

ECO INVESTOR

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**Investments That Solve
Environmental Problems**



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Front Cover: It looks like normal concrete but this is the first low carbon concrete path in Australia. See page 26.

Feel Bad about Feel Good

In recent weeks I have twice had the unpleasant experience of reading about “feel-good investments”. First by a journalist getting a big boot into environmental investments, and then in a sub-editor’s headline for a story about environmentally and socially sustainable investments.

The phrase “feel-good” investments does no good for anyone and is damaging to the credibility of environmental investments. It is a patronizing term that downgrades and diminishes the importance and contribution of environmental investments and their standing as viable, profitable investment choices.

I’m all for stamping it out. I have never read the phrase used in a positive way, because it probably can’t be. Usually it is used by writers who don’t understand the environmental investment sector, are struggling for something to say, or want to diminish the sector.

The sector does have people who don’t like it. Any sector that promotes major change such as replacing or reducing massive industries such as oil, coal and uranium will upset some people. Business is competitive and business people can play hard. Investment managers who like their high carbon fuels also have something to lose. So do employees.

There is an erroneous perception that these high carbon industries “earn their keep”, while environmental investments sound good but need government help to be viable.

The “feel-good investment” idea may also be a legacy of environmental investment being so enthusiastically embraced by the ethical and sustainable

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investment movements, both of which have not done all their intellectual homework and still have some woolly concepts floating about. This is one reason Eco Investor is strong on promoting environmental investment as a stand alone theme.

Even so, I find it curious that “feel-good investment” is almost always applied to the environment.

If ever there was a feel good sector it is healthcare. Savings people’s lives. Easing human suffering. Helping the disabled. Helping children live. And a lot more. Fantastic stuff. But when was the last time you heard healthcare, pharmaceuticals and medical devices described as “feel good investments”? I can’t remember.

Likewise with coal. Coal keeps our offices lit and our factories humming. It lets us cook our dinner in the evening and keeps granny warm in winter. But has coal

ever been called a “feel good investment”? It’s too macho for that.

No one dares call these sectors feel good because they are familiar industries and have a history of making serious money.

Likewise, one day everyone will be too embarrassed to use the term “feel good investments” for the environment. To hasten this process I suggest two things - pulling up anyone who uses the phrase by asking them what they mean, and making sure that as many environmental companies and funds as possible make a squillion dollars.

Victor Bivell
Editor

Key Characteristics of Environmental Investment

By Victor Bivell

Last month we made the distinction between ethical investment, sustainability investment and environmental investment. This month we look at the key characteristics of environmental investment in Australia.

As a stand-alone investment theme, environmental investment has several key characteristics that help determine the range of available investments, the risk and return profile of the sector, and what the sector can offer different types of investors.

On the positive side are the sector's high growth rate and the high returns that are possible; on the negative side is the sector's relative immaturity, evidenced by a small number of established companies and funds and a lack of diversification by industry. There is also the issue of understanding and making judgements about the purity of investments.

The immaturity of the sector is mostly a problem when adding an environmental theme to an Australian equities portfolio. North America and Europe offer greater choice for international equities.

High Growth Sector

For at least two decades investors have been anticipating that environmental investment would start to boom, as did information technology and biotechnol-

ogy in the 1990s, but this has begun to happen in a big way only in the past few years.

The boom is mostly due to the huge public concern about greenhouse gas emissions and climate change from the global economy's reliance on high carbon oil and coal. Other global environment issues - pollution, waste management, water security, and habitat destruction, among others - have also helped convince the public that working with nature and the environment is the best way to secure mankind's future.

This change in thinking has created an environmental revolution that has touched every sector of the economy. The resulting trend to clean energy and clean technology has led to an explosion of environment related business opportunities. The environment has become a major driver both in the formation of new businesses and in the growth of established environmental businesses.

New business formation is very evident in the boom in the number of companies undertaking research and development, seeking capital, and listing on the ASX. The large number of micro cap companies in particular is a clear indicator that the sector is growing fast.

Established environmental companies are also growing fast and today the ASX 300 has a small but record number of pure environmental companies.

Growth is also evident in the emergence of successful new investment sectors such as wind energy and coal seam gas, and in the high returns being made by many companies, particularly the larger more established businesses.

Environmental investors now have an unprecedented number of investment opportunities from which to choose, but turning this growth into investment returns is not easy. Investors have to understand and man-

age the immaturity of the sector as it makes successful investment that little bit more difficult.

Immaturity of the Sector

The immaturity of the Australian environmental investment sector can be seen in the small size of the environmental investment universe, and in the speculative nature of most of the available investments.

There are reasons for this. While there are many environmental problems, some of these have no immediate solution or only a partial solution. Even where there is a solution some of these are offered by private businesses that are not open to investment from the general public.

Australia has a very impressive number of unlisted early stage companies with interesting intellectual property under development, but these are mostly open only to institutional and high net worth investors.

A shortage of venture capital funds means many of these young companies list early, hence the explosion in recent years of environmental micro caps. Micro caps form the great majority of environmental investments in Australia. With little or no assets, no revenue, no profits, and no dividends, they are high risk speculative investments.

While there are a growing number of emerging companies that do make profits and pay dividends, there are still only a few environmental businesses among Australia's major listed corporates. Eco Investor recently identified 16 relatively pure play companies in the S&P ASX 300 Index, and another 24 that have an environmental business activity alongside non-environmental activities.

The shortage of investment grade companies means there are few specialist funds, listed and unlisted, that

focus on Australia. This makes entering the sector difficult for retail investors who prefer managed funds.

Lack of Diversification

The lack of investment grade opportunities affects portfolio diversification. At present the higher quality opportunities are concentrated in a small number of industry sectors, particularly energy and waste management. The environmental companies currently in the ASX 300 are focused on natural gas, coal seam gas, wind energy, metals recycling, waste management and aquaculture.

More investment grade companies and industry diversification will happen as more companies enter the ASX, more micro cap companies achieve revenue, profits and dividends, and more of these emerging companies enter the ASX 300. This trend is likely to continue well into the future, but the process can take many years.

Most of the issues that confront Australian environmental equities do not affect international environmental equities. The world wide growth in

environmental investments means there are many opportunities for investors who want to add an environmental theme to their international equities portfolio. This can be done through direct investments in overseas companies, and through listed and unlisted funds in Australia and offshore.

There are now also many Australian and international indices for the main sub-sectors of environmental investment that investors can use to identify opportunities or benchmark performance.

The Purity of Investments

Another issue is that not all environmental investment opportunities are “pure plays” - where the environmental products or services are the company’s sole business activity. Pure play businesses are preferable because they make it easy to identify the financial and environmental contribution of the business activities.

While such focus is usually the case in highly specialized sectors, such as pharmaceuticals or information technology, it need not be the case in environmental investment.

Many companies that offer environmental products or services also offer products that may have little to do with the environment or which could be seen to be environmentally harmful. Examples are engineering firms that offer environmental engineering as part of a suite of engineering services, and manufacturers that also make non environmental products.

The methodology developed by Eco Investor to identify focused environmental investments has three key criteria:

1. Environmental activity - where the core business activity is recognized as a solution or part solution to an identified environmental problem;
2. Environmental focus - where the company is wholly or largely focused on this environmental activity; and
3. Environmental commitment - where the company has a commitment to being an environmentally positive business.

Not all environmental companies meet the three criteria easily; some can be border line on environmental focus and environmental commitment, and may need



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ASX 300 Companies

time for management to prove itself one way or the other.

The S&P ASX 300 Index has many companies that have one or more environmentally positive activities but do not meet the standard for environmental focus or environmental commitment. In these companies the environmental business activity is not the dominant activity, or where it is strong there is a lack of commitment by management to divest assets or activities that are environmentally damaging.

Non-environmental activities make it difficult to measure the environmental, financial and investment contribution of the environmental activity to the business, and how this may be offset by the other business activities.

The shame is that many of these subsidiaries are mature businesses that would sit well in the most conservative of portfolios, and as stand alone companies many would add greater diversification and depth to the sector such as plantation timber, rail transport, environmental engineering, and environmental technologies.

However, as environmental investors generally prefer companies to have both a focus on and a commitment to their environmental business, investment in these less focused and less committed companies is a matter for individual investors.

The environmental investment sector in Australia is not as mature as many other share market themes, but overall it is developed enough to offer options for all types of investors. But to manage the issues, investors need to have a clear idea of their investment goals and a well thought out investment strategy to achieve them.

Next Month: Part 3 - Environmental Investment Strategies

BG Rebids for Origin While Origin Buys in NZ

Gas multinational BG Group is to make an off-market takeover offer for Origin Energy less than four weeks after having its initial offer rejected by Origin's board. BG has a minimum acceptance level of 50.1 per cent.

Origin has advised shareholders to take no action at this stage.

BG said it will offer \$15.50 per share, but the news immediately sent Origin's shares to above \$16 where they have remained despite a new slump in the share-market in June.

The bid puts a value of \$13.8 billion on Origin but the offer price per share will be adjusted down for any dividend or capital return.

BG said that, when rejecting its earlier offer, Origin overstated its coal seam gas reserves, and did not take into full account the risks of its coal seam gas commercialization strategy under which it is currently seeking development partners for its coal seam gas reserves. Nor is the Santos/ Petronas deal which Origin used as a valuation guide directly relevant, said BG.

The Bidder's Statement should be lodged within the week, and the offer will initially be open for two months and may be extended, said BG.

The new takeover offer came less than two weeks after Origin and its 51.4 per cent owned New Zealand subsidiary Contact Energy made a NZ\$110 million acquisition of the NZ oil and gas operations of Swift Energy. The acquisition of Swift NZ assets by Origin and Contact includes:

- * Two oil and gas producing areas in Taranaki,
- * The Rimu and Waihapa production stations,
- * Oil and gas transmission pipelines from Waihapa to New Plymouth,
- * Two offshore Taranaki exploration permits, and
- * Equipment and supplies.

Origin's managing director, Grant King, said the acquisition is part of Origin's ongoing expansion of its NZ interests. "The purchase of Swift's New Zealand assets will bring immediate production benefits for Origin, and also adds exciting development and exploration opportunities both onshore and off the Taranaki coast.

"Origin has been carefully building its position in New Zealand for a number of years. We hold the largest exploration acreage position of any company involved in New Zealand, are well advanced with the liquids-rich Kupe Gas Project in the offshore Taranaki, and have now added this important mix of operating assets."

"Origin gains the highly valuable expertise and technical skills of 56 Swift Energy staff who are transferring to Origin and we are establishing our New Zealand headquarters in New Plymouth," he said.

Swift Energy's gas and oil assets are bundle together and will add to Origin's oil exploration and production activities which form a small but ongoing percentage of its revenue. Origin is an oil producer in WA, and operator of Pancontinental Oil & Gas NL's offshore exploration blocks in Kenya. On 17 June Pancontinental announced it had identified slicks consistent with light oil and condensate. Only drilling and further work can establish the size and value of any oil or gas discovery, said Pancontinental.

Under a separate agreement between Contact and

Origin, Contact has purchased the right to own and develop the Ahuroa gas field as an underground gas storage facility and purchase the remaining gas and LPG reserves in the Ahuroa reservoir.

Contact chief executive, David Baldwin, said the acquisition provides Contact with a valuable gas storage development option which the company expects to have operating by 2010.

“Gas storage will be a critical component of New Zealand’s energy future. The ability to purchase gas during off-peak periods, store it underground and release it when it is most needed will provide valuable supply flexibility for Contact and enable the company to use its gas-fired power stations in the most economic and efficient fashion.”

Mr Baldwin said the gas storage development underpins the development of Contact’s 200 megawatt gas-fired peaking plant at Stratford which will be operational by the winter of 2010. The gas storage facility and the Stratford plant will be vital in increasing renewable electricity generation, he said.

Origin said its 50 per cent owned Kupe Joint Venture in New Zealand should start gas and condensate production by mid 2009 following successful completion of drilling and testing. The offshore well head platform, three production wells and the pipeline to shore, which account for half the project cost, are ready for production. The next step is completion of the onshore production station.

