



Dear Investor,

The past quarter has been a remarkably quiet period on world financial markets. While front page bulletins have shifted attention to environmental issues, investor apprehension towards markets remains understandably high.

And yet, for all these concerns, share markets have trended higher, with our own local index recording a twelve month gain of 39.58%. The Fund itself has performed impressively, rising 57.72% (refer portfolio statistics page 35).

For our part, the Fund's portfolio of businesses has stood up to the pressures of scrutiny. The addition of a number of high quality business franchises' to the portfolio during the tumultuous period of February through to June 2009, aided the Fund's performance.

In this quarterly edition we discuss another of our portfolio positions, delve into the economic merits of green energy, introduce an up and coming healthcare operator and briefly consider the relationship of governments and debts.

Perhaps finally, with 2010 rounding off the first decade of the new millennium, it is important to reaffirm that our investment aims are no different – to deliver our clients above index positive returns by identifying and investing in a concentrated portfolio of quality businesses.

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On this score, we are confident that the portfolio mix is positioned well to achieve these aims and that higher market valuations will follow as each investment meets its own internal business milestones.

Regards

Tony Scenna
Victor Gomes
Corey Vincent



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Performance December Quarter 2009

The Fund delivered a solid quarter; rising 11.74% and outperforming the All Ordinaries Accumulation Index which rose 3.71%.

For the current financial year to date, the Fund's outperformance is reflected by a 34.41% rise compared to the All Ordinaries Accumulation Index which rose 26.06%.

Performance table since inception

% Returns	Fund	AOAI	Outperformance
1 month	6.16	3.69	2.47
3 months	11.74	3.71	8.03
6 months	34.41	26.06	8.35
1 year	57.72	39.58	18.14
5 years compound pa	8.11	8.23	-0.12
Since inception compound pa	8.87	9.46	-0.59

Full portfolio performance statistics are detailed on page 35.

Whitehaven Coal (WHC) added to the portfolio

Table 1: Whitehaven Coal Limited Corporate History 1999-2009

Year	Event
1999	Founded by CEO Keith Ross backed by Hans Mende and Fritz Kundrun of AMCI (USA) to develop Canyon open cut coal mine in Gunnedah NSW.
2000	Canyon commissioned, Gunnedah Basin mines Tarrawonga, Werris Creek added.
2004	Exploration licence awarded for Narrabri Project at no cost, covering 112 Km ² .
2004	Newcastle Coal Infrastructure Group (NCIG) established to provide port facilities at Kooragang Island.
2005	NCIG successful tender to provide additional port facilities. Whitehaven direct interest 11.06%. Other members include BHP Billiton, Centennial, Donaldson, Peabody Energy and Felix Resources.
2007	Board strengthened with appointment of Excel Coal founders Tony Haggarty and Andy Plummer.
2007	Compliance listing, issued 1.9M new shares @ \$1.00 each, valuation \$323M.
2007	Appointment of new CEO Rob Stewart.
2007	Stage 1 Narrabri North Coal Project with 230 Mt coal tenements approved
2007	\$130M capital raising at \$2.65 per share to fund remaining 60% buyout Werris Creek and initial Narrabri North development phase expected to be \$140M.
2008	Mining lease granted in January for Narrabri North Coal Project.
2008	Sale 7.5% Narrabri Project plus off-take contract to China's Yudean group for A\$67M, valuing total project at A\$900M.
2008	Tony Haggarty becomes substantial shareholder with 5.7%.
2008	Further sale of 15% in Narrabri Project to J-Power and EDF Trading for \$A125M and US\$120M respectively, valuing total project at A\$1.7B.
2008	August pre-significant net profit of \$51.9M, underlying net profit \$12.9M.
2008	Rob Stewart resigns Tony Haggarty new CEO, Andy Plummer appointed director.
2009	Gloucester Coal and Whitehaven agree to merge February, combined \$900M value.
2009	Former founding director Excel Coal appointed executive director of operations.
2009	Gloucester's bid withdrawn after Noble Group's \$6.00 cash offer for Gloucester.
2009	Capital raising, issues 60.7M new shares @ \$3.05 per share raising net \$177M.
2009	Sale of additional 7.5% of Narrabri Project to Korean consortium for A\$125M, valuing total project at \$1.7B.
2009	August pre-significant net profit of \$244.2M, underlying net profit of \$77.3M.
2009	Contract to purchase long wall unit with 8Mtpa capacity, retro-fitted to handle Top Coal Caving.
2009	Purchase Vickery Coal in Gunnedah for \$31.5M from Coal & Allied.
2009	JORC marketable coal reserves more than doubled during 2009 to 278Mt, while coal resource increased to 762Mt.

Investment opportunity beckons

Worthy investment opportunities can present themselves from all matter of places. That we would add a coal company to the portfolio during a period of difficult global macroeconomic conditions and on the back of growing worldwide concerns with the effects of climate change makes this decision even more intriguing. However, far from being controversial, the decision to invest should be seen for what it really is - a relatively straight forward exercise in identifying an undervalued assets.



That the shares of the business were selling for a price substantially below its true worth was made largely possible by the uneasiness emanating from governments and industry alike regarding the coal industry. We share some of these concerns but as is often the way in life, rather than fearing the impacts of change, we chose to understand the role it would play and ultimately how it would affect businesses like Whitehaven. To this end, we added Whitehaven to the portfolio in July this year (entry price \$3.05) with Table 1 providing a snapshot of the group's commercial progress thus far.

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And yet while the timeline accurately outlines the group's corporate development, it falls short of truly reflecting the management vision and depth that has underpinned Whitehaven's rise. When founding CEO Keith Ross - a fifty year coal industry veteran - chose Gunnedah to build a coal business it seemed an unlikely place to start.

Gunnedah Coal Basin

The Gunnedah Basin in NSW is located some 350 kilometres northwest of the Port of Newcastle, a distance considered by most to be too far from port. But Ross had vision and a somewhat contrarian approach to addressing the growing global demand for coal and the depletion of existing coal reserves in the traditional coastal

fields. He teamed up with former partners Hans Mende and Fritz Kundrun from AMCI (USA) who provided funding – AMCI (USA) is a private coal company with operations in USA, South America and Queensland. Together the group kicked things off with the 1999 purchase of an exploration licence and development of the open-cut Canyon mine. Commissioned in 2000, the Canyon mine has allowed the company to remain profitable every year since.



Whitehaven's big break

However the group's big break came in 2004 when the company was awarded the right to carry out exploration in the nearby Narrabri region. Having spent a good part of his life surveying the region, Ross had a sense of where to peg and drill, ultimately coming up trumps with the discovery of what is now referred to as the Narrabri Project. Better still, Whitehaven picked up the exploration licence rights for nil consideration under the old NSW non-tender system. New entrants to the Gunnedah region including BHP Billiton and China's Shenhua Energy group have since parted with some \$100 million and \$300 million respectively for the privilege of exploring the Caroon and Watermark leases.

