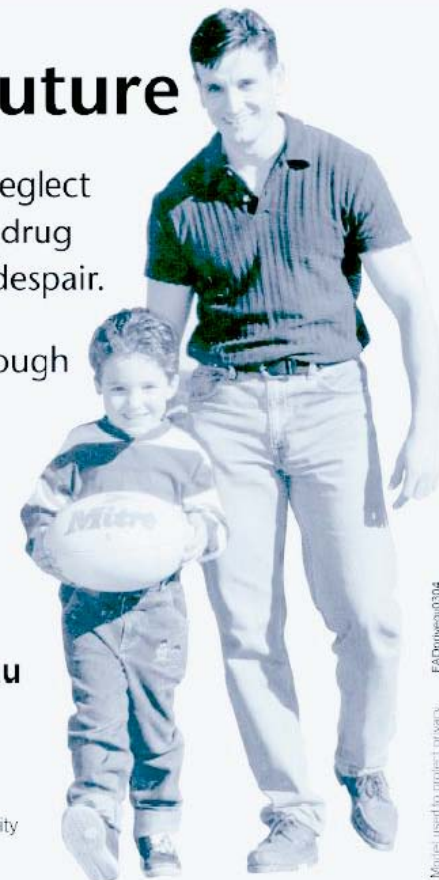
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## Unlisted Companies

### Clear Vision for Environmental Wipe

By Victor Bivell

An unlisted company that has developed a non chemical and environmentally friendly wipe for cleaning a range of viewing surfaces including glasses is now entering the commercialization phase of its development.

Founder and managing director of SunnyWipes Pty Ltd, Peter Steve, said the invention of the wipes has been several years in the making and involves no chemicals yet the formula, based on natural substances including eucalyptus oil, is able to deliver a smear free finish that is cleaner and superior to existing products.

The product is suitable for hard viewing surfaces which need to be looked at or through, such as safety eyewear, sunglasses, glasses, scopes, lenses, mirrors, perspex, respiratory masks, windscreens, and computer and other monitors. It also has occupational health and safety and military applications and hospital grade standards for disinfection.

The wipes prevent fogging, remove static build-up, kill bacteria, repel water and can remove grease, he said. 18 months of beta testing showed the product worked, product acceptance was high and that the market was not satisfied with existing products.

The company has four branded products for different users: SunnyWipes and NuClear for the consumer market, CeVu for the auto and marine

markets, and EziVu for the occupational health and medical markets. These products have met the Good Environmental Choice requirements of the Australian Environmental Labelling Association.

An interesting feature is that the product is not wet and leaves the surface dry. It also polishes so that no secondary cleaning is necessary. Mr Steve said in fact it saves water as a typical wearer of glasses will regularly use water to clean and rinse their glasses, sometimes up to 2 litres on a daily basis. Water cleaning is not necessary with SunnyWipes.

The product is available in high volume canisters and small individual sachets.

“The product has been acknowledged as a superior lens cleaner in the consumer market by both the consumers and retailers themselves in SunnyWipes’ beta environment,” says the Australian Environmental Labelling Association endorsement.

SunnyWipes has previously obtained an AusIndustry COMET grant and a top up grant.

Mr Steve said SunnyWipes is now seeking to raise a minimum of \$300,000 in working capital for further international patent and trade mark protection in selected countries.

The company has an Australian contract manufacturer for the products and is now seeking to identify a commercial distributor for Australia and New Zealand. It hopes to commence a rollout in the next few months.

SunnyWipes needs both capital and people, said Mr Steve. With the product development phase now complete, he sees that others with managerial and commercial experience may be more able to take the



business forward.

Another commercialization option could be a joint venture with a larger firm based on a royalty arrangement.

### Grants for animal protection

Animal protection organisation Voiceless is offering grants to organisations which share its objectives of promoting respect and compassion for animals. The grants are not available to commercial organisations but applications will be considered from non-profit organisations, schools, universities and other tertiary institutions and local governments.