The Kupe Gas Project is projected to supply 15 per cent of NZ’s gas, 50 per cent of its LPG, and 14.7 million barrels of condensate over the life of the project.

Contact is also about the begin construction of its 23.3 megawatt NZ\$100 million geothermal binary power station at Taupo. Commissioning is expected in

2010. A 200-240 megawatt geothermal power station at the same Tauhara steam field is also planned.

Meanwhile, with Origin’s share price at around \$16 following the rejected takeover offer by BG, in the past month Origin senior executives took the opportunity to exercise a large number of options. Parcels include 31,000 at \$6.50 each, 25,000 at \$7.21 each, 20,000 at \$5.71 each, 180,000 at \$4.14 each, 59,000 at \$6.50 each, 145,000 at \$7.21, 23,000 at \$6.50, 58,000 at \$7.21, 171,000 at \$5.71, 85,000 at \$4.14, 24,000 at \$7.21, 60,000 at \$6.50, 227,000 at \$7.21, 24,000 at \$7.21, 46,000 at \$6.50, 260,000 at \$4.14, 101,000 at \$6.50, 100,000 at \$6.75, 59,000 at \$5.71, 68,000 at \$7.21, 25,000 at \$4.14, 148,000 at \$5.71, 49,000 at \$7.21, 49,000 at \$6.50, 11,290 at \$5.71, 51,000 at \$7.21, 55,000 at \$6.50, and 24,960 at \$5.72.

Commonwealth Bank and its subsidiaries have sold down their shares in Origin from 6.26 to 5.14 per cent.

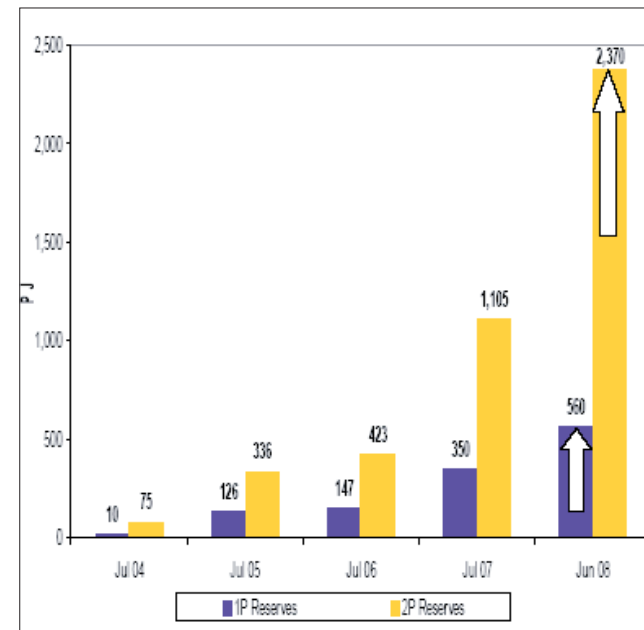
Perhaps the message is to take some profit while the shares are at record highs. (ASX: ORG)

Qld Gas Co Enters ASX 100

Queensland Gas Co (ASX: QGC) has entered the S&P ASX 100 Index, joining environmental investment heavyweights Origin Energy, AGL Energy and Sims Group. The inclusion is part of a spectacular rise by QGC which began with \$12 million in 2000 and is now capitalized at \$5.2 billion.

QGC’s managing director, Richard Cottee, said the inclusion is further evidence of the arrival of coal seam gas as a mainstream energy source.

QGC’s buoyant share price also benefited from the company’s announcement that it expected to significantly increase its proved, probable and possible coals



The growth in Qld Gas Co’s coal seam gas reserves in petajoules; BG Group owns 20 per cent of the reserves

seam gas reserves. When it came, the independent assessment increased QGC’s proved reserves (1P) from 477 petajoules to 609 PJ; proved and probable reserves (2P) from 1,317 PJ to 2,415 PJ; and proved, probable and possible reserves (3P) from 3,116 PJ to more than 7,163 PJ.

QGC owns 80 per cent of the reserves and BG Group the balance following their recent deal joint venture to build an LNG export facility at Gladstone in Queensland.

Mr Cottee, described the reserves as “world class acreage”.

QGC has taken a 19.16 per cent in Roma Petroleum

NL and is to make a friendly takeover offer that is unanimously recommended by Roma's directors. Roma has coal seam gas acreage near to the proposed pipeline for the planned QGC/ BG Gladstone LNG export plant. Roma is also an oil explorer and very small producer at around 140 barrels per day. It made a small loss in the last half year.

The \$50 million takeover offer is half cash and half QGC shares.

QGC has also become the largest shareholder in Victoria Petroleum NL with a 19.24 per cent interest following a placement of 41.75 million shares at 22.5 cents each. Victoria Petroleum said the \$9.39 million raised will accelerate exploration and development its of coal seam gas resources in the Surat basin.

Arrow Still Going Up

Arrow Energy's share price has doubled over the past three months and reached \$4 before falling back in late June to around \$3.70. At first the shares were driven by the surge in interest in coal seam gas, and since early June by a preliminary agreement for a major \$776 million alliance with Shell.

Shell is to pay Arrow up to \$644 million for a 30 per cent stake in all of Arrow's Australian upstream coal seam gas tenements. Shell is also acquiring 10 per cent of Arrow International Pte Ltd for up to another \$132 million.

Arrow will remain the operator of the upstream assets, and the deal excludes the downstream pipelines, electricity generation assets and corporate shareholdings.

Shell will also contribute senior management and research and development, and have the right to off-

take LNG produced from the upstream tenements.

The deal is expected to be finalized by the end of August. \$490 million will be paid upfront and the balance as milestones are achieved on the planned LNG plant and development of international gas reserves.

Arrow chief executive Nick Davies said it was a company making deal for Arrow that would propel the company through a steep growth curve over the next six years.

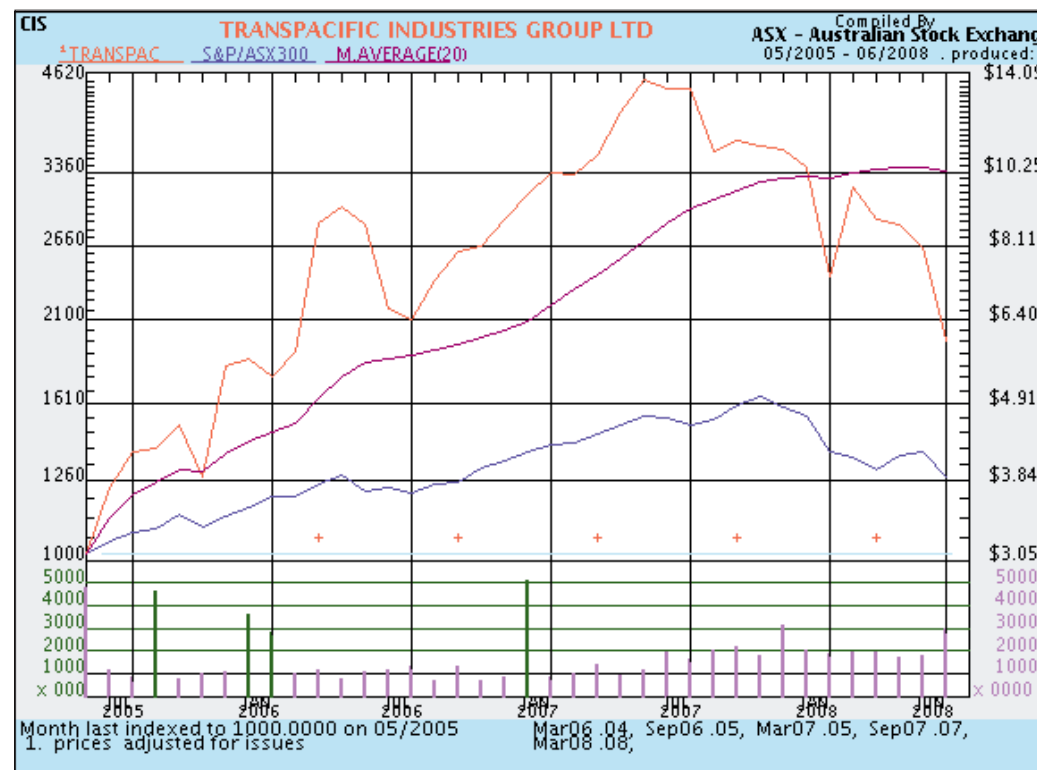
Chris Gunner, chief operating officer with Shell (Development) Australia, said Arrow has proven coal seam gas experience, and extensive Australian and international CSG acreage, while Shell has global gas marketing and financial strengths and leading research capability.

At the end of June Arrow said it would make a pre-tax profit of \$25 million on the sale of its 50 per cent interest in the North Queensland Gas Pipeline. Arrow and its 50/50 joint venture partner AGL Energy will receive \$205 million for the pipeline and continue to operate it for the new owner, Victorian Funds Management Corporation. (ASX: AOE)

Transpacific Shares Double then Halve

At around \$6, Transpacific Industries' share price is back to its level of two years ago. In July 2006 the shares dipped to \$6.01 before recovering and rising to a high of \$14.56 in July 2007 and then falling to around \$6 at the end of last month

In an effort to clarify what it says is some confusion by analysts about its debt position, Transpacific (ASX: TPI) has reiterated that its position is sound and that it has a balanced and diversified debt portfolio to meet its



Transpacific's share price (in red) since listing. The S&P ASX 300 Index is in blue. Source: ASX

“ongoing financing needs into the future”.

TPI said it “will continue to use available cash flows to repay debt where possible and as appropriate. Based on TPI’s organic growth profile, current forecasts suggest that TPI’s total debt can be extinguished within less than eight years.”

The company said further cash would become available to repay debt as it develops and realizes value from its “significant land bank. This will occur as landfills become full and close. For example, TPI is currently addressing its options in respect of Tullamarine which recently ceased accepting waste.”

Executive chairman, Terry Peabody recently told the ABC’s Inside Business program that TPI has a number of landfill sites where the land and development value is far greater than their book value.

Mr Peabody said “TPI has ample headroom and intends to settle future acquisitions by equity. TPI’s gearing will be circa 50 per cent at 30 June 2008 and there are no covenants related to market capitalization. TPI’s strong organic growth and the resulting cashflows indicate debt will be repaid in the medium term. Also, as TPI’s working landfills complete their lives and are sold, they will generate substantial proceeds which will be applied to debt.”

Mr Peabody has also said he has no TPI shares on margin loans nor any personal debt at all.

TPI’s takeover offer for Dolomatrix has failed. At the end of the offer period TPI had 22.7 per cent of Dolomatrix’s shares. Dolomatrix said TPI received acceptances for only 0.06 per cent of its shares since the offer was announced on 19 March, confirming its view that the offer “grossly undervalued” the company.

TPI’s shares were around \$9 when the offer was made.

Record Share Price and Positive Earnings Guidance for Sims

Sims Group said its 2008 full year earnings are likely to exceed by 10-15 per cent a previous estimate by analysts of \$314 million. This would place it at a minimum of between \$345 million and \$361 million. The news helped push Sim’s share price to a new record high of \$41.45.

A week later the shares peaked at over \$42 when Sims announced it had sold subsidiary Sims Steel, an Australia wide steel distribution business. The company said its strategy is to focus on its core global metals recycling and Sims Recycling Solutions businesses.

Substantial shareholder M&G Investment Management Ltd, M&G Ltd, M&G Group Ltd and Prudential plc has increased its interest from 8.72 to 9 per cent.