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Having staked out an extensive tenement position, management's immediate task to fund the Gunnedah projects, ultimately led to the recruitment of founding Excel Coal executives Tony Haggarty and Andy Plummer. Their involvement has been pivotal in the group's progress, culminating in the group's public listing in May 2007. Today, with more than a few years under its public belt, Whitehaven is advancing on a number of operational fronts while chalking up a growing list of accomplishments.

Mining Operations

Operationally, the group's business can be viewed in two parts. Firstly, there are the four open cut mines that have the capacity to produce at the rate of 5.5Mtpa of both Pulverised Coal Injection (PCI) coal - injected into blast furnaces as a replacement for coke in producing pig iron - and high quality thermal coals used in power generation. Reserves in place today could sustain these types of production levels for at least the next 20 years.

Narrabri Project – key asset

The second leg to the business surrounds the group's large underground Narrabri Project, located 40 kilometres outside the town of Gunnedah. The ground, acquired for no upfront cost, is currently moving through the various levels of mining approval processes. Stage 1 production is expected to commence in early 2010 while the larger Stage 2 has a 2011 start date. When completed, annual production is expected to be running at 6Mtpa, with sufficient reserves in place to sustain this rate for at least 25 years. The capital cost to make all this happen is around \$600 million or \$100 million per million tonnes of production, a far cry from the typical \$200 million per million tonnes outlaid for Queensland based coal projects.



Management steers a steady course

Sensibly, management has steered the business in a conservative manner, selling down equity stakes in the Narrabri Project to key customer groups in order to fund the capital expenditure program. To date, thirty percent of the project, in four lots of seven and half percent parcels have been sold, netting Whitehaven \$500 million and valuing the group's remaining seventy percent stake at \$1.2 billion.

The group has also been tackling its main business road block, that of infrastructure. Just because you have the resources and customers to sell too, doesn't in itself guaranteed the stuff can be delivered on time. The bottleneck that has seen ships stranded off the Newcastle coastline waiting to berth, is a product of increasing demand for coal and a lack of government foresight to provide adequate facilities. However, recent developments at the Port Waratah Coal Services (PWCS) loading facility and the privately funded Newcastle Coal Infrastructure Group (NCIG) – of which Whitehaven is one of six shareholders with a direct stake of 11.06% - will ultimately lift ship loading capacity from the current 102Mtpa to in excess of 200Mtpa by 2015.

Coal markets – what the future holds

Ultimately Whitehaven's long term success depends on customers demand for coal. This perhaps is the most contentious issue facing investors and also the most difficult to forecast. That said, CEO Haggarty has sought to address the issue in a pragmatic

manner. He contends that the world and specifically developing nations are not in sync when it comes to energy demand.

This results in demand distortion for energy fuels such as coal. To illustrate the point, he uses the 2007 International Energy Agency (IEA) figures on electricity consumption per person. In 2007 the Scandinavian countries were using above 18,000 KWh per person, in Australia the figure was 11,000 KWh, while China and India were sitting near the bottom of the list, consuming on average 2,000 KWh and less than 500 KWh per person respectively. As long as such disparity exists, developing nations would appear to be very reluctant to agree to any capped emission trading demands from developed nations.



Furthermore, coal is necessary for steel making, and base load electricity supply. Alternatives will play an increasing role, but this demand simply can't be met in the immediate future from any single alternative energy source or combination including nuclear power.

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China's growing appetite for coal

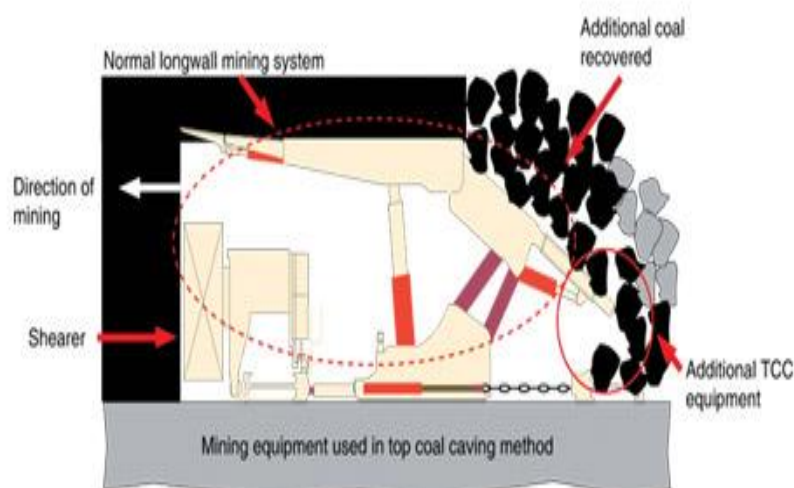
Putting aside the current climate debate, the growing list of new coal buyers clearly reflects an appetite from international groups. For its part, Australia is the largest exporter of coal, running at 250Mtpa, followed by Indonesia at 200Mtpa, the Former Soviet Union (FSU) countries with 150Mtpa and the combined countries of the US and Canada exporting 100Mtpa. Historically China has also been a net exporter of coal, however this is set to dramatically change as it looks to import a net 100Mt this year.



Certainly from Whitehaven's perspective, the general outlook for demand is decidedly positive, while internally the business remains on track to complete its transformation from start-up, to one where production is expected to ramp up from 3Mtpa in 2009 to

11.3Mtpa by 2014. Importantly, Narrabri's contribution to this number is 6Mtpa based purely on accessing the bottom half of the 9 metre thick coal seam. Should it be able to tackle the top half of the seam with the use of Top Coal Caving methods as depicted below, production levels could rise by an extra 3.5Mtpa with minimal additional costs. While we applaud management in its foresight, a decision to proceed is still some time off. More appealing though is the group's focus on blending the Narrabri seam to produce a higher valued PCI coal product with early indications suggesting this can be achieved without any real loss in yield.

Diagram 1. Top Coal Caving



Management's interest are aligned

A tight management team, who collectively account for 138 million shares or 29% of the stock gives us comfort that any future decision regarding the business will be both considered and in the best interests of shareholders. On this point, management have good form. Unlike MacArthur Coal's founding CEO Ken Talbot - who chose to offload his considerable personal stake in the company at record prices while leaving ordinary shareholders high and dry - Whitehaven executives Haggarty and Plummer successfully garnered a full bid for their previously listed Excel Coal business by selling to the US's largest coal producer, Peabody Energy for US\$1.5 billion in July 2006. While we would not discount the potential for future corporate action in Whitehaven, we suspect management will be unwilling to part with such a valuable suite of assets for anything less than full value.