The not for profit organisation was set up in 2004 by Brian Sherman, the former joint managing director of funds management group Equitilink, and Ondine Sherman.

Actor Hugo Weaving is ambassador for the organisation.

Voiceless lists as high priority areas for action:

- \* live export of animals
- \* kangaroo culling and other hunting and poisoning
- \* animal experimentation
- \* use of animals for entertainment, in zoos, circuses, racing and rodeos
- \* killing of animals for fur and skins used in fashion.

## International

### Sustainability Opportunities in Emerging Countries

The US based World Resources Institute (WRI), part of whose mission is to catalyze investment capital into environmentally and socially responsible small and medium enterprises in emerging economies, is this year launching operations in two additional countries,



**WRI develops sustainable businesses in emerging countries**

India and Indonesia.

Virginia Barreiro, director of New Ventures which is part of the World Resources Institute, said she believes that as Socially Responsible Investment funds become more popular, particularly in the developed world, enterprises that provide financial, social and environmental benefits in Indonesia will be of increasing interest to the Australian venture capital community.

“What we can offer those VCs is the chance to meet pre-screened, dynamic green enterprises in three major countries in Asia - Indonesia, China and India.

“There may be Australian investors who are interested in the types of enterprises that we will be supporting and showcasing,” she said.

New Ventures provides business mentoring services to companies in sustainable sectors such as renewable energy, certified forestry, organic agriculture, clean technology, biodiversity and ecotourism.

It is hosting its First Investor Forum for Indonesia’s sustainable enterprises in November in Jakarta. The one-day program will take place on December 13 at the Four Season’s Hotel, and will kick off the Call for Business for the First New Ventures Investor Forum for Sustainable Enterprises in Indonesia.

“New Ventures has been operating for over five years, in which time we have established in-country operations in Brazil, China and Mexico and helped the transfer of over US\$12 million to our portfolio companies,” she said.

New Ventures is a project of WRI, a Washington based environmental think tank that says it finds practical ways to protect the earth and improve people’s lives. WRI’s mission is to move human society to live in ways that protect Earth’s environment and its

capacity to provide for the needs and aspirations of current and future generations.

New Ventures works with a series of partners in-country to identify, select, mentor and showcase outstanding investment opportunities working in innovative sustainable sectors.

See [www.new-ventures.org](http://www.new-ventures.org) for more information.

### Phillips Doubles Green Sales

Multinational Royal Phillips Electronics says its focus on key global environmental challenges and innovations for emerging markets is showing positive results with its flagship green products doubling their turnover from €1 billion in 2004 to €2 billion in 2005.

Phillips says that during the year it launched 50 new “Green Flagship” products, bringing the total number to more than 160.

“Green Flagship products must be proven to offer substantially better environmental performance than their predecessors or closest commercial competitors on energy consumption, packaging, hazardous substances, weight, recycling and disposal and lifetime reliability,” says the firm.

Among 2005’s additions were: new digital radiography systems which cut energy consumption by 41 per cent, flat TVs that use 39 per cent less energy and contain no hazardous substances, and an internal active portable TV antenna that uses 40 per cent less energy and weighs 85 per cent less than its competitor.

Phillips says it sees sustainable business as central to longterm profitable growth. In the past five years it has invested over €400 million in green lighting technologies. Its new energy efficient products have the potential to “drastically reduce CO2 emissions”.



## International Conglomerate Acquires Darwin Start-up

A multinational manufacturer listed on NASDAQ is to acquire an innovative Australian university start-up based in Darwin.

Fasco Asia-Pacific, a division of NASDAQ listed Tecumseh Products Company, is to acquire In Motion Technologies Ltd (IMT), which has developed a brushless motor with reduced power requirements.