Director Paul Varello has increased his holding from 4,600 to 6,225 American Depository Receipts (ADRs), while fellow director Gerald Morris exercised options to acquire 30,750 American Depository Receipts and then sold down 10,750 ADRs. He retains another 205,000 options to acquire ADRs. (ASX: SGM)

B&B Wind Partners Holds Its Own

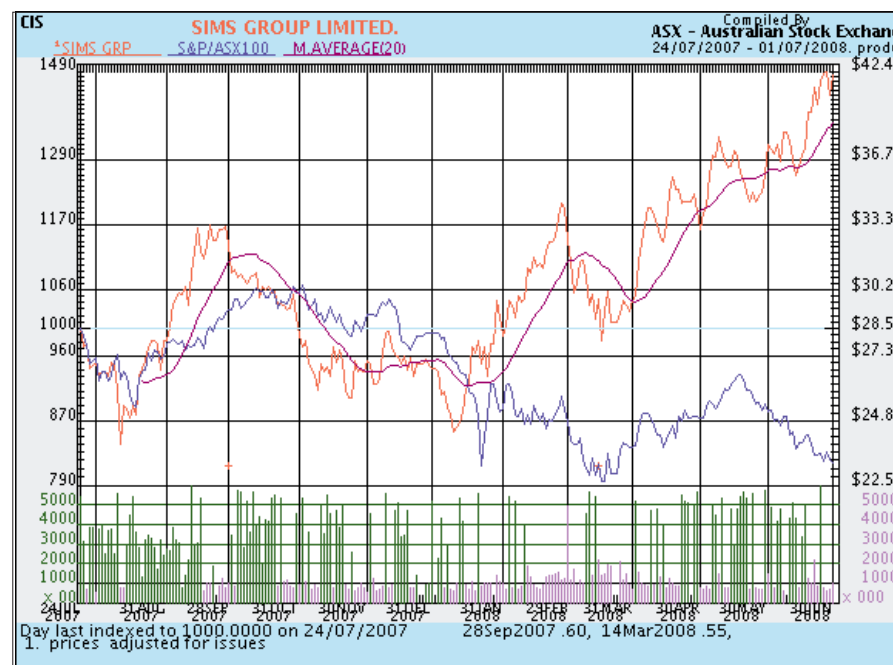
Babcock & Brown Wind Partners has proved its resilience with its securities continuing to trade above their listing price and continuing to recover despite dips

with the share market crash of last year, earlier this year, and the June plunge in the share price of its parent company, Babcock & Brown.

BBW’s securities listed at \$1.40 in October 2005 and have mostly traded in the \$1.60-\$1.80 band - with an all time high of \$2.07 in May 2007 and an all time low of \$1.20 in August 2006.

Early this year the share market crash saw the securities touch a low of \$1.29 but they gradually recovered. Last month they briefly fell to a low of \$1.32 when parent company Babcock & Brown (BNB) had high profile debt issues, but the securities quickly recovered and are now trading in the \$1.55 range.

BBW’s management has ex-



Sims Group share price (in red) over the past 12 months and the S&P ASX 100 Index in blue. Source: ASX

pressed concern about the lack of higher growth in the security price and the discount to net asset backing, but since the share market crash of August last year the securities have outperformed many growth stocks, and have fallen less than many income stocks, as well as being one of the best performing funds in the Babcock & Brown stable.

Since listing the securities have consistently paid a high distribution. The distribution for the six months to 30 June is expected to be 7.25 cents per security, which will bring the full year distribution to 14.5 cents. The final distribution is expected to be fully tax deferred. Payment will be around 18 September.

BBW is also to get an independent chairman, a move announced by the manager to help restore investor confidence in parent company BNB.

Data from Credit Suisse and published in the Australian Financial Review shows that for 2006-07 BNB had an 11.7 per cent interest in BBW at a carrying value of \$74 million. The current market value at \$1.54 per security is \$153 million. With an unrealized gain of \$79 million, it was one of only two Babcock & Brown funds in which BNB's interest last month was showing a profit. The profit for the other was \$1 million.

In terms of unlocking some of the value in BBW's European portfolio, BBW would no doubt have been encouraged by Allco and its partners' sale in June of their Tehachapi wind project in California for US\$325 million. Allco's head of infrastructure, Nick Bain, said "This sale has delivered to Allco and its co-investment partners a highly profitable outcome in a relatively short time frame, a result of the decision two years ago to establish its global wind energy business."

Phil Green, managing director of BNB, said first round indicative offers for BBW's European wind

farms are imminent and any asset sales should be finalized in the third quarter of this year.

"Wind energy development will continue to be a significant origination activity for Babcock & Brown over the longer term," he said.

"We have also this year expanded our activities in the area of solar energy and are now building a development pipeline in Europe and commencing activities in North America."

Eco Investor thinks it would be good for environmental investment in Australia if this led to a solar fund along the same lines as BBW. (ASX: BBW)

AGL Favours Wind Energy

AGL's share price continues to improve and at around \$14.20 it is now higher than it has been since last October. The biggest boost came at the end of May with the Petronas/ Santos coal seam gas deal that re-rated the value of the coal seam gas sector in which AGL is also a participant.

Further good news was an early June refinancing of \$550 million in senior and unsecured debt including \$50 million in oversubscriptions, and came at a time when some corporates were having difficulty refinancing their debt. AGL's chief financial officer, Stephen Mikkelsen, said it was an excellent outcome for AGL and a clear vote of confidence in the credit quality of AGL.

AGL has credit facilities for \$2.57 billion, of which \$2.08 billion is used and \$487 million is available.

In late June AGL and 50/50 joint venture partner Arrow Energy sold the North Queensland Gas Pipeline to Victorian Funds Management Corporation (VFMC) for \$205 million. When the deal settles in late July it will give AGL another \$102.5 million including a \$17 million profit after tax and transaction costs.

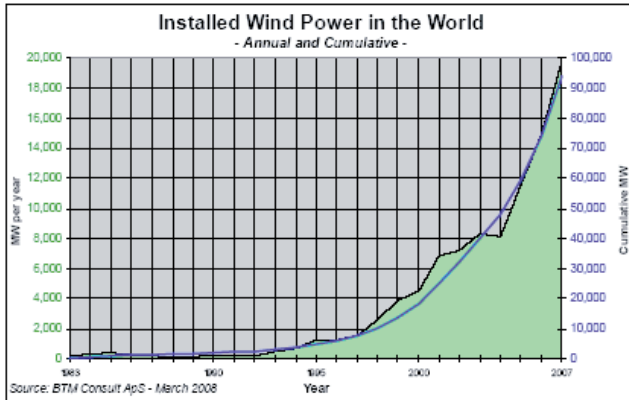
AGL and Arrow through their 50/50 owned North Queensland Pipeline Management Pty Ltd will continue to operate the pipeline for VFMC.

AGL said it will use the sale proceeds to repay debt, and is expecting more cash from the sale of a number of

AGL's Renewable Energy Development Pipeline

Project	Location	Type	Nominal capacity (MW)	Earliest operational date	Project Definition	Status
Bogong	Victorian Alps	Hydro	140	October 2009	Under Construction	Committed
Hallett 1 (Brown Hill)	SA - Hallett	Wind	95	May 2008	Commissioning	Committed
Hallett 2 (Hallett Hill)	SA - Hallett	Wind	71	Jan 2010	Under Construction	Committed
Hallett 3 (Mt. Bryan)	SA - Hallett	Wind	90	2010	In Development	Probable
Hallett 4 (Nth Brown Hill)	SA - Hallett	Wind	189	2011	In Development	Probable
Macarthur	Vic - West	Wind	330	2010	JV with Meridian Energy	Probable
Other	Various	Various	1440	-	Under Review	Possible

- > **Probable Projects:** AGL holds development rights or project under development
- > **Possible Projects:** AGL seeking to secure project development rights



other non core assets including its PNG oil, gas and LNG assets.

Speaking at a Sydney conference, managing director, Michael Fraser, said wind power is the fastest growing global renewable energy and is dominating the sector. From 1990 to 2004 it grew from 4 to 82 terawatt hours, while biomass and waste grew from 125 to 227 TWh, geothermal from 36 to 56 TWh, and solar from 1 to 4 TWh.

Of the world's 94,000 megawatt wind capacity at the end of 2007, 19,791 megawatts or 21 per cent was installed in 2007. The average growth rate for wind power to 2012 is expected to be 20.7 per cent per year, and wind will dominate as the most economic large scale renewable technology for the next 10 years, he said.

AGL's pipeline of wind, hydro and other renewable energy projects is expected to increase renewables from 30 to 43 per cent of AGL's energy generation, with gas falling from 62 per cent to 49 per cent, and coal falling from 18 to 8 per cent.

Other renewable energy sources will emerge in the next decade, said Mr Fraser. (ASX: AGK)

Geodynamics Raises Another \$33.5 Million

Geodynamics has raised \$33.5 million under a Share Purchase Plan that saw 55 per cent of shareholders participate. The new shares were priced at \$1.50 each and were part of a larger funding package that saw private equity group Sentient and super fund SunSuper become joint cornerstone investors in the company.

For every two shares under the SPP, new shareholders also received one \$2 option exercisable by 28 February 2009.

Geodynamics now has 258.9 million shares on issue. Origin Energy did not participate and was diluted from 9.96 to 8.36 per cent.

Geodynamics and the other investors in Exorka International Ltd have swapped their holdings for shares in Exorka's parent company Geysir Green Energy ehf (GGE). Exorka is now a subsidiary of GGE and Geodynamics' 25 per cent stake in Exorka has become a 3.2 per cent stake in GGE.

Exorka is developing Kalina technology based geothermal power projects and has "an extensive portfolio of geothermal acreage in Germany" and a geothermal project in Nicaragua "where a brine testing program is about to take place".

GGE said "Kalina technology uses an ammonia-water mixture for steam production, through a binary cycle. Exorka is currently developing four projects in Bavaria, Germany with a combined capacity of up to 25 MW electrical."

GGE is an unlisted Icelandic company with gross assets of €399.7 million and net assets of €163.8 million. Its extensive geothermal assets includes shares in geothermal operators and developers in Iceland, Can-

ada, China and Philippines.

Geodynamics said it "strongly supports its new investment in GGE as it gives the company exposure to a much wider portfolio of global geothermal assets while retaining an indirect interest in the Kalina technology". (ASX: GDY)

Transfield Infrastructure Drops Out of ASX 200

Transfield Services Infrastructure (ASX: TSI) was removed from the S&P ASX 200 Index as of the latest quarterly rebalance commencing 20 June, but remains in the S&P ASX 300 Index.

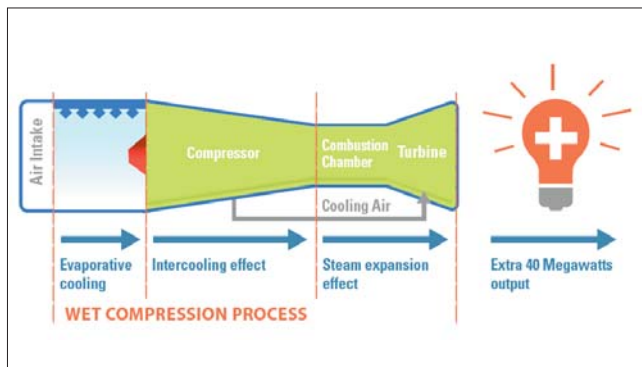
No specific reason was given for the removal but inclusion is based on meeting capitalization and liquidity benchmarks. Over the past 12 months TSI has seen its security price halve, from around \$2.40 to \$1.20-1.30.

The performance of the Fund has been disappointing since its entry to the ASX last June. The \$2.10 securities initially rose and peaked at \$2.57 in July but have steadily declined since then.

In some positive news, TSI has completed an \$833 million debt refinancing to fund the previously announced acquisition of four wind farms. TSI chief executive Steve MacDonald said "This strong response from the banks reinforces their support for TSI Fund's highly contracted revenue streams."

The final half year distribution is expected to be 9 cents per security approximately 60 per cent tax deferred. This would be the full year distribution to 18.5 cents. The record date was 30 June for payment on 17 September.

The Fund has also completed the upgrade of its Kemerton Power Station in WA that includes the installa-



How the Kemerton power station generates additional power through efficiency

tion of what it said is an innovative and environmentally friendly solution to boost Verve Energy's ability to supply the WA energy market. The station's peak summer output has been increased by 40 megawatts to over 300 megawatts and the increased efficiency saves up to four tonnes of carbon emissions per hour of operation, it said. Another 10,000 homes can now be supplied.

Gas Explosion Knocks Energy Developments

The Karratha LNG facility that is part of Energy Developments' West Kimberley Power Project was temporarily shut down due to the early June explosion at Apache Energy's Varanus Island gas plant.