Table 2. Whitehaven Coal Financial Snapshot

\$'M	2008	2009	2010(f)	2011(f)	2012(f)
Revenue	252.0	489.4	362.2	510.6	863.0
Operating Margin (%)	12.6	14.2	19.5	24.8	21.9
Underlying EBITDA	35.0	136.5	106.1	145.0	346.1
Underlying EBITA	17.0	110.2	78.8	113.9	304.8
Underlying NPAT	12.9	77.3	56.9	82.0	218.0
Net Debt / (net cash)	(25.6)	(78.4)	(85.1)	(127.5)	(313.2)
Market Capitalisation	1,771.4	1,278.3	2,491.6	2,491.6	2,491.6
Enterprise Value	1,745.8	1,199.9	2,406.5	2,364.1	2178.4
Production Profile (100% basis) Mtpa	2.7	3.3	4.2	6.1	10.1
Production Profile (equity basis) Mtpa	2.3	3.0	3.5	5.1	7.9
Earnings Yield (%)	0.9	5.8	3.3	4.8	13.8
ROCE (%)	3.8	15.0	9.3	13.4	35.7
Cover ratio	n/a	n/a	n/a	n/a	n/a
GOCF / EBITDA (%)	51.1	99.4	157.6	92.3	85.5
Underlying Earnings per share (¢)	3.3	19.0	11.9	17.2	45.8
PER	137	16.5	43.9	30.4	11.4
Share Price 30 June (\$)	4.52	3.14	5.23*	5.23*	5.23*
Issued Capital million	391.9	407.1	476.4	476.4	476.4

* Price as at 31 Dec 2009

In the meantime, management's task is to bring the Narrabri Project on line and within budget. The number of moving parts still to be overcome should not be underestimated, particularly when you consider the added risks associated with any underground mining venture. That said, the path forward for the company is clear, the necessary regulatory hurdles are mapped out and the capital required is in place and accounted for. All that is required is time and a successful execution of the business roadmap. **SFM**

Impedimed (IPD)

Table 3: Impedimed Limited Corporate History 2006-2009

Nov 2006	Pre IPO raised \$20M
Nov 2006	Starfish Ventures holding 37% CEO Panaccio previously backed ResMed (RMD), SIRTEx (SRX) in venture capitalist role
Nov 2006	Versant Ventures 8% leading US venture capitalist to medical start ups
Nov 2006	Macquarie Alternative Investment 8.5%
Mar 2007	US 5 years National Institutes of Health (NIH) trial results show secondary lymphoedema can be reversed with early detection and treatment
April 2007	First US FDA clearance for lymphoedema device (Imp XCA)
Sept 2007	IPO to raise \$18M @ \$0.72¢
Oct 2007	Acquired Xitron to expand patent based Bioimpedence Spectroscopy (BIS) device
Dec 2007	Positive reimbursement report
July 2008	Placement raised \$3M @ \$0.75¢
Oct 2008	FDA clearance for lymphoedema device L-Dex (U400) on arms of breast cancer patients
Nov 2008	NSW Breast Cancer Institute adopts L-Dex technology
Jan 2009	Placement raised \$2M @ \$0.70¢
May 2009	Underwritten placement raised \$5M @ \$0.64¢
May 2009	Shareholder entitlement offer 1:9 ratio @ \$0.64¢ raised \$7M
June 2009	NHS Great Western Hospital Swindon adopts L-Dex U400

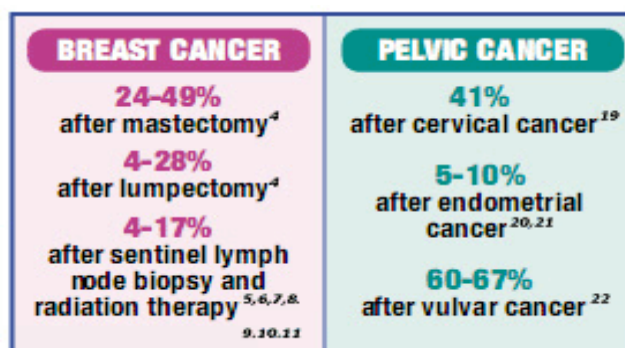
We have followed Impedimed (IPD) for a relatively short period of time. That said, we have had a couple of one on one meeting's with management and explored other information sources. Impedimed's main product treats secondary lymphoedema. This disease has a high incidence in breast cancer and pelvic cancer patients. See Diagram 2 following page.

What is secondary lymphoedema?

From background reading, and the experience of a family member of one of our investment managers, we learnt that surgery and radiotherapy form the backbone of first line breast cancer treatment. Both treatments inflict trauma on the surrounding tissues which commonly involves unavoidable and irreversible damage to the lymphatic system. Lymph is the fluid, transported around the body via a network of channels, supplying nutrients and other metabolites to tissues and organs. When these channels are damaged, there is a net accumulation of fluid in the affected tissue. This swelling is called secondary lymphoedema, a chronic and progressive condition experienced by a significant number of women who undergo treatment for breast cancer.

Secondary lymphoedema can affect one or both arms. As the disease deteriorates, the build-up of protein rich fluids in the arm leads to inflammation and fibrosis. Other than use of a compression bandage worn for months at a time there are limited treatment options available.

Diagram 2. Lymphoedema incidence



Bioelectrical impedance analysis for the early detection of lymphoedema

The breakthrough idea that underlies Impedimed indicates that pre-operative assessment enables the early diagnosis and successful treatment of secondary lymphoedema.

Until now most physicians used indirect and rather antiquated measurements of lymphoedema such as arm circumference or volume – the use of a tape measure or limb displacement in a bucket of water.

Studies undertaken at the Queensland University of Technology revealed that bioelectrical impedance analysis (BIA) could reliably detect subclinical lymphoedema. The physiological changes of lymphoedema occur well before the swelling appears and BIA provides a better measurement of limb fluid volume.

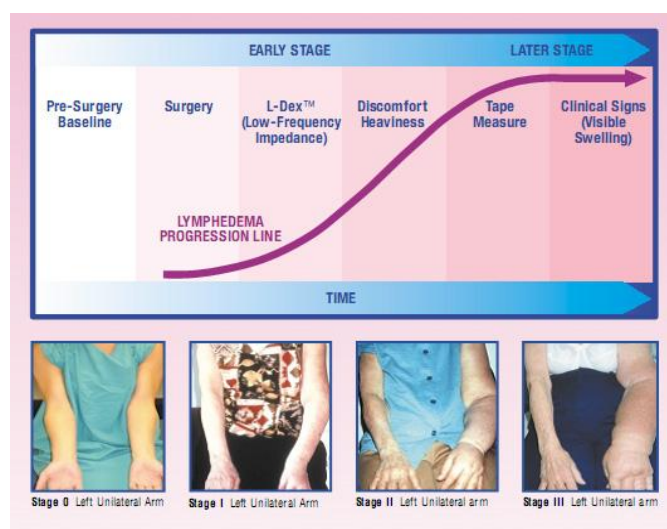
The device scans the limb over a range of frequencies and uses proprietary software algorithms to process the data into a clinically useful bioimpedence measurement.

Impedimed prospectus

A scan of the Impedimed prospectus, dated September 11 2007, reveals that Starfish Venture Capital held around 37% of Impedimed before the initial public offering (IPO) and did not sell any stock into the IPO. Today its holding stands at 30% after the issue of shares to new investors diluted its stake.

So on a recent trip to Melbourne we met up with Starfish Ventures founder Michael Panaccio. Starfish specialises in early stage investments in medical and biotech companies. Prior to establishing Starfish, Panaccio, as investment manager for JAFCO Investment Asia Pacific, was the venture capitalist behind SIRTEx Medical in the late 1990's (see SIRTEx story September 2009 quarterly newsletter) and from which our relationship developed. Interestingly, Panaccio's venture capitalist role also extended to medical device company ResMed, which currently forms one of our investment portfolio holdings.