IMT says the technology grew out of the Darwin to Adelaide solar car race in which the university participated each year. The firm says "The impetus for developing the motor technology arose principally because the best solar cells were not available to the university in the 1990s. Thus competitive advances in motor technology had to be made in the electrical engineering of the vehicle. This motor technology has since been adapted to many other applications, such as ceiling fans and air conditioners, reducing the operating power requirements for these devices."

IMT says it has also worked in the area of electric bicycles with Avanti Bicycles and power generators and agricultural equipment with John Deere. The company has also received an AusIndustry grant.

John McKay, deputy chairman of TFG, the main adviser to IMT, said his firm has been working with IMT for 18 months to find a suitable strategic partner. "This is a good transaction for IMT," he said. "We have been able to secure continuing R&D in Australia whilst leveraging the global reach of Tecumseh to commercialize the technology globally."

IMT is the university's first spin-off, formed in 2000 to commercialize the motor technology, which had been under development for a number of years.

## New Products

### Bushfire Protection Windows



Trend Windows & Doors has recently released a range of products designed for bushfire zones.

The company says its Xtreme range windows and doors is the first in Australia to be designed to withstand temperatures from up to category five fires without failure of either the glazing or the window system.

The Xtreme range is a response to the realisation that internal ignition resulting from the failure of windows is often the reason houses are lost in bushfires. Most of these houses survive the passage of a fire front only to be ignited later by wind borne embers or sparks.

Trend says it has combined the technologically advanced Quantum window system with Pyro- Protec seals and glazing systems and 5mm standard toughened glass to produce the Xtreme windows and doors.

Testing at CSIRO laboratories has shown that the Xtreme products withstand the extreme heat generated by category 5 fires (40kW).

### Eco-friendly Wood Stove

Philips Research has developed a more efficient domestic wood stove intended to improve the lives of people in some of the world's poorest communities.

The stove achieves more efficient combustion of fuel, meaning it requires less wood to cook a meal and it reduces smoke pollution by up to 90 per cent. Toxic elements in the smoke from cooking fires are a major health hazard for up to 300 million poor families around the world, it says.

The stove also generates electricity which can be used to power equipment such as lighting or radios.

An electronically controlled fan forces air through the combustion chamber, achieving a better fuel to air ratio and higher cooking temperatures.

A thermoelectric generator uses heat from the burning wood to generate electricity for the fan and its equipment.

Philips Research says it tested the stove in India last year and the response of users has prompted it to plan to start a commercial pilot scheme there this year.



Philips Research is now looking for partners to market the device in poor rural areas around the world which, it concedes, are difficult for it to reach through its existing distribution channels.

## Thermal Glazing with Advanced Tint



Thermal glazing manufacturer Magnetite has begun to use what it claims is the world's most advanced window film in its products.

Martin Energy Products (MEP) film is produced using an advanced sputtering technology that ensures evenness of coating on the film for uniform colour.

Magnetite says testing of the MEP solar tints shows they can reduce ultra violet light penetration by 98 per cent as well as dramatically reduce glare from the sun.

The company says its thermal glazing with MEP tint film achieves a five star windows energy rating which puts it on par with argon gas filled double glazing.

## Green Loans

Queensland credit union mecu Limited is offering reduced rate car and home loans to customers who purchase environmentally friendly vehicles or housing products such as solar power.

Mecu general manager of marketing and development Rowan Dowland said the company planned to become the leading socially responsible banking institution in Australia.

"Mecu is the first credit union in the world to become a signatory to the United Nations Environment Program Finance Initiative and we have established our own sustainable development committee," he said.

## Light Without Heat

A Solar Gard brand window film now available in Australia is claimed to block over 99 per cent of damaging ultraviolet radiation and 95 per cent of infrared heat while not noticeably affecting light transmission.

The Solar Gard LX 70 film, manufactured by



Bekaert, uses a patent-pending layering of metals such as titanium oxide, gold and silver.

Australian managing director of Bekaert, Peter Wotton, says this layering enables the film to block specific light wavelengths while still allowing adequate visible light to pass through.