Energy Developments (ASX: ENE) said it has sourced alternative gas supplies and pipeline transport has been secured on a short term basis.

"This fully interruptible arrangement involves access to lower gas quantities at a higher current market price than Energy Developments' usual gas supply and pipeline transport arrangements... The financial impact

of the alternative gas supply arrangements is being examined and Energy Developments' insurers are being kept informed of the situation," said the company.

The explosion came just as the already troubled West Kimberley Power Project was nearing completion. In some good news, by mid June the last of the five power stations in the West Kimberley Power Project passed its 60 day reliable operations test and all five stations are operational and earning revenue for ENE.

ENE said its \$60 million coal mine methane project at Anglo Coal's Morandah North Coal Mine is within budget and on schedule for commercial operations to commence in the last quarter of calendar 2008.

Despite the tight conditions in the credit market, ENE has finalized a new five year \$300 million debt facility. \$192 million is a non recourse refinance facility.

"The refinance underlines the low risk, diversified nature of the company's Australian operating asset base and our blue chip customers such as BHP Billiton, Xstrada and Anglo Coal," said managing director, Greg Pritchard.

"The new debt structure with a large revolving debt component will provide the company with considerable flexibility to prudently pursue growth in the company's core businesses and capital management opportunities."

Infratil and Infratil Australia have increased their substantial holding from 29 to 30.4 per cent.

Gas Explosion Misses APA

APA Group says the explosion at Apache Energy's Varanus Island gas processing facility in Western Australia is not expected to have any material impact on APA. This is because its contracts for the Telfer and

Goldfields pipelines are take or pay, and the ability of shippers to source alternate gas.

As an owner and operator of major gas pipelines in Qld and NSW, APA said it expects to benefit from the development of coal seam gas projects in both states. These include LNG export and new gas infrastructure, the Qld government requirement that 18 per cent of electricity be generated from gas, planned new NSW gas power stations under the Owen report, moving Qld and Vic gas to NSW, and growing gas demand in NSW, Vic and SA.

APA has brought forward the record date for its final distribution each year to the last business day of the financial year. The change was made for tax reasons and will benefit security holders, said APA.

APA's estimated distribution for the half year to 30 June is 15 cents per security, which APA said is consistent with its guidance of 5 per cent annual growth.

The 2008 financial results will be announced on 26 August and the distribution paid around 10 September. (ASX: APA)

DUET to Redeem POWERS

DUET Group's guidance for its 2008-09 distribution is 28.25 cents per security. If achieved this will be the fourth consecutive annual increase in distributions.

The 2007-08 distribution will be 27 cents per security, with the final distribution to be 13.5 cents per security. DUET said this will be a 9.2 per cent increase over 2006-07. Payment date for the final distribution is 15 August.

DUET has announced that it will redeem its hybrid Preferred to Ordinary with Exchange and Reset Securities (POWERS) at the next reset date, with trading of

the ASX listed instruments to be suspended on 18 August.

DUET chief executive Peter Barry, said the Group has a new \$685 million senior debt facility. "The debt facility will provide important benefits to DUET security holders when compared to the POWERS terms including lower cost and increased flexibility regarding future refinancing."

POWERS unitholders will receive \$105.2632 per unit comprising the face value of \$100 plus the exchange discount of \$5.2632. The redemption, and the final distribution for the POWERS units for the period from 1 March, will be paid on 1 September.

Dampier to Bunbury Pipeline, one of the assets in DUET's portfolio, is to proceed with the stage 5B expansion of the gas pipeline. Construction will commence in 2009 with completion expected in early 2010. Stage 5B will duplicate another 440 kilometres of the pipeline. (ASX: DUE)

Sunshine Confirms More Coal Seam Gas

Sunshine Gas said completion of the Atria Coal Seam Gas project in Queensland's Bowen Basin has confirmed that its permit has "considerable coal seam gas in place".

Managing director Tony Gilby said the results "are particularly encouraging as we push to increase Sunshine's strong reserve position and secure feedstock for expansion of our proposed SUN LNG project at Gladstone in partnership with Sojitz Corporation".

The company is now calculating prospective resource figures for the project area.

In further good news, Sunshine and partner West-Side Corporation will expand their Paranui coal seam gas pilot project in Queensland following promising gas shows from recent drilling. "The expanded pilot is expected to enhance the prospects of certifying gas reserves in the area," they said. (ASX: SHG)

Tassal Substantial Shareholder Moves

Tassal Group substantial shareholder JPMorgan Chase & Co and its affiliates reduced their holding in May from 9.43 per cent to 8.13 per cent, and then in early June to 6.8 per cent. The sale was by IF Capital Partners Ltd, which was a buyer in April, and a seller in May and June including 2 million shares at \$2.96 and 852,289 shares at \$2.61 each.

Commonwealth Bank ceased to be a substantial shareholder in early June with net buying by Events Investments and Commonwealth Bank Officers Superannuation Corporation insufficient to offset considerable selling by Colonial First State Investment. The net reduction across the group was 1.59 million shares at an average of \$3.04.

The Capital Group Companies, Inc acquired another 2.15 million shares in May and increased its holding from 6.15 to 7.75 per cent. (ASX: TAR)

HDF Distribution

Hastings Diversified Utilities Fund will pay a June quarter distribution of 7 cents per security. The record date was 28 June and the payment date is 28 July. (ASX: HDF)

Forest Enterprises Growing Well

Company: Forest Enterprises Australia Ltd

Year established: 1985

Market capitalization: \$188 million

Number of shares: 405 million

Total assets: \$443 million

Net assets: \$288 million

2006-07 revenue: \$101.7 million

1H 2007-08 revenue: \$39.99 million

2006-07 net profit: \$21.4 million

1H 2007-08 net profit: \$1.74 million

2006-07 earnings per share: 6.8 cents

1H 2007-08 earnings per share: 0.43 cents

Dividend yield: 4.3 per cent

Current share price: \$0.46

P/E ratio: 6.8

Managed Investment Schemes based on plantation timber can deliver higher returns for investors than originally planned, says Forest Enterprises Australia (ASX: FEA) which is clearfell harvesting its first MIS plantation that was planted in 1993.

"This harvest will be a great outcome for our growers," said chief executive, Andrew White. At the time of planting it was estimated the Tasmanian eucalypts would yield 375 cubic metres of wood per hectare, but better than expected growth rates means this should be exceeded, he said.

Growers will also receive a financial boost because 60 per cent of the wood will now be used for higher

value sawlogs rather than pulpwood as then planned.

Growers also received a return from thinings done in 2003.

Forest Enterprises is an emerging forestry and forest products company and one of the few relatively pure play timber plantation companies on the ASX. Although the ASX has some larger plantation timber companies, in recent years these have diversified into other agribusiness sectors and so diluted their plantation focus. FEA and Willmott Forests are the two plantation businesses that pass Eco Investor's three point test on environmental activity, environmental focus, and environmental commitment.

FEA sees itself as a vertically integrated forestry and forest products business with its own forest resource, saw mills, and marketing. In 2006-07 its consolidated revenue was \$101.7 million, of which \$79.7 million came from its plantation based Managed Investment Schemes division and \$20.6 million from its Forest Products division.

FEA says it "controls a substantial private forest resource. This includes not only hardwood plantations managed for about 9,000 growers, covering approximately 51,000 hectares, but also about 290,000 tonnes a year of softwood sawlogs purchased under a long-term contract." The forest estates are in Tasmania, northern NSW and south-east Queensland.

Its strategy for investors is to blend short and longer-rotation hardwoods and a range of markets including pulpwood, structural sawn timber, select-grade sawn timber and veneer.

The strategy appears to work with sales for its 2008 Plantation Project up 93 per cent to \$116 million. Sales were assisted by a 90 per cent increase in supporting dealer groups, an almost 60 per cent increase in the ad-

visor base, and a four to four and a quarter star out of five independent rating for the project.

In 2007 sales of FEA Plantation woodlot projects were \$60.2 million, which was consistent with sales in the previous year, said the company. "MIS segment revenue increased 18 per cent to \$79.7 million and profit increased by 8.6 per cent to \$33.2 million. This was mainly attributable to growth in planting and annuity income."

The company recently opened a new softwood mill at Bell Bay in Tasmania, and in 2007 it acquired a nearby 85 hectare industrial site to expand its softwood and hardwood timber operations.

"As a result of these developments, the operating contribution made by the Forest Products manufacturing segment is expected to grow significantly in the years ahead, resulting in increased shareholder value," says chairman William Edwards.



FEA's timber plantation regions in Qld, NSW and Tasmania

It is also expected to boost the Forest Products division's revenue so it more evenly matches revenue from the Managed Investment Schemes division.

FEA's plantation hardwood products include EcoAsh and EcoAshclear, and its softwood brand is BassPine.

SmartFibre Pty Ltd, which is owned equally by FEA and ITC Ltd, has a long term contract to supply pine wood chips from Bell Bay to Japan's largest pulp and paper manufacturers. It can also supply hardwood chips. Most of the wood chips are from saw mill residue.

FEA has a 10-year contract with Taswood Growers to buy plantation softwood sawlogs. Taswood Growers is a joint venture between Forestry Tasmania and GMO Renewable Resources, and the softwood resource is managed by Rayonier Australia. FEA also processes hardwood and softwood from FEA freehold resources, Forestry Tasmania, landowners, and woodlots owned by growers in FEA's Managed Investment Schemes.

The company has an active research and development program to increase the value of sawn timber and to investigate emerging forest products. Research includes fast growing eucalypts. The company says it is also looking at the potential for carbon trading.

Mr Edwards says the company is "committed to growing an environmentally sustainable timber resource", and along with an Environmental And Sustainable Forest Management Policy it has a number of certificates to show for its efforts. Among others these include "Environmental Management System (EMS) – a framework which ensures that all aspects of FEA's forest operations are identified and managed with the aim of minimising avoidable impacts to the environment"; and Sustainable Forest Management system

certification of its Tasmanian forest estate achieved in March 2007 and for its mainland estate achieved in October 2007.

FEA said it hopes to achieve chain-of-custody standard AS4707-2006 this year. This provides an inventory tracking system that follows forest products from forest to end use to assure the industry and clients that the products they sell have come from sustainably managed forests and not been blended with non-certified products on the way.

FEA's financial performance is quite impressive. It has a five year history of rising consolidated revenue, from \$23.9 million in 2002 to \$101.7 million in 2007. It also has a five year history of rising profit after tax from a loss of \$2.5 million in 2002 to a profit of \$21.4 million in 2007. Earnings per share growth has also been strong over the five years from 1.8 cents to 6.8 cents, and the company has been paying dividends since 2005.

Viridis Distribution on Target

Viridis Clean Energy Group will pay a final distribution of 5 cents per stapled security, bringing the full year distribution to 10 cents, in line with directors guidance.

The final distribution will be paid around 4 September. The record date was 30 June. Viridis said the distribution is likely to have taxable, tax deferred and foreign tax credit components.

The distribution reinvestment plan will not operate, perhaps in part due to Viridis' languishing security price since the share market crash earlier this year. A year ago the \$1 securities traded around \$1.10 but have fallen to the 70 cent range. At that price the 10 cent annual distribution is a yield of 14.2 per cent.

Willmott Forests Keep Growing

Despite a reported downturn in financial product sales across the investment industry, Willmott Forests says woodlot sales for its two forestry projects have exceeded last year's sales of \$45 million.

Chief executive, Marcus Derham, said it was "an excellent result that demonstrates the market demand for a highly rated and innovative forest investment which blends three proven species across diversified regions with a range of end markets. This is an exciting project that delivers multiple income streams commencing as early as year three."

The species were pine for sawlogs and pulp logs, she-oak for biomass and conversion to charcoal and energy, and silky oak for high value hardwood timber. 100 per cent finance was available for the projects, which closed on 30 June.

Micro Cap Companies

Biomass Opportunity for Pacific Energy

Hydro energy operator Pacific Energy (ASX: PEA) has the opportunity to explore the possible development of up to four biomass renewable energy projects as part of an exclusive 12 month agreement with Australia's largest plantation timber company Great Southern Plantations.