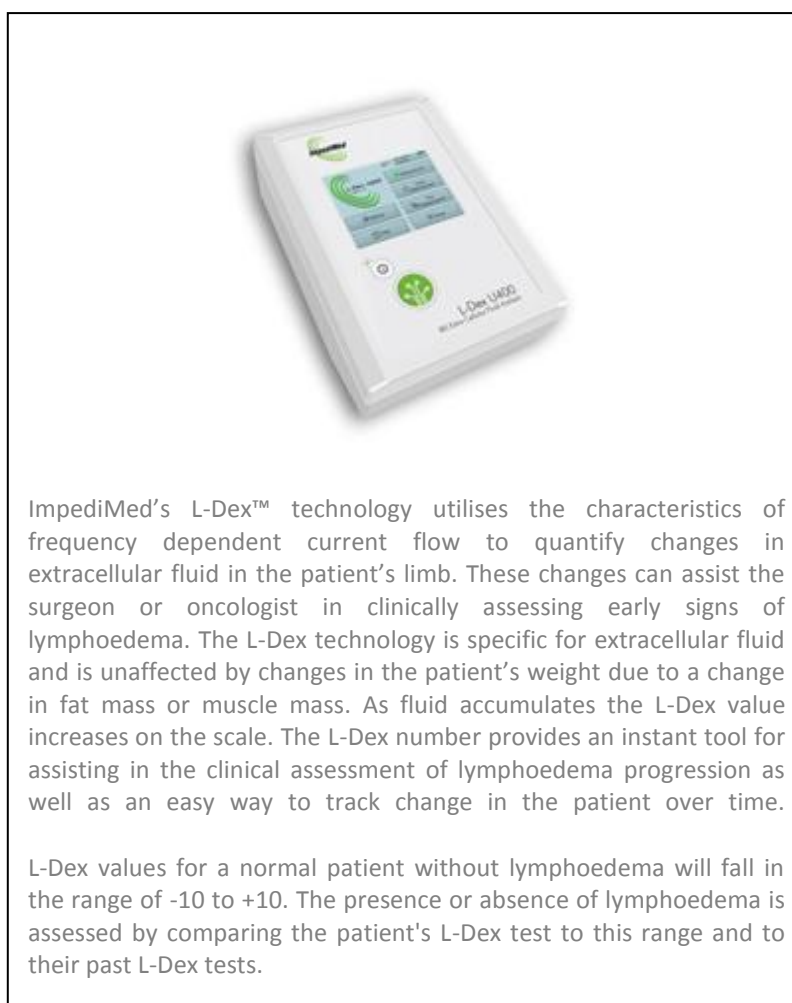
Diagram 3. Disease progression



Our Melbourne visit represented another chapter in the Impedimed book as we build on our knowledge and understanding of the company and the key challenges it faces. It quickly became evident that the main hurdle facing the group is in navigating the path to Category 1 reimbursement in the United States.

A Category 1 code formally establishes the process that doctors will be reimbursed for using the product. Adoption and usage of this monitoring device thereby offers doctors a profitable means to treat patients via regular checkups. Under the Impedimed business model, Category 1 adoption would lift consumable demand from all doctors and specialists, who would be contracted to buy from the group, resulting in an ongoing annuity income stream for Impedimed.

Diagram 4. The L-Dex U400 device & how it works



What we liked

Initially a couple of important factors attracted us to the business.

- 1) The product is an FDA (US Food & Drug Administration) cleared device designed for early detection and monitoring of secondary lymphoedema, a common side effect of lymph node biopsy dissection or removal during breast and pelvic cancer.
- 2) If left untreated secondary lymphoedema can progress to an irreversible condition – permanent severe limb swelling.
- 3) The key challenge of the business is navigation of the US reimbursement systems. The board and management team has a track record of industry success in medical devices in the target market.
- 4) Board and management hold significant equity.
- 5) The product is unique and the competitive landscape is stable.
- 6) A successful reimbursement application would deliver the group significant IP protection and access to an attractive annuity income stream.
- 7) Breast cancer is a high incidence and high profile disease attracting significant global government attention.

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How will it pan out?

The American Society of Breast Surgeons (ASBS) has invited Impedimed to establish a patient register with the goal of 200 – 300 surgeons adopting the technology and tracking the long term patient benefits. The aim is to provide further evidence that early intervention prevents the irreversible disease. An earlier five year trial study carried out by the National Institutes of Health (NIH) and announced by the company to the market in March 2007 clearly established the case for early detection.

One key positive for the group is the L-Dex U400 product is already FDA approved and is in use by leading US breast cancer surgeons. However the regulatory pathway remains uncertain and complicated. Furthermore, in a typical Catch-22 situation we are also aware that surgeon uptake is one of the most important factors in establishing reimbursement codes, however, without reimbursement in place, many surgeons are slow to move. So the ASBS register is an important step in the process.

In the first half of 2010, Impedimed will learn of the success, or otherwise, of their Category 1 reimbursement application. Should it fail with its initial application, the company is most likely to receive a Category 3 reimbursement code which will

involve a much slower road to market acceptance. Either way, the company which currently has a market capitalisation of \$86 million, will in all likelihood require more funds along the way.

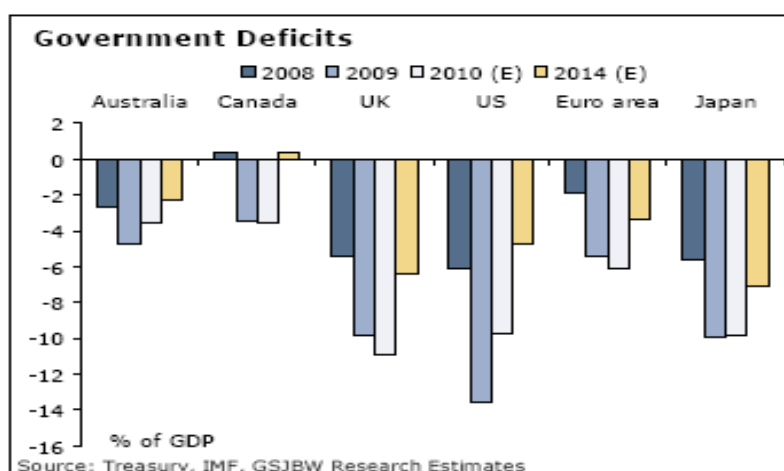
Starfish have a high level of confidence in the technology, in management and in the business model. We share these views. They also believe that the greatest risk to the company is time.

That is, time to get the reimbursement code, time to get to break even and time to become the gold standard in testing and preventing the onset of secondary lymphoedema. We think on balance it's a journey worth following. **SFM**

Governments and Debts

In our June 2009 quarterly newsletter we turned our attention to the natural healing process that companies undertake during times of financial hardship – more commonly referred to as capital raisings. Titled “Earnings Dilution”, the article focused on the need of businesses to repair stretched balance sheets, at a time of investor apprehension and weak earnings profile. That so many company executives took advantage of the market’s preparedness to forgive past excesses by launching highly dilutive raisings has now largely run its course. However for governments the situation is not as easy to remedy. Unfortunately, one of the real casualties to emerge from the events of last year, surrounds the impact that growing government debts will have on both the public at large and economies in general.