Solar Gard LX 70 is an optically clear, polyester-based film that is applied to the interior surface of windows. Bekaert offers a 10-year warranty on the film if it is applied by its network of independent professional applicators.

## Fibre Composite Bridges

Footbridges built from fibre composites are being trialed by Queensland's Environmental Protection Agency. The bridges in Brisbane Forest Park have replaced hardwood structures.

Fibre composites are made from plastics reinforced with carbon, glass and/or Kevlar fibres. Originally developed for the aerospace industry, they are now starting to be used in building and construction.

Although fibre composites incorporate plastics produced from petrochemicals their use in many applications should have ecological and energy saving advantages. The fibre composite are much stronger than the hardwood usually used and the bridge is expected to last 50 years rather than 10 to 15 years.

The bridge was designed and built by the Fibre Composite Design and Development Centre at the University of Southern Queensland at Toowoomba.

With nearly \$200,000 in funds from the EPA's Queensland Sustainable Energy Innovation Funding program, the centre has also been able to trial fibre composite beams in road and rail bridges.

### Solar Energy Innovation Captures Lost Light

An innovative technology that allows more energy to be produced from solar energy devices has been nominated as a finalist in the Qld Environmental Protection Agency's Sustainable Industries Awards.

XeroCoat Pty Ltd, based in St Lucia, has developed an anti-reflection coating technology that allows solar energy devices to capture light that is normally lost through reflection.

XeroCoat's Dr Paul Meredith said the technology could be easily integrated with conventional silicon based solar cell modules producing more energy from current devices at a negligible increase in overall cost.

Dr Meredith said that "Our research and development has always focused on producing processes that have low environmental impacts that are practical for improving the sustainability of solar energy technologies. Alternative energy sources will become more popular when they produce more energy during their lifetime."

Qld Environment Minister Desley Boyle said XeroCoat's technology could potentially deliver up to a 12 per cent increase in efficiency of solar energy devices.

There were 24 state finalists of the Environmental Protection Agency's inaugural awards, from which six category winners will be announced at a gala dinner ceremony at the Sofitel Hotel Brisbane on Monday, May 15. The finalists had been selected from 115 entries.

### Filtering Indoor Air Pollution

Researchers at Western Australia's Curtin University are experimenting with nanotechnology to filter carcinogens and other unhealthy substances from the air we breathe inside buildings.

"Indoor air quality is attracting greater public attention due to its impact on health which is estimated to cost Australia about \$12 billion," says team leader Professor Moses Tade at the Cooperative Research Centre for Contamination and Remediation Technology (CRC CARE). "Air toxins consist mainly of volatile organic compounds (VOCs). These gas-like pollutants can leak from sources such as paints, glues, coatings, pesticides, carpets, plastics, cleaning fluids and office equipment.

"Australians typically spend 80 or 90 per cent of their time indoors breathing levels of air pollution that are often higher than those on a busy highway," he says.

The solution, according to Professor Tade, is to develop low cost technologies which can "scrub" the VOCs from the air.

His team are working on two techniques.

The first is a combination of absorption and catalytic destruction which uses nanosized porous material with high absorption capacity and catalytic activity to achieve low temperature destruction of the toxic VOCs.

The second, known as photocatalytic oxidation (PCO), uses a nanosized photocatalyst with visible light function to oxidise VOCs at room temperature.

The challenge is that while substances with good filtration properties have been identified, they generally require high temperatures to operate efficiently.

The team therefore plans to use nanotechnology to create a "molecular sieve" that will operate efficiently at low temperatures.

"The reason nanotechnology works better at low temperature is that its particles are so small. This gives them superior ability to filter absorb and catalyse things like VOCs," says Professor Tade.

PCO promises to be cheaper than the molecular sieve but there are research challenges to be overcome in developing a truly efficient catalyst that will soak up the VOCs using natural light as a stimulant for its semiconductors which normally use ultraviolet, he says.