Under the agreement PEA has the rights over Great Southern's biomass harvest residues and the right to conduct feasibility studies for renewable energy projects utilizing the biomass. Over the 12 month period the

two companies will use their best endeavors to strike a longer term alliance to develop the projects.

The biomass rights cover regions near Albany in Western Australia, the Green Triangle in South Australia, and Bundaberg in Queensland. These are key plantation industry regions with forest estates managed by other growers, said PEA.

Adrian Boyd, managing director of PEA, said the Great Southern plantation estate residues are a significant renewable fuel source with the potential to fuel three or four renewable power stations nationally and add certainty to PEA's strategy to rollout a portfolio of biomass fueled renewable energy generation projects.

PEA is already developing a 50 per cent owned biomass renewable energy project near Perth, studying the feasibility of a 100 per cent owned 33 megawatt biomass energy project in New Jersey USA, operates two small hydro electric power stations in Victoria, and is developing a hydro project in New Jersey.

The 28 megawatt Perth Bioenergy Project is planned for construction this calendar year. It is located close to pine plantations, softwood and hardwood mills and electricity transmission lines. It has exclusive rights for a 150 kilometre radius to all residues from the WA Government's Forest Products Commission. The \$88 million project is expected to generate revenue of \$40 million per year over its 20 year life.

The Cardina Reservoir and Blue Rock Dam hydro projects east of Melbourne are 3.5 and 2.6 megawatt capacity respectively and have a 20 year take or pay agreement with TRUenergy. Their average combined long term annual margin is \$1.2 million.

PEA is capitalized at around \$20 million and made a small profit of \$232,00 in the year to 31 December 2001.

No Flies on BioProspect

BioProspect's prospects for commercializing pesticides derived from natural products received a boost with a licence agreement with Bio-Gene Technology to develop its Qcide based insecticide.

Qcide is an oil extracted from the Eucalyptus cloeziana tree and contains a chemical compound, Tasmanone, that can be effective on a range of insects such as domestic flies, ants and animal parasites like Buffalo Fly.

Under the agreement BioProspect has given Bio-Gene an exclusive licence to use its existing intellectual property to develop and commercialise Qcide based products on an international scale.

Bio-Gene will initiate development work and extraction programs to produce the natural oil and place it into human and animal health markets where a naturally derived, low toxicity pesticide is required. Bio-Gene will be responsible for all further development, patent costs, biodiscovery agreements and product registration.

BioProspect will receive an initial fee of \$100,000 and a royalty of 2 per cent of gross sales from any product containing Tasmanone. It will also collaborate with Bio-Gene on research, oil extraction and registration requirements.

Bio-Gene is a West Australian company with expertise in growing and extracting compounds from Australian native plants. The company has previously produced an essential oil from *Boronia megastigma*, a rare plant endemic to the South West of Australia. The company says this oil is regarded as one of the finest and most expensive extracts in the world.

Bio-Gene has already instigated work on human hy-

giene applications and fabrics/textile sanitizers that contain Qcide.

In late June BioProspect's managing director, Warwick Dowse, resigned citing personal reasons and will leave in three months. (ASX: BPO)

Mission Biofuels to Become Mission NewEnergy

Mission Biofuels, which is about to change its name to Mission NewEnergy, has been invited by the German Government to participate in an International Sustainability and Carbon Certification project. A selection of major biofuel industry participants will test an international certification system to reduce the risk of non-sustainable production of biofuels and give proof that over their full life biofuels reduce greenhouse gas emissions.

The project aims to include all major biofuel feedstocks including rape seed oil, soy oil and palm oil

Mission, which has implemented long term plans to gradually replace all its palm oil usage with jatropa oil, said it was the only palm oil based producer asked to participate.

German biofuel law says energy products can only be classified as biofuels if the production of the biomass meets sustainable cultivation requirements, protects natural habitats, or the energy product has a required carbon reduction potential.

Cleaner Coal Easier to See

White Energy Company has completed construction of its first commercial scale cleaner coal production plant and commissioning and full scale production is

believed to be imminent. The 90,000 tonnes per annum plant at Cessnock, NSW utilises White Energy's licensed binderless coal briquetting technology to upgrade lower grade coal and significantly increase its energy efficiency.

White Energy's managing director, John Atkinson, says "The completion of White Energy's first commercial production plant represents a significant milestone for the company. We will soon be processing coal for power companies to use to conduct combustion tests and trial burns some months in advance of what was originally forecast."

The Cessnock Plant upgrades sub-bituminous coal using a patented process to crush, dry and briquette high moisture coals. The result is the reduction of the moisture content and conversion of the product into a higher energy, more stable, cleaner burning coal briquette.

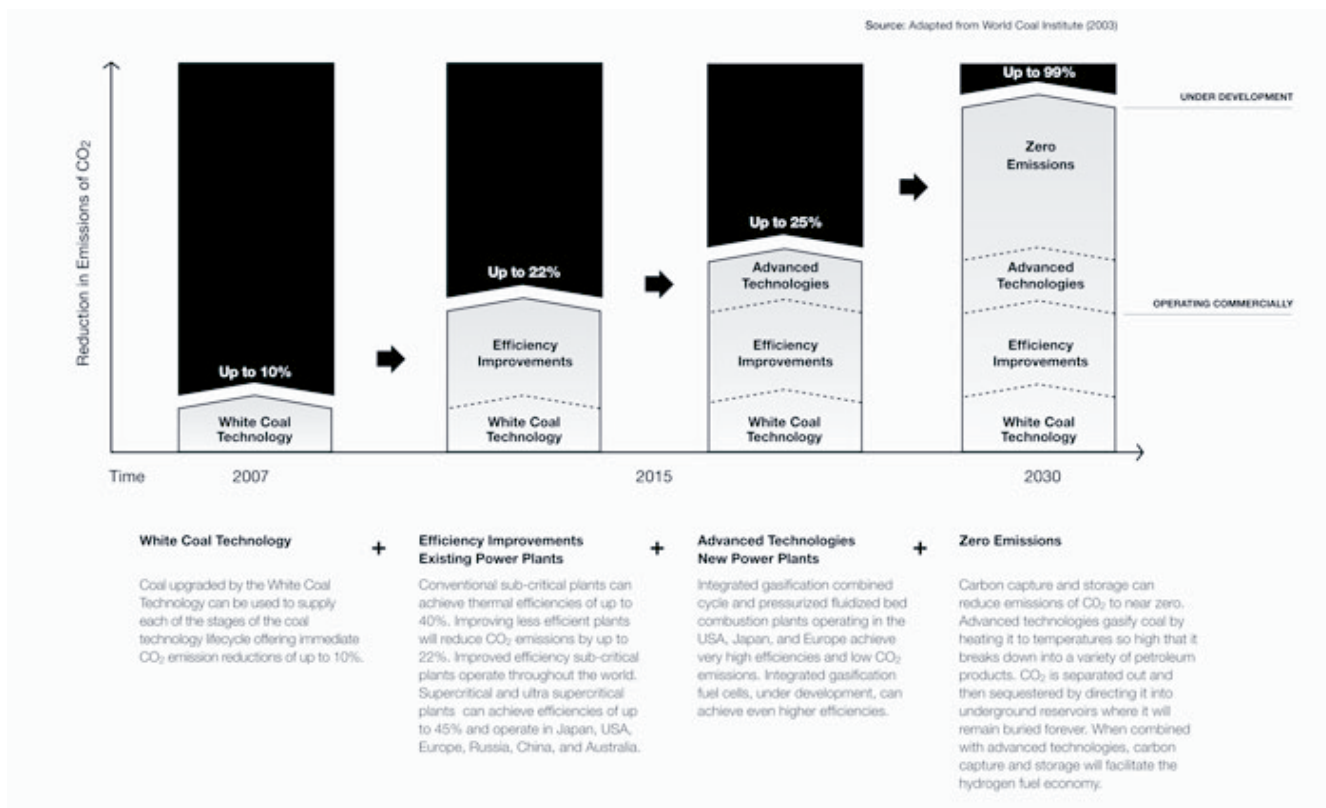
The company said its upgraded product can be transported and handled like normal coal, but has significant transportation cost benefits, combustion advantages and, importantly, is a cleaner fuel from an emissions perspective when compared to the burning of traditional thermal coal.

White Energy said the process has been shown to be cost and operationally superior to competing technologies. White Energy is the exclusive worldwide license holder of the Binderless Coal Briquetting process that was developed by CSIRO in conjunction with TraDet Inc, K.R. Komarek Inc and The Griffin Coal Mining Company.

The company said it is committed to delivering cleaner coal technologies and ultimately achieving zero emission targets.

The design and construction of the Cessnock Plant

The Path to Clean Coal



Source: White Energy Co

is similar to the design and construction process required for a one million tonne per annum plant now being built at East Kalimantan, Indonesia by White Energy and joint venture partner Bayan International Pte Ltd.

The Cessnock Plant will also be used for continued development purposes and for research and training.

White Energy has a Heads of Agreement with Da-

tang International Power Generation Company for the development of coal upgrading plants in China, and has a development agreement with NRG Energy and Buckskin Mining for a potential project in the US.

White Energy plans to build plants in Indonesia, China and the US during 2009, and hopes the Cessnock Plant will generate further overseas interest. (ASX: WEC)

BluGlass to Open Lighting Plant

BluGlass will this month open its pilot manufacturing plant in Sydney built to demonstrate its light emitting diode (LED) technology and facilitate its licencing to lighting manufacturers.

The plant opening will coincide with the installation of the company's first commercial-scale semiconductor reactor. BluGlass said this will be used to demonstrate the significant energy and cost savings that the breakthrough technology process is expected to deliver for next-generation LED lighting products.

"We have worked hard with our business and development partners to get to this advanced stage, and now we are significantly closer to generating recurring revenues for BluGlass," interim chief executive officer Giles Bourne said. "Our lighting technology will have tremendous benefits for the environment because it not only produces LEDs without the emission of toxic gases, but LED lights use a fraction of the electricity of traditional incandescent bulbs."

The demonstration plant and reactor is expected to attract significant interest from global lighting manufacturers seeking cheaper ways of making LED lighting fixtures for commercial, industrial and household use.

BluGlass intends to sell its own reactors, license its technology and earn royalties from the LED chips that its clients produce.

The reactor incorporates BluGlass's energy efficient and non-toxic Remote Plasma Chemical Vapour Deposition (RPCVD) technology that is expected to deposit gallium nitride onto cost efficient glass wafers. An independent analysis of the Australian-bred technology has found that cost savings of more than 48 per cent could be achieved at the wafer level. (ASX: BLG)

Unlisted Funds

Customize Your Alternative Energy Portfolio

BlackRock Investment Management and Bakers Investment Group have launched an alternative energy focused managed investment scheme that allows investors to either follow a Model Portfolio or customize a Personal Portfolio to suit themselves.

The Bakers Alternate Energy Model Portfolio aims to achieve capital growth and dividend income by investing in ASX listed companies that operate a majority of their business within the alternate energy sector. Its benchmark is the S&P/ASX 300 Index.

The future of energy will be diversified, so the MIS is designed to provide a diversified alternative energies investment over the longer term, said Ross Paul, chief investment officer with Bakers. Bakers designed and maintains the Model Portfolio, while BlackRock is the custodian and manager.

Unfortunately the product disclosure statement does not list the universe of available stocks in the portfolio, and investors will not see the stocks until they invest. So some trust is involved if an investor wants to outsource stock selection by following the Model Portfolio.

However investors who want to use the Model Portfolio as a guide and then customize their Personal Portfolio might find the product useful.

The customization feature may also be necessary for those investors who do not want exposure to uranium. The Model Portfolio has a diversified strategy across low emission utilities, renewable energy, natural gas, hydrogen, environmental technologies, and uranium.

The Bakers Alternate Energy Customised Portfolio allows investors to substitute a security with another security or cash, include securities that they already own, and have a pre-determined exposure to a particular security.