Table 4: Government Deficits

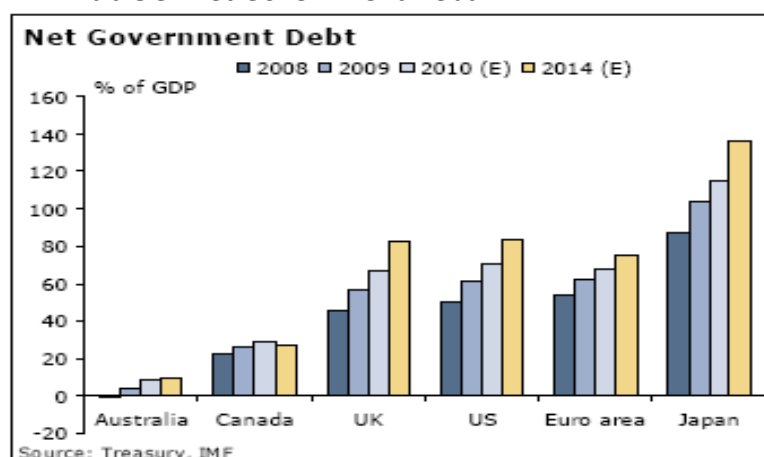


Tables 4 and 5 - provided courtesy of Goldman Sachs JBWere - bring into sharp focus the dilemma facing many of the world's major trading regions. In Table 4, whilst the overall "Government Deficits" situation is forecast to improve by 2014, the need to maintain ongoing economic stimulus will see government deficits in place for many years to come. Interestingly, the US is expected to reduce its deficit dramatically from its 2009 peak of 14% of its Gross Domestic Product (GDP) to about 5% by 2014. At the same time, Australia's deficit is expected to halve to 2%, whilst the UK and Japan find themselves maintaining uncomfortably high deficits.

Too Much Debt

The impact that running continuous deficits has on the finances of a country is clearly highlighted in Table 5. While all countries are forecast to experience rising net government debts as a percentage of GDP by 2014, the magnitude of the rise varies. From a surplus position in 2008, Australia is expected to see its net debt position settle at around 10% of GDP during this period. In contrast, the UK, the US and Euro areas will all experience large jumps in net debt to around 70-80% of GDP, while Japan has its work well and truly cut out with a figure well north of 120% of GDP.

Table 5: Net Government Debt



As net debt levels rise, any material lift in interest rates from current settings of near zero will cost governments dearly. The need to raise additional revenue streams understandably becomes a high priority to meet these rising costs as well as funding ongoing broader community needs. With such added pressure on governments, it's no wonder that investors need to remain vigilant to both the opportunity that this presents as well as the potential threat that might impact existing business profits. On one hand, governments of all persuasions will look to outsource and tempt investors with new floatation offerings – illustrated by the Queensland

Government's recent proposal to sell down its rail assets - while on the other hand looking to extract more in the form of higher taxes and royalty charges. So while companies have acted quickly to raise funds and restore mangled balance sheets, governments are still caught in the crosshairs with many hurdles still to jump. **SFM**

Small-scale renewable energy - two case studies

What would it take for more people to risk some of their hard earned cash in a household renewable energy project? A growing concern about climate change? Possibly. A better than decent return on investment? More likely.



Depending on where you live and the type of renewable energy solution chosen, a decent return on investment is now on offer, helped in no small way by generous government rebates and feed-in tariffs¹. Following are two case studies of a recent personal experience in this area by a member of the investment team.

1. Solar Photovoltaic

Spurred on by the rising price of electricity and encouraged by generous incentives, one of us recently investigated the option of putting solar panels on our house. The solar panel system would generate "green" electricity and help offset some of our existing household electricity usage.

¹ Feed-in tariffs are the price your electricity supplier pays you for the green energy you generate and feed back into the power grid – is often much higher than the price paid for grid provided power

Solar panels on our roof

Our traditional Californian Bungalow house, although pointing in the right direction (i.e. north facing roof), was less than ideal due to its modest size and the affect of earlier alterations. About ten years ago the roof space was converted into a 2nd storey attic, creating a large room for general retreat. Unfortunately the 2nd storey dormer windows have now reduced the usable north facing roof space that can be devoted to solar panels.



"Google maps" picture of our house roof

Not to be deterred, a couple of solar panel companies were duly called and quotes requested for turning the available roof space into a mini renewable power generator. The system would be connected to the local power grid. Excess energy not used by the house would be fed back into the grid for others to use.

How photovoltaic's work

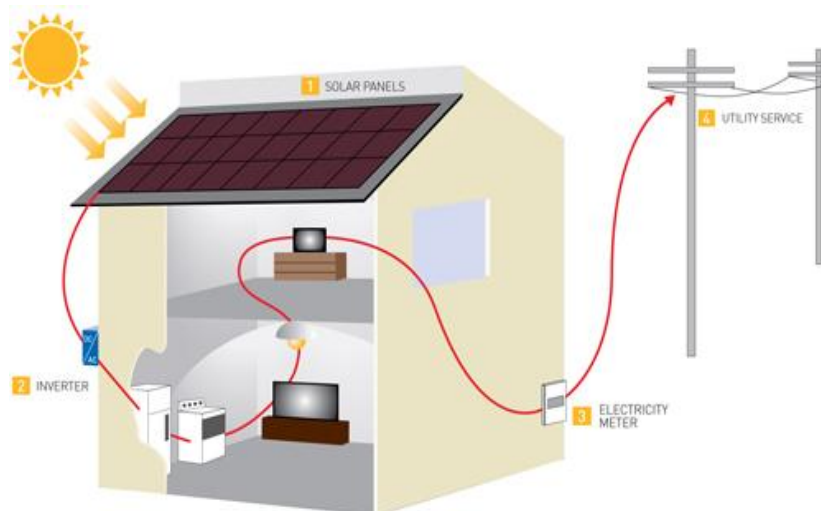


Diagram 5. Solar panels at work



Before we get to the specifics of the roof installation, let's briefly recap on what is a grid connected solar panel system and how photovoltaic (PV) solar panels work. In short, a photovoltaic solar panel consists of an array of individual solar cells made of very pure silicon (the expensive bit) arranged on a panel and sandwiched between toughened glass. Photons (sunlight) hit the panel causing the release of some electrons from the silicon. The electrons start to flow thus generating electrical energy.

PV panels have been around since the early 1940's although the PV effect was first observed during the 1800's. The panels have no moving parts and are long lasting with a typical useful life of 25-40 years (and possibly longer). The average efficiency of current solar panel technology in converting available sunlight into electrical energy is about 10-12%. This has improved from under 5% efficiency when first developed.

The energy available in sunlight at a latitude equivalent to Sydney averages at around 1000 watts (1Kw) per square metre during peak daylight hours (about 5-6 hours per day averaged over a year - a capacity factor of approximately 25%). Solar panels will generate 100-120 watts per square metre at the current 10-12% efficiency levels.