CRC CARE managing director Professor Ravi Naidu says the technology could also be modified for remediating outdoor air pollution.

### Technology for Smart Electricity Meters

The CSIRO is working on technology which will make smart electricity meters effective.

Researchers at the CSIRO's Energy Transformed National Research Flagship are developing intelligent sensors and agents which will monitor generation and demand, communicate with each other and make control decisions based on parameters set by generators, distributors and consumers.

The intelligent software agents will receive consumer preferences and interact with smart meters and other agents to act on them.

Used in conjunction with smart meters the technology will, for example, enable domestic consumers to set preferences to run air conditioners only when electricity is below a certain price but to

make an exception if the temperature rises to a certain level. Similarly, industrial users will be able to tailor their demand profiles to take maximum advantage of fluctuations in price.

The CSIRO is currently running a prototype energy management system at its Newcastle Energy Centre which incorporates the agent control technology.

Dr Glenn Platt of CSIRO Energy Technology says the system is effectively a mini electricity grid incorporating a micro gas turbine generator, photovoltaic arrays, a wind generator, a weather station, cool rooms and part of the building's climate control system. All are under agent control.

"The sensor and agent technologies coordinate supply and demand, controlling generation and loads intelligently as the market changes," says Dr Platt.

The system is also being trialed by a major utility company.

## Solar Seen as Clean Coal Partner

Solar thermal energy is showing potential to be a cost-competitive source of electrical power, especially if it is used in combination with clean coal technology, according to a recent study.

The study's lead author, Dr Louis Wibberley of the CRC for Coal in Sustainable Development (CCSD) and the CSIRO, argues that one of the most promising uses for solar thermal power is to provide supplementary steam energy to bolster the efficiency and cut the greenhouse gas emissions of the nation's 39 coal fired power plants.

Solar energy could be used to provide the lower level energy required to filter CO<sub>2</sub> out of the exhaust

gases of existing coal and gas-fired power stations for long term storage.

Solar energy could also be used to re-form natural gas and coalbed methane to produce clean energy, industrial chemicals and badly needed transport fuel, he says.

The report notes that despite early progress in developing efficient solar thermal technology, Australia has neglected this area over the past decade.

It says the global situation has now changed dramatically with solar thermal forecast to become cost competitive with fossil fuels and 5000 megawatts of solar thermal generating capacity due to be installed in India, Egypt, Morocco and Mexico by 2013.

"Australia is one of the world's three top solar regions with two-thirds of the continent receiving over 18MJ of sunlight per square metre," Dr Wibberley says.

"What makes solar thermal particularly attractive is the fact that it integrates very well with existing technologies including coal, gas, biomass, photovoltaics and wind power.

"It is suitable for base and peak-load grid power and for distributed or stand alone generation. In contrast to photovoltaic and wind electricity, the energy from solar thermal can be stored far more cheaply in the form of heat and so provide more continuous power," he says.

A major solar-coal trial is taking place at Liddell power station in NSW using solar heat and power to boost steam production. This is now being expanded to produce 6,000 MWh per year. This will result in a reduction of about 6000 tonnes of CO<sub>2</sub> annually.

Fossil fuels and renewables are not mutually exclusive as energy sources - in fact they can go hand in hand, says CRC for Coal in Sustainable Development (CCSD) chief executive, Frank van Schagen.

CCSD is running an on-going technology assessment program that examines all options that offer opportunities for large scale reductions in greenhouse gas emissions.

The CSIRO's national solar research facility in Newcastle under Dr Wes Stein is exploring methods to use solar thermal power to reform methane from natural or coalbed gas to make synthesis gas (CO + CO<sub>2</sub> + H<sub>2</sub>) for power generation (solar gas), industrial chemical or transport fuel production, or for generating hydrogen for power production. This technology has the added bonus of taking off the CO<sub>2</sub> in a pure stream, ideal for long term sequestration.

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