The indicative Model Portfolio has 75 to 100 stocks, so it contains many small cap, micro cap and other early stage high risk companies. The PDS gives little information on the breakdown of large cap versus small cap securities. However, Mr Paul said investors can get a feel for this on Bakers' web site where the AltAustralia Emerging Energy Index has 95 stocks with a total market capitalization of \$55 billion. The most recently available figures show an average capitalization of \$445 million and a median capitalization of \$45.8 million. The top five stocks account for about 54 per cent of capitalization, while uranium stocks accounted for 21 per cent.

Mr Paul said the Index has outperformed the benchmark ASX 300 by 30 per cent year to date to late June, and outperformed in back modeling for the last 18 months.

The Model Portfolio uses both active and passive management of securities. Once the universe of stocks is determined, a bottom up analysis of the securities is undertaken using Bakers' qualitative and quantitative investment overlay, says Bakers.

The Model Portfolio is weighted 25-75 per cent active management, 25-75 per cent index, and 0-20 per cent cash. "Security weightings within the passive holdings of the portfolio are applied in line with the relative market capitalization of each security relative to the total market capitalization within the approved universe," it says

The minimum investment amount is \$5,000. Fees

are: a manager's fee of 1.25 per cent per annum, a performance fee of 17.50 per cent of out performance of the benchmark index. There is also an administration fee starting at 0.6 per cent for the first \$0.5 million and then declining. The contribution fee of up to 4.4 per cent may be negotiated with the financial adviser.

The Customised Portfolio is not taxed as investments are beneficially held by investors in their separate Personal Portfolios, and all income and gains in the Personal Portfolio accrue directly to the investor.

Distribution Forecast for Eco Tourism Fund

Mariner Financial's Coastal Investment Fund is forecasting a cash distribution yield of 9.2 per cent for the 2008 financial year, and 9.25 per cent for 2009.

The March 2008 quarter distribution was 2.29 cents per unit, the December 2007 quarter distribution 1.94 cents per unit, and for the October 2007 period 0.86 cents. The returns are 100 per cent tax deferred.

The \$70 million Fund is one of the few eco-tourism investment options in Australia. It has four properties covering 39 hectares: EcoPoint Myall Shores Resort, NSW, a 4 star resort within the Myall Lakes National Park; EcoPoint Murramarang Resort, NSW, a 4 star resort in the Murramarang National Park; Nestle Inn Tourist Village, Qld, a 3 star resort; and EcoPoint Resort Port Douglas, Qld, which is currently under development.

The Fund has a five year life from its inception in 2007. (Eco Investor Oct 2007)

In its most recent Update the Fund said revenues since the Fund started represent increases on prior year operations due in part to higher occupancy rates across

the three operating resorts.

“This positive trend should continue, resulting in further increases to the EBITDA as emphasis is placed on increasing operational efficiencies, enhancing marketing strategies and the effective scheduling of capital expenditure works, so that the quality of product offering is maintained.

Future growth is aimed at attracting conference business and turning this into returning vacation business.

Challenges have been the close down of the conference market in Canberra leading up to the Federal Election last year, a wet summer period, and a significant increase in leisure trips overseas, it said.

Unlisted Companies

Converting Organic Waste to Animal Feed

A West Australian company is looking to commercialize a technology that converts organic waste, especially discarded domestic and commercial food and green matter, into safe and nutritious animal feed, and says it has numerous opportunities to establish plants in south east Asia.

Bio Culture, the trading name for Volt Investments Pty Ltd, has spent six years developing the technology, and would now like to build a demonstration plant in Indonesia. It has an agreement with the Government of East Java to build a small scale demonstration plant in Surabaya, and two of Bio Culture’s four directors are Indonesian and the third has an Indonesian background.

Bio Culture was established to develop technology to dispose of waste safely and cost effectively, especially in developing countries where funding for waste disposal is minimal. The initial plant was designed to convert organic waste into briquettes of organic fertiliser. Chief executive Sam Salpietro said although the end product was good, it wasn’t cost effective as the process was energy intensive and the fertiliser had a market mostly limited to organic farmers.

A rethink of the strategy and many visits to waste landfills in Indonesia and China alerted the team to the fact that a large number of landfills had herds of domestic animals such as cattle, goats, pigs, poultry, etc living on the landfill, eating the discarded food and green waste. “These herds used the landfills as paddocks of natural food,” said Mr Salpietro.

A few years of research carried out by Murdoch University on the viability of using discarded food scraps and green waste as a safe raw material for animal feed, together with additional work by engineering and agricultural consultants, resulted in the design of a plant called the Biofeed system.

A Biofeed plant has a daily capacity to process 1,000 tonnes of waste and produce 350 to 400 tonnes of pelletised animal feed. It would also separate and package glass, metals, aluminium and plastic for sale to recycling outlets. Such a plant would cost between \$30 and \$40 million. Mr Salpietro said the technology is proven, and most of the equipment is already used in food production and stock feed manufacturing. Some of the mixing and heating equipment is provisionally patented.

The company says that the use of discarded food and green waste makes it a cost positive waste disposal method. Other methods such as environmentally controlled landfills, waste to compost, waste to gas, and waste to energy can be cost negative as the cost of processing can be greater than the cost of the end product.

“Our financial models show that a typical 1,000 tonnes per day plant will cost nearly \$40 million to erect, not including land, employ about 200 workers, and generate approximately \$6 million per annum of profit from the sale of the animal feed,” said Mr Salpietro.

These are early, 2005 figures and capital outlay and



A Lake Front Family Villa at the EcoPoint Myall Shores Resort at Myall Lakes National Park, NSW

operating costs have since increased, but the sale price of animal feed has increased at a greater rate, he said. A plant could possibly also be a source of carbon credits.

The company says the technology is suited to many Asian countries as it is labour intensive.

Many Asian municipalities have been supportive and the company reached the agreement with the Government of East Java to carry out a small pilot test to process approximately 200 kilograms of typical Surabaya waste, and use the Biofeed process to produce pelletised animal feed. The pilot test was conducted at the University of Surabaya by Bio Culture and the Government of East Java and supervised by Ron Kho, a Surabaya-based member of Bio Culture's management team.

Mr Saltpietro said the results were successful and the product was tested for safety and nutrition content by Perth based ChemCentre, a division of the Department of Agriculture.



Producing animal feed from organic waste

Bio Culture, which has no debt, would now like to build a demonstration plant and is looking at funding options.

The growing demand for traditional raw materials for animal feed such as cereals and grain means these will escalate in cost and become scarce to source. Because the raw material for the Biofeed system is free, Bio Culture can produce and sell good quality animal feed for half the price of commercial feeds, he said.

“To build a small scale demonstration plant in Surabaya will cost \$4 to \$5 million. We believe it will be a great opportunity for existing entrepreneurs to provide seed capital and guidance in return for a stake in Bio Culture,” said Mr Saltpietro.

“Ideally we would like to receive assistance with listing our company on the stock exchange, and raise \$4 to \$5 million with the very specific target of building a demonstration plant in Surabaya.

“The East Java Government has been very supportive of our plans, and was our partner in the initial test pilot project. They want to be partners in the demonstration plant, as they firmly believe that this plant would become the “Mecca” for Governments with waste disposal problems, aid agencies, animal feed manufacturers and consumers, etc. They are of the opinion that apart from the obvious benefits to their Region, there would be other benefits flowing from visits from interested parties.”

Other Indonesian municipalities such as Bali, Bandung and Java have also expressed interest in having a plant. A plant would alleviate a municipality's waste disposal problem, create local employment, and help reduce dependence on raw materials for animal feed production, said Mr Saltpietro.

“And interest in our technology already exists in

China, SE Asia, India, etc,” he said. “Our ultimate target is to build animal feed manufacturing plants in all developing countries for various clients, using organic waste as a raw material. We see our client base as a mix of Government agencies that want a means of disposing of organic waste in a cost positive process, as well as private sector groups interested in a financially viable commercial venture.”

International Funds

Water Fund Distribution

The Credit Suisse PL100 World Water Trust has completed the annual re-balance of its 15 stock notional portfolio, replacing three stocks. The three removed stocks are: Pall Corp of the US, Elbara Corp of Japan and Aqua America Inc of the US.

The three new stocks are: Comphania Del Aneamento Basico Do Estado De Sao Pa of Brazil, Aguas De Barcelona of Spain, and Watts Water Technologies Inc of the US.

The Trust expects to make a distribution of 0.867 cents on 18 July for the period ending 30 June.

In late June the net asset value of the Fund was \$0.8867 per unit. (ASX: CSW)

Climate Change Fund Distribution

The DWS Global Climate Change Fund expects to pay a distribution of 3.2309 cents per unit for the six months to 30 June 2008. In late June the \$1 units had a redemption price of \$0.8901 and a purchase price of \$0.8964. The fund is now \$8.04 million in size.



LDK Solar is a manufacturer of multicrystalline solar wafers. The Chinese headquartered company is listed on the New York Stock

Good recent performing stocks have been LDK Solar, American Superconductor, and Vestas Wind Systems, while negative performers have been Tanfield Group, Wacker Chemie and Suzlon Energy.

The Fund said it used the recent weakness in solar stocks to increase its exposure to the sector. It also increased its holdings of Calcon Carbon (CCC) which it says should profit from increased demand for activated carbon which is used in a range of filtering products. "For example, coal-fired boilers used by many utilities emit mercury as a pollutant and new federal legislation is expected to drive demand for carbon longer-term," it says.

Deep Green Fund Has Cash to Invest

The June fall in stock markets has removed the premium from the value of Hunter Hall's Global Deep Green Fund. At the end of May the Fund was one of the

few international funds launched last year that had a unit value ahead of its issue price. In part this was due to its launch late in the year and the cautious pace of investment. Eight months after launch it still had 48 per cent of its assets in cash or liquids.

At the end of May the \$1 units had a redemption price of \$1.029 and an entry price of \$1.0352. However the June share market slump reduced these to \$0.9816 and \$0.9875 respectively. Nonetheless, the Fund remains one of the best performing 2007 vintage international funds and could be expected to benefit quickly when share markets recover.

In addition to the top 10 holdings published last month (Eco Investor Jun 2008), another holding is Australian metals recycler CMA.

The Fund is now \$9.3 million in size, and is cashed up at a time of low share prices.

International Companies

BG Group A Gas Giant

BG Group's takeover offer for Origin Energy has drawn Australian investor's attention to this global gas giant. Given the growing economic and environmental importance of gas, and the much larger role BG would like to play in Australia, how does BG stack up as an environmental investment? Should it be on the radar of direct investors in international equities?

The short answer is yes. For two key reasons: environmentally it is very focused on gas, and financially it is very big.

BG, formerly British Gas, is listed on the London Stock Exchange and is one of the largest gas companies

in the world with operations in 27 countries and 60 per cent of its professionals working outside the UK.

It describes itself as follows: "We have a proud history in all aspects of the energy sector, particularly natural gas, where we have experience across the entire gas chain – from exploration to delivery to the consumer... Our focus is on understanding, building and supplying natural gas markets around the world."

The company operates in four key sectors – Exploration and Production, Liquefied Natural Gas, Transmission and Distribution, and Power. Other activities are natural gas vehicles and domestic combined heat and power.

Under Exploration and Production, BG is a gas producer in 11 countries and an explorer in 10 countries including Australia through its recent alliance with Queensland Gas Co. Its 2007 production was 220.3 mmbob (million barrels of oil equivalent), a rise from 219.2 mmbob in 2006. Its proved reserves were 2,039 mmbob.

Like some other major gas companies BG also has related oil activities, but its oil reserves, at 506 mmbbl (million barrels of oil), are a quarter of the size, and include crude oil, condensate and natural gas liquids.

The LNG business undertakes liquefaction in four countries and regasification in another four countries. In 2007 it had a record year and managed 13 million tonnes, of which 7 million tonnes were new contracted supplies, additional spot cargoes and liquefaction volumes. The division is also a major shipper of LNG and its fleet of owned and chartered ships supplies nine countries.

The downstream Transmission and Distribution business operates in Brazil, India, UK, Argentina and Paraguay where it services residential customers, man-

ages networks, and supplies compressed natural gas for vehicles.