The other expensive bit of kit in a solar panel system is the inverter that converts the typically 12-48V DC power from the solar panels into 240V AC power that can be fed back into the local power grid. Lastly we need an extra meter to measure the electricity we generate so we can get paid for it.

Renewable Energy Certificates (RECs)

In Australia, Renewable Energy Certificates (RECs) are electronic certificates that reside on a publicly available Internet database. RECs are generated under the Federal Government's Mandatory Renewable Energy Target (MRET) scheme. Certificates are issued by the government for the generation of renewable energy, which large wholesale buyers of electricity (such as electricity retailers) are then obliged to purchase in order to fulfil their REC liability (see "*demand for RECs*", page 23).

RECs can be created from a range of renewable energy sources including PV solar systems, rooftop household solar hot water systems, small and large wind farms and hydro electric schemes (such as Snowy Hydro).

They are generally created when a megawatt hour of renewable energy displaces an equivalent amount of “black” energy². They are intended to approximate the cost of displacing one ton of CO² generated from fossil fuel energy sources. The Australian market for RECs trades on a wholesale basis between registered participants and in parcels sizes of 5,000 or more.



Supply of RECs

The RECs legislation awards 5 RECs for each megawatt hour of renewable energy generated annually to households installing a PV system of 1.5Kw in size or smaller (i.e. 1 standard REC + 4 bonus RECs per Mwh). This bonus is to be phased out over five years so that by 2016 only 1 REC is received per Mwh of renewable electricity. At our Sydney location a 1Kw PV system will receive 1.382 RECs per annum³. Thus a 1.5Kw system is entitled to 2.073 RECs pa (i.e. 1.382 RECs/Kw x 1.5Kw).

Since our system is not greater than 1.5Kw in size, we receive the 4 bonus RECs per Mwh for a total of 10.365 RECs per annum. For PV systems larger than 1.5Kw in size the RECs are received on a 1:1 basis for the excess above 1.5Kw.

Under the RECs legislation, solar panel system owners can forward sell 15 years of RECs in one upfront transaction (i.e. 10.365 RECs x 15 years = 155.475 RECs)

RECs market in oversupply

The level of bonus RECs being allocated to owners of small household PV systems plus the ability to forward sell 15 years of RECs upfront is adding to the recent oversupply of RECs in the marketplace. Combined with an equally generous Federal

² Electricity generated from fossil fuels such as coal, oil & gas

³ Figure determined using the Office of the Renewable Energy Regulator's zone ratings table (www.orer.gov.au)



Government rebate for solar hot water systems, has seen the market flooded with RECs in the past 12 months.

During this period, REC prices have fallen by about 40% to around \$30 today. The consequences of the price fall are both obvious, in that a lower cost offset to the installation of a PV system is available, but also less obvious in that the project life returns for large scale renewable energy projects being planned are very dependent on the REC prices they receive. The viability of many of these projects is marginal at a \$30 REC price and may lead to project deferral or complete abandonment.

Demand for RECs

The demand side of the RECs market is driven by Australia's commitment to generate 20% of its electricity from renewable sources by 2020 under the MRET scheme described earlier.

To meet this target, buyers of wholesale electricity (e.g. electricity retailers such as AGL and Origin) must purchase up to 20% of their electricity from renewable sources by 2020. They can do this by either generating or buying the renewable electricity directly themselves or alternatively buying RECs to the value of 20% of the electricity they sell. The recent failure to enact an emissions trading scheme in Australia plus the lack of any binding agreement emerging out of the Copenhagen climate conference has seen the demand outlook for RECs soften along with the price for other globally traded emission permits.

1.5Kw PV system size

So back to our house and the grid connected solar system. The general consensus from the professionals who visited was that it could manage a maximum 1.5Kw system on the roof, needing about 12 sq metres of north facing roof space (9 panels of 170w each at 1.5m x 0.9m per panel). The quotes for supplying and installing the system came in at about \$6,400 net. This roughly breaks out as follows:

Quotes for a 1.5Kw grid connected solar panel system	
Cost of panels, inverter + new meter	\$11,000
Less sale of RECs (155 RECs @ \$30 each)	(\$4,600)
Net cost of 1.5Kw solar panel system	\$6,400

The cost of the system pre any subsidies/RECs is therefore about \$7-8 per watt of generating capacity.



Chinese imports driving down PV costs

The recent entry into the PV panel manufacturing industry by the Chinese, has seen prices per watt fall by 20-40% in the past year alone (cost was \$11-12 pre price fall) with more likely in the years ahead as improved manufacturing technologies and greater scale efficiencies kick in. Technology advancements are also likely to see the current 10-12% energy efficiency conversion ratios rise strongly, possibly above the 20% levels over the next decade, further reducing the cost per watt.

The tipping point for mass consumer take-up of PV technology appears to be near. Even without subsidies such as the bonus RECs currently on offer, the payback period of a PV system is being quickly shortened by the falling cost of equipment and the rapidly rising cost of electricity.

So turning back to the PV system installed on our house, an average of about 7.2 Kwh per day of renewable electricity would be generated:

Calculation
12 sqm of PV panels
x 1Kw sqm of energy in sunlight
x 10% efficiency level of PV panels
x 6hrs day of average peak sunlight
= 7.2Kwh day
x 365 days
= 2600Kwh or 2.6Mwh pa

Average Aussie household

The average Australian household uses about 16-18Kwh of electricity per day. Our household is within average at 16 Kwh of electricity consumption per day.

The 1.5Kw solar panel system would therefore be good for a little over one third of our daily energy needs (more in summer, less in winter).

The retail electricity price in NSW is about 20c per Kwh. This makes our annual electricity bill roughly \$1200 per annum, or \$300 per quarter. The grid connected solar system would therefore offset about \$500 of electricity costs for our household

(assuming the same price is received for the solar generated electricity as is paid for grid electricity).

Attractive feed-in tariffs

But here is where things get interesting. The state of NSW has recently introduced what many regard as the most generous feed-in tariffs in the world. Most other Australian states also have generous feed-in tariffs, but less so than NSW. In NSW, residents with solar or micro wind grid connected systems receive a gross feed-in tariff of 60c/Kwh, about 3 times the rate consumers currently pay for grid power.

What this means is that instead of receiving the same price for renewable electricity fed into the grid as is paid for power drawn from the grid (20c/Kwh), to encourage the take-up of renewable energy technologies, the NSW Government has mandated that energy retailers must pay 60c per Kwh for all gross renewable electricity fed into the power grid regardless of whether there is excess electricity generated or not.

Not only is this rate the highest in Australia, but it pays for renewable electricity on a gross basis rather than on a net basis as is the case in other states⁴. Under a net basis, households will only receive the higher feed-in tariff when more electricity is generated over a billing period than used. To receive this “net” feed-in rate a household would have to install a system that generates more electricity than they consume, and then they only get the high feed-in tariff rate on the surplus electricity generated (the net) with the rest offset against usage on a one for one basis (i.e. at 20c/Kwh).