The Power division has a portfolio of mostly gas-fired power stations in the US, Italy, UK, Philippines, and Malaysia. At the end of 2007, total power capacity was 4.3 gigawatts. A number of the gas fired stations are said to be among the most efficient in the world. The 264 megawatt Masspower power plant in Massachusetts is both gas and oil-fired.

BG's other activities are co-generation and energy services and compressed natural gas stations for vehicles in Brazil.

Exploration and Production is the largest division with 2007 revenue of £4.03 billion and operating profit of £2.38 billion. Liquefied Natural Gas had revenue of

£3.09 billion and profit of £521 million. The results for Power Generation were £523 million and £130 million respectively, and for Other £7 million and a loss of £37 million.

Overall Eco Investor rates BG highly for environmental activity, medium for environmental focus, and highly for commitment to its gas business.

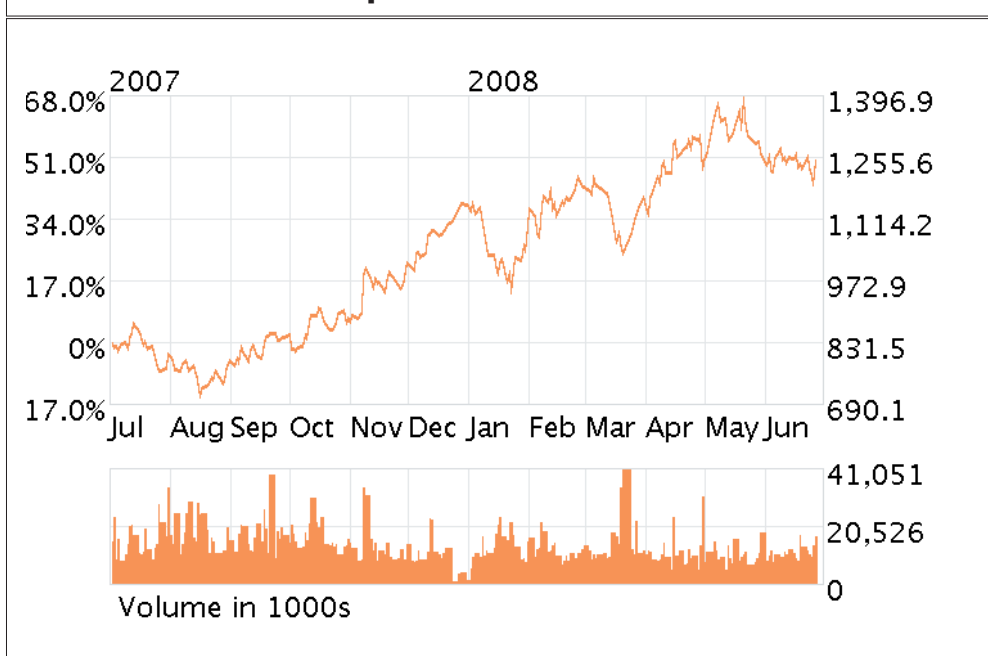
The company says it sees natural gas as part of the solution to climate change and has been publishing a detailed Social and Environment Report and more recently a Corporate Responsibility Report since 2001.

On the financial side, BG's operating profit for 2007 increased by £145 million to £3.24 billion. A final dividend of 5.76 pence per share brought the full year dividend to 9.36 pence per share, an increase of 30 per cent

on 2006. Dividends have been rising in recent years and BG said the Group is strongly financed and its cash flows are becoming more substantial as the business grows.

BG is capitalized at £41 billion and is a FTSE 100 company. The recent share price is around £12. The year high is £14.15 per share and the year low is £9.30. BG says total shareholder return including share price and dividends over the last three years is about 180 per cent and well above the FTSE 100.

BG Group's One Year Share Price



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New Reports

Trends in Cleantech VC

The latest Cleantech Investment Monitor says North American and European venture capitalists continued to be “bullish on every cleantech sector” in the first quarter of 2008, and that the investment wave continued with “a remarkable US\$1.25 billion of venture capital” invested in renewable energy, water, air, and sustainability in the quarter.

This number is a minimum as 23 of the 102 new funding rounds did not disclose the value and are not included in the total.

The sectors to receive the most capital were cellulosic ethanol, which reached a new investment high, and concentrated solar power (CSP) which surpassed its 2007 total with US\$115 million invested in the first quarter. Other emerging sectors were innovative lighting technologies and energy efficiency for homes and businesses, with the report’s authors saying they expect these sectors to receive continued attention in the coming year.

Cleantech investment has also spread from specialized investors to traditional “generalist” VCs. 58 of the more than 188 cleantech investors for the quarter were new to cleantech.

Cleantech clusters in Europe and Israel are seeing more investment activity as are previously overlooked regions in the US, says the report

Deal size appears to be returning to more traditional smaller-scale “technology innovation” levels rather than the larger “factory buildout and capacity” investments as only 36 deals were over US\$10 million compared to 52 in the fourth quarter of 2007.

A notable deal was Brightsource Energy, a Concentrated Solar Power firm which won what the authors say is the largest ever solar contract awarded by a utility, for 900 megawatts of energy generation from Californian renewable power utility, PG&E.

The first quarter numbers for North America show a decline on the fourth quarter of 2007: the number of rounds fell from 80 to 65, and invested equity fell from US\$1.19 billion to US\$873 million.

Big Role for Solar in US

It is possible to increase the contribution of solar energy to the US electricity supply from its current amount of less than one tenth of one per cent to a realistic 10 percent by 2025, says a new report Utility Solar Assessment (USA) Study: Reaching Ten Percent Solar by 2025 published by Clean Edge, Inc and Co-op America Foundation.

The change can be done by a combination of solar photovoltaics (PV) and concentrating solar power

(CSP).

The report says that historically utilities have played a marginal role in the growth of solar power, but this is beginning to change because public resistance against nuclear power remains high, and is rising against coal with 60 new coal plants in the US cancelled, blocked, or delayed since 2006.

Solar power can now compete in regions with high electricity rates and favorable incentives. It can compete for peak power production in grid-constrained territories and applications that are off the grid, among other benefits to utilities.

Capital costs for conventional energy sources are often not dissimilar to the capital costs for solar PV, and as solar prices decline and the capital costs for coal, natural gas, and nuclear plants increase, a crossover point is being reached.

Other advantages of solar are no ‘fuel’ costs, low operating and maintenance costs, zero on-site emissions, and broad public approval.

The report projects solar PV will reach cost parity

Comparative Power Costs for Utility Deployment

Energy Type	Coal	Natural Gas Combined Cycle	Geothermal	Wind	Concentrating Solar Power (CSP)	Nuclear	Solar PV
Capital Costs per 1000 MW (U.S. 2007 Average)	\$1 billion - \$3 billion	\$1 billion - \$2 billion	\$1.2 billion - \$2 billion	\$1.5 billion - \$2 billion	\$3 billion - \$4 billion	\$3 billion - \$7 billion	\$5 billion - \$7 billion
Fuel Costs	Yes	Yes	No	No	No	Yes	No
Subject to CO2 Regulations	Yes	Yes	No	No	No	No	No

Source: Clean Edge, 2008

with conventional retail electricity pricing throughout much of the US on a straight kWh rate basis by around 2015.

The investment required to reach the 10 per cent target by 2025 is not inexpensive, but “is definitely within the range of what utilities and other energy consumers would have to pay for more traditional and polluting sources such as coal and natural gas fired plants, and we believe, considerably less than the price tag for a similar amount of nuclear power or coal power (in a carbon-regulated environment).

“Our figures show that the investment will be between US\$400 billion and US\$500 billion to install the required PV and an additional US\$50 billion to US\$60 billion to install the required CSP to reach the 10 per cent target. That’s a total projected price tag of between US\$450 billion and US\$560 billion between now and 2025, an average of US\$26 billion to US\$33 billion per year.”

The report says this is not investment in R&D but deployment of these technologies - procurement and installation capital costs paid for by utilities, businesses, residences, governments, and others installing solar systems.

“In this scenario, solar would represent more than half of all new generating capacity installed in the nation by 2025. To put the projected investment in perspective, the Edison Electric Institute estimates that the US electric utility industry spent more than US\$70 billion on new power plants and new transmission and distribution investments in 2007 alone.

“Conservatively assuming similar expenditures between now and 2025 (and most experts believe those annual costs will increase), we’re talking about a total investment of more than US\$1.2 trillion—roughly dou-

ble to triple our projected investment for solar in the US.”

Other findings of the report include:

- * Solar power will soon reach price parity with conventional sources.
- * Solar can provide utilities with a peak-power hedge.
- * Utility participation is critical to solar success, and the solar industry needs to cooperate with utilities.
- * Utilities need to be able to integrate solar expenditures into their rate base—and to be able to take a full life-cycle cost approach.
- * Smart grid deployment is imperative.
- * Distributed solar PV offers utilities unique advantages.
- * Standards around net metering, distributed generation assets, feed-in tariffs, and other elements are critical to the growth of solar.
- * Not just PV but also CSP can play a role.

An Energy [R]evolution is Possible

Climate change demands an energy revolution at the core of which is a revolution in the way energy is produced, distributed and consumed, says a new report by Greenpeace titled Energy [R]evolution: A Sustainable Australia Energy Outlook.

The report outlines two scenarios: a Reference Scenario based on the 2007 energy demand projections by the Australian Bureau of Agricultural and Resource Economics and amended to account for the new policy measures of the new Government. The second is the Energy [R]evolution scenario based on significant efforts to fully exploit the large potential for energy effi-



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table 6: investment cost projections for renewable energy technologies

			2010	2030
Photovoltaic	investment costs	AUD\$/kW	4,565	1,802
	generation costs (min/max)	AUD\$/kWh	0.34	0.11-0.22
Concentrating solar thermal	investment costs	AUD\$/kW	2,282	1,181
	generation costs (min/max)	AUD\$/kWh	0.13-0.21	0.10-0.14
Wind	investment costs	AUD\$/kW	1826	1,517
	generation costs (min/max)	AUD\$/kWh	0.11-0.14	0.08-0.10
Biomass (no CHP applications)	investment costs	AUD\$/kW	4,629	3,411
	generation costs (min/max)	AUD\$/kWh	0.10-0.18	0.10-0.19
Geothermal	investment costs	AUD\$/kW	10,158	7,370
	generation costs (min/max)	AUD\$/kWh	0.18-0.32	0.13-0.21
Hydro	investment costs	AUD\$/kW	3,730	4,114
	generation costs (min/max)	AUD\$/kWh	0.06-0.16	0.08-0.16
Ocean energy	investment costs	AUD\$/kW	5,126	2,928
	generation costs (min/max)	AUD\$/kWh	0.18-0.58	0.10-0.27

ciency, all cost-effective renewable energy sources for heat and electricity generation, and production of sustainable biofuels.

“While energy related CO2 emissions will increase under the Reference Scenario by about 20 per cent by 2020 - far removed from a sustainable development pathway - under the Energy [R]evolution Scenario they drop significantly, decreasing from 370 million tonnes (Mt) in 2005 to 232 Mt in 2020, a reduction of 37 per cent,” says the report.

The sustainable energy future is based on 40 per cent of electricity provided by renewable sources, and energy efficiency can cut energy consumption by 16 per cent by 2020.

Coal-fired power can be phased out entirely by 2030 using an aggressive implementation of energy efficiency measures, use of gas as a transitional fuel, and up-scaling of renewable energy technologies.

Smarter use of resources such as combined heat and power generation (CHP) can make power plants more efficient, and the use of fossil fuels for CHP can be steadily replaced by biomass and geothermal energy.

Using electricity for the transport system and cutting consumption of fossil fuels through efficiency means electric vehicles can quickly take the place of petrol/diesel vehicles.

The report says the Energy [R]evolution Scenario is an exercise in job creation, as well as reducing emissions, and will generate a net gain of between 33,700 and 57,500 jobs.

The expected decrease in the number of jobs in coal-fired electricity generation is more than compensated for by employment in the renewable energy sector – a net gain of over 10,000 jobs.

The report contains detailed data on the current and sustainable energy scenarios.