Average household with a 1.5Kw grid connected PV system		
Annual Electricity (Expense) Rebate		
Gross feed in tariff @60c		
Electricity use @ 18Kwh day	= (6,600 Kwh) x 20c	(\$1,320)
Electricity generated @ 7Kwh day	= 2,600 Kwh x 60c	\$1560
Net (cost) rebate for household elect	= (4,000 Kwh)	\$240
Net feed in tariff @ 60c		
Electricity use @ 18Kwh day	= (6,600 Kwh)	
Electricity generated @ 7Kwh day	= 2,600 Kwh	
Net elect used @ 11Kwh	= (4,000 Kwh) x 20c	(\$800)
Net (cost) rebate of electricity to household		(\$800)
Feed in tariff of 60c is not received under “net” basis as no surplus electricity is generated		

⁴ ACT also pays on a gross basis but at a lower rate of 44c/Kwh



As illustrated on page 25, the “gross” feed-in tariff basis adopted in NSW means that an average household using 18Kwh per day and installing a 1.5Kw solar panel installation effectively eliminates their electricity costs at the current 20c/Kw price of electricity. The same household under a “net” tariff scheme would be paying for a net 11Kwh per day or about \$800 pa.

Too good to be true?

Although the NSW feed-in tariff rate is the highest in Australia, the main limitation is its short duration, being guaranteed at this rate for just 7 years. All other states and Territories have offered longer programs of 15-20 years. There is also a cap on the number of systems that will receive the higher rate, being 50 megawatts of total capacity for the state, or about 33,000 homes with a 1.5Kw system.

Very attractive returns

So what are the returns from our investment in this green energy option?

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Return calculations	
Net system cost:	\$6,400 installed
Energy generated:	2,600Kwh p.a.
Feed-in rate:	60c/Kwh
Returns:	\$1,560 pa

This equates to a return on investment of 24% per annum guaranteed for 7 years. At this rate the system is paid off in 4.5 years. This means that after 4.5 years, the owner gets a free ride with the opportunity to sell another 2.5 years of solar electricity at the very generous rate of 60c/Kwh gross.

After the initial 7 year program there are possibly another 15-20 years of electricity to be generated by the system. To be sure, the NSW feed-in tariff beyond 7 years is unknown but is unlikely to be less than the prevailing retail price of electricity (which as we know is expected to rise rapidly). Essentially one locks in the electricity price for near enough to a lifetime for more than a third of existing electricity consumption. With some modest efficiency measures one may even be able to reduce household electricity usage further such that the free element is even more than a third of usage.

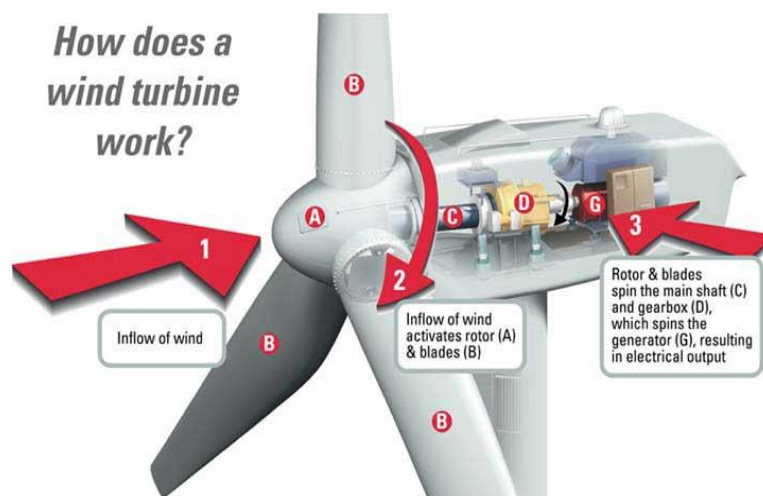
2. Small Scale Wind

Although the price of renewable solar has fallen dramatically over the past couple of years, the same economic and technological forces have also been at work with wind power, such that the capital cost is still below that of PV at \$6-7 per Kw of generating capacity (pre-subsidies) for small scale systems.



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In addition, in a strong wind resource area, wind has the potential to generate more energy over a year than is available from solar. Most wind farms are struck on a capacity factor of 30-40%, meaning the wind is only blowing 30-40% of the time, allowing electricity to be generated. As explained earlier, the same capacity factor for solar is lower at about 25-30%.



Windy Jamberoo

Having bought some rural land in Jamberoo a few years back (a relatively windy area on the south coast of NSW), we also looked at the economics of a wind turbine installation based on the generous 60c/Kwh gross feed-in tariff on this land.

Unlike suburban Sydney, we were under no size constraints on this rural land. Our aim was to put in the biggest system we could afford and one that would still qualify us for the gross feed-in tariffs. The NSW Government has limited individual installation system sizes to 10Kw under their scheme. We therefore looked at what would be the cost and returns from a 10Kw wind turbine system installed on a windy ridge of our rural south coast land.

4.9 Kw wind turbine on an 8m pole



Local supplier

Coincidentally, we found a supplier of this size of system only a few kilometres away at nearby Gerringong. They had recently installed a demonstration unit on a farm nearby that was attracting a reasonable amount of media interest.

There is no development approval required to install these systems on land zoned as rural. This eliminates any red tape in the process. When installed in built-up suburban locations, wind turbines require development approval. They are more problematic as a suburban renewable energy source because of their visual and noise impact on surrounding residents.

The local supplier had recently started up his business of selling a range of fully installed grid connected wind turbine systems (5Kw, 10Kw and 30KW systems) to farmers and other rural energy users.

9.8Kw turbine – Princes Hwy Gerringong



Phones are running hot

The recent change in the NSW feed-in tariffs has been a boon to his business. Before the change in the NSW tariff structure, provisional orders were on hand for about 10 turbines located across rural NSW with only a handful of systems installed to date. In the weeks following the new feed-in tariffs announcement in early November, the phone has not stopped ringing.

The Chinese again

The turbine offered was a Chinese manufactured 9.8Kw generating unit mounted on a locally made 12m galvanised tilt tower and connected to the grid via two German-made 5Kw Windyboy inverters. Total cost was \$70,000 for the system. As with solar, system sizes larger than 1.5Kw only receive the bonus 4 RECs on the first 1.5Kw of capacity. The excess system capacity above 1.5Kw receives only 1 REC per Mwh of annual generating capacity. Further, unlike solar, the RECs can only be sold upfront for 5 year periods. As a consequence the REC's offset on the installation cost is only about \$6,000 (first 5 yrs of RECs).

There were a number of other possible installation cost offsets available including GST rebate for small businesses (\$6,300), the RECs produced in the following two five year periods and accessible in year 6 (\$3,600) and year 11 (\$3,600), and the 50%



small business investment allowance that was offered until 31 December 2009 (value depends on owner's tax rate but at 30% is worth about \$10,000).

Attractive returnsagain

Unlike solar, wind turbines have a number of moving parts that need maintenance and replacement. The turbine has a 5 year maintenance interval costing about \$300 per service. The blades may need to be replaced after 10-20 years at a cost of about \$3,000 per set. The generator unit has an estimated life of 15-25 years and a replacement cost of \$5,000.

So for a 25 year service life comparison to the Solar PV system (and ignoring the small business investment allowance and minor servicing costs) we have the following net present value capital costs.

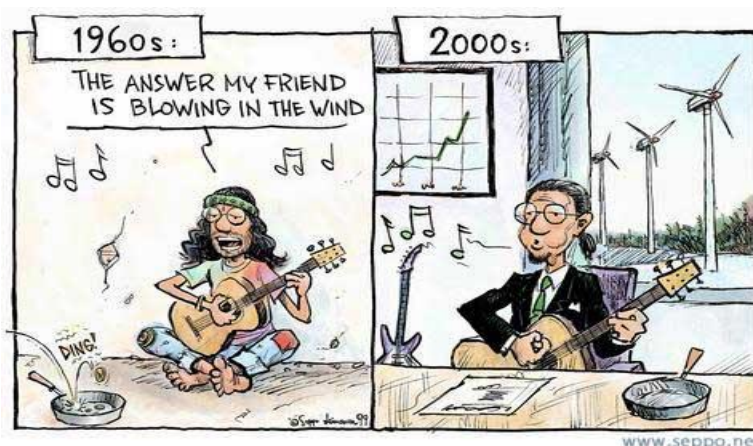
Capital cost of 9.8Kw wind turbine system	
Initial system installation	\$70,000
Less REC's for years 1 – 5 (@\$30)	(\$5,800)
Less GST rebated	(\$6,300)
Less REC's for years 6 – 10 (NPV@10%)	(\$2,000)
Less REC's for years 11 – 15 (NPV@10%)	(\$1,300)
Plus blade replacement year 15 (10% NPV)	\$800
Plus new generator year 20 (10% NPV)	\$800
TOTAL capital cost wind turbine system	\$56,200

The windy spot where the turbine is to be located has an average annual wind speed of about 6 metres per second (21.6km/h).

In this wind resource, the system supplier estimates the turbine should generate about 30,000Kwh per annum of renewable electricity which equates to revenue of about \$18,000 pa using the 60c/Kwh feed-in tariff. There are expected to be minimal running costs other than the 5 year servicing. The return on investment for this wind turbine is therefore estimated to be about 32%.

The risks are that the wind doesn't blow as much as expected, that the unit performs below its specification or that the feed-in tariff beyond 7 years is very low. Nonetheless, the guaranteed feed-in tariff over 7 years and the calculated payback of a little over 3 years do provide some buffer for underperformance. In any case a return north of 20% even allowing for some performance slippage is not too shabby at all.

Even if one was to be very conservative and assume a wind speed of say 4.5m/s (the historical average wind speed across NSW) and a 20c/Kwh feed-in electricity price, the turbine would generate 18,600 Kwh per annum @ 20c = \$3,720 pa. This represents a 6.6% return on investment with utility-like risk.



This modest level of return on investment will only rise with any increase in the electricity price over the prospective 25 year life of the turbine. One would have to say this is a high probability outcome as reflected in recent regulator pricing reviews, even if one assumes no cost for carbon emissions.

3. Concluding Thoughts

Not wanting to burden readers further given the liberty we have already taken in exploring this topic there are nonetheless a number of other issues not covered which are worthy of a passing mention;

1. **Debt funding:** The strong level of ungeared project returns combined with government guaranteed tariffs would easily lend themselves to some level of project debt funding. Debt has the potential to significantly enhance equity returns within manageable risk parameters.
2. **Federal Government green loans:** These are four year interest free loans available for such projects, which further improve returns.
3. **Mass take-up economics :** Household solar or wind technologies appear to be nearing the point of mass take-up given the near utility type returns (6-8% pa) available even before non-REC subsidies and high feed-in tariffs are factored in.



4. ***Retail price of electricity.*** If there is one certainty in the current investment climate, it is that electricity prices are going up in the years ahead. You need to look no further than some recent regulatory pricing decisions for evidence of this. The key factor here is the years of underinvestment in electricity generation and distribution by industry and governments alike that now must be caught up. The future costs of climate change and emissions trading, if any, will be a further burden on the electricity price beyond this.

There are now clear examples of where being green no longer requires one to suspend their desire for a reasonable return on investment. To the contrary, these investments can in some cases deliver very handsome returns indeed. **SFM**

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Company visit diary December Quarter 2009

October

SXE	Southern Cross Electrical management conference call	01/10/09
QRX	Qrxpharma management meeting	12/10/09
ACL	Alchemia conference presentation	13/10/09
CXD	CathRx conference presentation	13/10/09
NAN	Nanosonics conference presentation	13/10/09
MSB	Mesoblast conference presentation	13/10/09
CXS	Chemgenex Pharmaceuticals conference presentation	13/10/09
HXL	Hexima conference presentation	13/10/09
BTA	Biota Holdings conference presentation	13/10/09
HIN	Heartware International conference presentation	13/10/09
SPL	Starpharma Holdings conference presentation	13/10/09
UBI	Universal Biosensors conference presentation	13/10/09
ACR	Acrux conference presentation	13/10/09
CST	Cellestis conference presentation	13/10/09
PXS	Pharmaxis conference presentation	13/10/09
WHC	Whitehaven Coal management visit	14/10/09
CSL	CSL annual general meeting	14/10/09
PXS	Pharmaxis September quarter conference call	15/10/09
COH	Cochlear annual general meeting	20/10/09
SEN	Senetas Corporation management meeting	20/10/09
PXS	Pharmaxis annual general meeting	21/10/09
IPD	Impedimed management conference call	22/10/09
ACG	Atcor Medical Holdings management meeting	22/10/09
WES	Wesfarmers investor briefing day	23/10/09
CRX	CathRx site visit	23/10/09
IPD	Impedimed management meeting	26/10/09
KMD	Kathmandu Holdings management meeting	26/10/09
SRX	SIRTeX annual general meeting	27/10/09
WOR	WorleyParsons annual general meeting	27/10/09
TLS	Telstra investor briefing day	28/10/09
WOR	WorleyParsons investor briefing day	28/10/09
MQG	Macquarie Group half year results briefing	30/10/09

November

QBE	QBE Insurance Group investor briefing	02/11/09
WBC	Westpac Banking Corporation full year results briefing	04/11/09
IPD	Starfish Venture Capital	05/11/09



RMD	ResMed Q1 conference call	06/11/09
COH	Cochlear management meeting	11/11/09
BBG	Billabong International management conference call	12/11/09
WHC	Whitehaven annual general meeting	17/11/09
HXL	Hexima management meeting	17/11/09
FLT	Flight Centre management meeting	18/11/09
CXD	CathRx annual general meeting	18/11/09
BOG	Bank of Queensland banking conference	19/11/09
N/A	MECU banking conference	19/11/09
BEN	Bendigo & Adelaide Bank banking conference	19/11/09
MIK	Mikoh Corporation management meeting	20/11/09
PXS	Pharmaxis conference meeting	24/11/09
FAN	Fantastic Holdings management meeting	25/11/09

December

CEN	Centennial Coal conference meeting	02/12/09
FLX	Felix Resources conference meeting	02/12/09
KZL	Kagara management conference call	08/12/09
CSL	CSL R&D investor briefing day	10/12/09