The five key principles behind the shift are to:

- * Implement renewable solutions, especially through decentralised energy systems
- * Respect the natural limits of the environment
- * Phase out dirty, unsustainable energy sources
- * Create greater equity in the use of resources
- * Decouple economic growth from the consumption of fossil fuels.

Green Collar Employment Higher Than Brown

Well designed policies to reduce greenhouse gas emissions can result in increased, not decreased, employment, says a new report, Growing the Green Collar Economy: Skills and labour challenges in reducing our

greenhouse emissions and national environmental footprint. The report was commissioned by Dusseldorp Skills Forum and undertaken by CSIRO Sustainable Ecosystems in Canberra.

This report was commissioned “to explore the skills, innovation and workforce dimensions of the transition to a more environmentally sustainable society, with a particular focus on the challenges involved in achieving deep cuts in greenhouse emissions.”

The report explores potential green collar employment futures: a technology based ‘physical economy’ approach, and a price based ‘monetary economy’ approach. The report says projections developed by the two approaches share substantial areas of agreement despite fundamental differences in the underlying structure, constraints, and drivers of change incorporated into the models.

The key results of the report include:

- * Well designed policies can substantially decouple economic growth from environmental pressure, so that living standards continue to increase at current rates while the national environmental footprint reduces over time.

- * Achieving a rapid transition to sustainability would have little or no impact on national employment, with projected increases in employment of 2.5 to 3.3 million jobs over the next two decades.

- * Employment in sectors with high potential environmental impacts will also grow strongly, with projected increases of more than 10 per cent over ten years. This will add 230,000 to 340,000 new jobs – in addition to normal employment turnover – in the transport, construction, and agriculture, manufacturing and mining sectors.

Employment in the construction and transport sec-

tors is projected to grow significantly faster than the national average. But achieving the transition to a low carbon economy will require a massive mobilisation of skills and training – both to equip new workers and to enable appropriate changes in practices by the three million workers already employed in the key sectors influencing Australia’s environmental footprint. Current approaches do not appear sufficient for meeting these challenges.

The report concludes that the transition to a low carbon economy will require policy attention to both incentives for environmental performance and to the skills required to deliver this performance.

There is a triple-dividend of greater wellbeing, cost-saving and greater competitiveness, and reduced environmental impact to be earned if measures are taken to support the skill revolution required for a low-carbon, environmentally sound society.

The Future

Low Carbon Concrete

The development of a low carbon concrete has taken another step with the first geopolymer concrete path in Australia laid at the Curtin University of Technology campus in Perth.

The developers says Geopolymer concrete produces 80 per cent less greenhouse gases and also has a number of other desirable properties over ordinary Portland cement based concretes.

“This is a very exciting stage in the development of geopolymer concretes for widespread general usage,” says Stevan Green, chief executive of the Cooperative Research Centre for Sustainable Resource Processing



A geopolymer concrete path at Curtin University

(CSRP). “With cement and concrete estimated to contribute around 5 to 8 percent of the world’s man-made greenhouse gas emissions, a technology which can produce a superior product with a fraction of the emissions will be an important contributor to our response to climate change risk.”

Geopolymer concretes are produced by reacting aluminate and silicate bearing materials with a caustic activator. Often waste materials such as fly ash from power generation or slag/waste materials from iron and metal production can be used.

Researchers will monitor the 100 square metre path for performance, and other demonstration projects are also being planned.

Professor Arie van Riessen from Curtin University said that the demonstration geopolymer path is a result of collaboration between many organisations including CSRP, CSIRO, Curtin University, Rocla, Golden Bay Cement, Boral and the Geopolymer Alliance.

CSRP aims to progressively eliminate waste and emissions in the materials cycle by creating new methods to produce minerals and metals, satisfying the global material needs of society with significantly reduced ecological impacts.

Magnifying Solar Energy

IBM says it has achieved a breakthrough in photovoltaics technology that could significantly reduce the cost of a typical concentrator photovoltaic (CPV) based system. The breakthrough uses a much lower number of photovoltaic cells in a solar farm and concentrates more light onto each cell using large lenses, much like a kid with a magnifying glass.

IBM says its system cuts the number of photovoltaic cells and other components by a factor of 10. For example, a 200 sun system (“one sun” is equal to the solar power at noon on a clear summer day) produces about 20 watts per square centimetre of power, while the IBM Lab result is a 2300 sun system where approximately 230 watts per square centimeter are concentrated onto the cell system.

IBM said the trick lies in its ability to cool the tiny solar cell. Concentrating the equivalent of 2000 suns on such a small area generates enough heat to melt stainless steel. By borrowing innovations from IBM’s R&D



in cooling computer chips, the team was able to cool the solar cell from greater than 1600 degrees Celsius to just 85 degrees Celsius.

The IBM researchers say their liquid metal cooling interface is able to transfer heat from the solar cell to a copper cooling plate much more efficiently than anything else available.

The research team coupled a commercial solar cell to an advanced IBM liquid metal thermal cooling system using methods developed for the microprocessor industry. It used a very thin layer of a liquid metal made of a gallium and indium compound that it applied between the chip and a cooling block. Such thermal interface layers transfer the heat from the chip to the cooling block so that the chip temperature can be kept low. IBM said the liquid metal solution offers the best thermal performance available today, and at low cost.

Concentrator-based photovoltaic technologies have been around since the 1970s, and with very high concentrations have the potential to offer the lowest-cost solar electricity.

IBM is exploring four main areas of photovoltaic re-

search: using current technologies to develop cheaper and more efficient silicon solar cells, developing new solution processed thin film photovoltaic devices, concentrator photovoltaics, and future generation photovoltaic architectures based upon nanostructures such as semiconductor quantum dots and nanowires.

IBM is also looking at other areas related to energy and the environment, including energy efficient technology and services, carbon management, advanced water management, intelligent utility networks and intelligent transportation systems.

NZ Tidal Power Coming

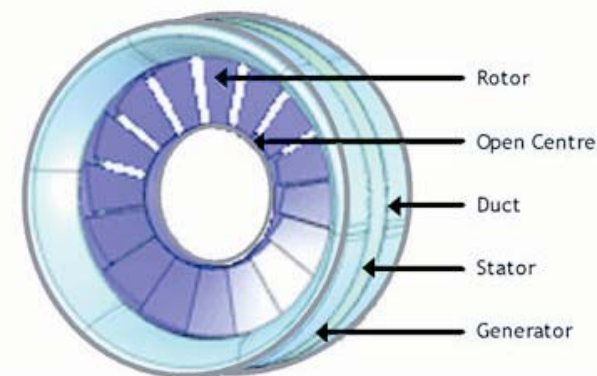
Crest Energy, a small unlisted New Zealand company aiming to establishing a commercial tidal energy farm, is now looking at its funding options for the next step of the project.

In late May the company was awarded a NZ\$1.85 million grant by the NZ Minister for Energy toward initial deployment costs of the 200 turbine farm to be located in the Kaipara Harbour, northern New Zealand.

Director Anthony Hopkins, said "Construction planning is under way, as are the first steps towards raising significant capital for the project. Potential funding routes include stock market listing, risk capital from major banks, and partnerships with electricity industry participants and infrastructure companies.

"Total expenditure over the first ten years of the project is estimated at NZ\$600 million, to be offset by modest but growing revenues from year three."

Mr Hopkins said the funding process has just commenced, and follows an oversubscribed funding round in October 2007. 33 shareholders have funded the project so far.



An open hydro turbine

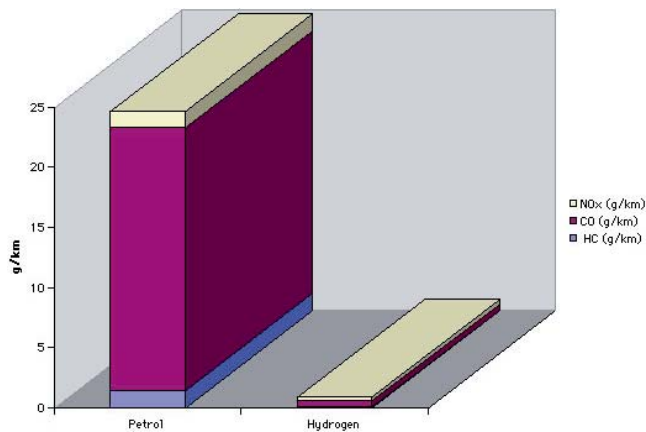
Kaipara is a large harbour with a five metre deep sand bar at the entrance that prevents use by large vessels. It is strategically located close to the Northland power supply. The tidal range is 2.68 to 1.52 metres.

Crest Energy said NZ requires new electricity generation of around 200 megawatts of installed capacity per year, and the Crest project could represent a significant component of this.

Hydrogen Won't Go All the Way

Mechanical engineer Dr Michael Brear from the University of Melbourne has developed plans for a super efficient hydrogen engine, according to an ABC News report by Anna Salleh.

The engine was presented at last month's World Hydrogen Energy Conference in Brisbane, and could be operational by the end of the year. However, a super-efficient hydrogen internal combustion engine would not be sufficient to ensure a switch from petrol, says the



Dramatic reduction in pollution levels are possible when hydrogen is used instead of petrol as fuel. ADR37 City Driving Cycle Test.

Source: University of Melbourne

report.

Dr Brear is reported as saying “We’re aiming to get a 40 per cent thermal efficiency for an internal combustion engine, which is comparable to the best diesel engines out there now.”

His team is also working on a hydrogen storage device to tackle the problem of having enough hydrogen to allow cars to travel long distances - a major technical hurdle for hydrogen vehicles. Dr Brear says the more efficient an engine, the less hydrogen it needs to use and store.

Putting the engine in an electric hybrid vehicle would provide equivalent mileage to a prohibitively expensive hydrogen fuel cell vehicle, but at a price similar to an existing hybrid vehicle, says the report.

But it adds that CSIRO’s Low Emissions Transport Leader David Lamb believes that roads full of hydrogen-powered cars are still decades off as hydrogen fuel is much more expensive than fossil fuels, and there is no infrastructure such as hydrogen service stations to support large-scale roll-out of hydrogen vehicles.

Mr Lamb believes that while hydrogen should be the ultimate future fuel, it cannot in the short term solve the problems of greenhouse emissions and oil shortages.

“Hydrogen was 40 years away 40 years ago. It’s still 40 years away,” he is quoted as saying.

Better Lithium battery

US based Superlattice Power, Inc says it has made a successful move toward the development of a new cathode material that will be incorporated into a Lithium Ion Polymer battery to significantly increase its operating voltage range and energy density.

The company says its new Lithium Ion Polymer battery consists of a new cathode material with a “Superlattice Structure” allowing electric vehicles to be driven over 200 miles compared to the current 120 to 140 mile range, and operates at a wide voltage range of 4.3 volts to 2 volts.

The pure material was produced in-house and has been synthesized at an industrial scale, it said.

Dr Surajit Sengupta, director of Battery R&D, said “Our objective is to create the next generation of Lithium Ion Polymer battery that is environmentally non-toxic, safe, less expensive and more powerful.”

Sustainability Accountants

In what it says is an Australian first, the University of Southern Queensland (USQ) has launched a program aimed at producing the next generation of accountants qualified to guide business through the process of becoming sustainable.

USQ vice chancellor, professor Bill Lovegrove said the Bachelor of Accounting and Sustainable Business (BASB) degree will focus accountants on the triple bottom line of economic, social and environmental accountability to meet the public’s expectations of corporate responsibility.”

“Corporate sustainability reporting has become a high priority. There is strong evidence of a direct relationship between sustainability, share prices and long term profitability which business managers ignore at their own peril.”

Professor Lovegrove said proving a company is sustainable had an effect on shareholder value. “Sustainability attracts responsible investors and affects the ability of business to contract with host governments.

“It can also affect a company’s ability to raise finance. For instance Westpac and the European Bank for Reconstruction and Development will only consider lending to organisations that can demonstrate their impact analysis and remediation plans and the achievement of sustainability targets.

“The BASB will give USQ students the administrative and management skills now required by organisations to compete in the global economic environment.”

The Bachelor of Accounting and Sustainable Business is accredited by the Institute of Chartered Accountants in Australia and is currently undergoing accreditation by the CPA.

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