Infratil
Update
December
2015

Electricity in New Zealand is 82% renewable, 100% reliable, amongst the lowest cost in the world, and generated and retailed by an efficient and competitive industry. In the future the industry can build on those attributes and provide good investor returns.

Financial markets are a riddle wrapped in mystery inside an enigma. Is there a hedge?

Electricity for Investors

Electricity is New Zealand's largest industrial activity. The market value of the whole industry is approximately $40 billion and last year total industry earnings (before interest, tax and depreciation) were about $3.8 billion.

The five main generator/retailers and the largest distribution company are on the NZX and together they make up almost 25% of the equity market value of the top 100 New Zealand listed companies. (There are also another 28 distribution companies, the State-owned grid company, Transpower, and a number of smaller generators and retailers.)

Perhaps reflecting its scale and importance, there is almost no sector of the economy which produces more information or has as much written about it. Unfortunately the volume of information can obscure the key drivers of earnings and value, and media coverage often highlights asset sales, poor investment decisions, threats from new technology that delivers energy from the sun or efficient batteries or smart meters, and so on. However, in New Zealand the following factors are likely to be the keys to generator/retailer returns over the next decade:

- **Wholesale electricity prices over the short to medium term:** There is a deep and observable market that allows generators and electricity retailers to fix the price of the electricity they are generating/retailing for a period of up to three years. The prices in this market reflect the intrinsic uncertainty of hydro/wind generation on the one hand and the high cost of alternative generation on the other. Over the last few years these prices have been relatively stable at about 8c/kwh. **The short to medium term prices available to generators are stable.**
- **Wholesale electricity prices over the long term:** Over the longer term the open-market structure of the New Zealand electricity sector means that electricity prices should reflect the economics of the most efficient new-build power station. In New Zealand this is likely to be fuelled by gas, wind or geothermal. Photovoltaics (converting the sun's rays into electricity) will not play an important part. The longer term prospect for electricity prices is in the range of 9-10c/kwh in real terms which is a small rise on current levels (changes to the CPI needs to be added on). **Longer term the prices received by generators can be expected to rise modestly in real terms.**
- **Electricity retailing margins:** Electricity retailing in New Zealand is highly competitive, there are no restrictions on start-ups, cost saving technology is being introduced as are smart meters that allow consumers to choose to use cheaper "off peak" electricity. However, the key factor for investors is that electricity retailing requires substantial capital and to be viable a retailer has to make a return on that capital. While some retailers will struggle to cope with industry change and competition, the industry is not about to vanish and **successful energy retailers will provide a satisfactory return on capital.**

While the economic, technology and demand circumstances of the market should allow generation-retailing companies to provide solid and growing earnings over the medium and long term, the performance of individual companies will of course depend on the quality of their management, their ability to execute profitable growth niches, and their exposure to particular risks such as transmission pricing.

Context

New Zealand's electricity consumption has not risen over the last decade and neither have real wholesale electricity prices. Looking forward, the 20 year forecast of the Ministry of Business, Innovation, and Employment is for demand growth of at least 0.5% per annum (even if the Tiwai Smelter closes) and wholesale electricity price increases of slightly over 1% per annum in real terms (inflation will raise prices further).

This may feel like an underwhelming picture for investors, but a decade ago it was widely believed that electricity demand and prices would rise strongly and this was reflected in high share market values for generators which resulted in low subsequent returns as the assumptions were subsequently revised down. The Ministry forecasts for demand and price may not be thrilling, but if they prove to be correct they will underpin satisfactory investor returns, all other things being equal.

The Value of Generation Over the Longer Term

Last year over 80% of New Zealand's electricity generation came from hydro, wind and geothermal power stations. Without a need to take into account the price of fuel (oil, coal or gas) and emissions, valuing renewable generation largely depends on expectations about the future price of electricity.

Forecasting electricity prices over the longer term involves a "Cost Curve" for new generation. This approach asks a simple question "what electricity price is required to justify investors funding the construction of new generation?". NB "new generation" can range from $5,000 of rooftop photovoltaics to a $500 million wind farm.

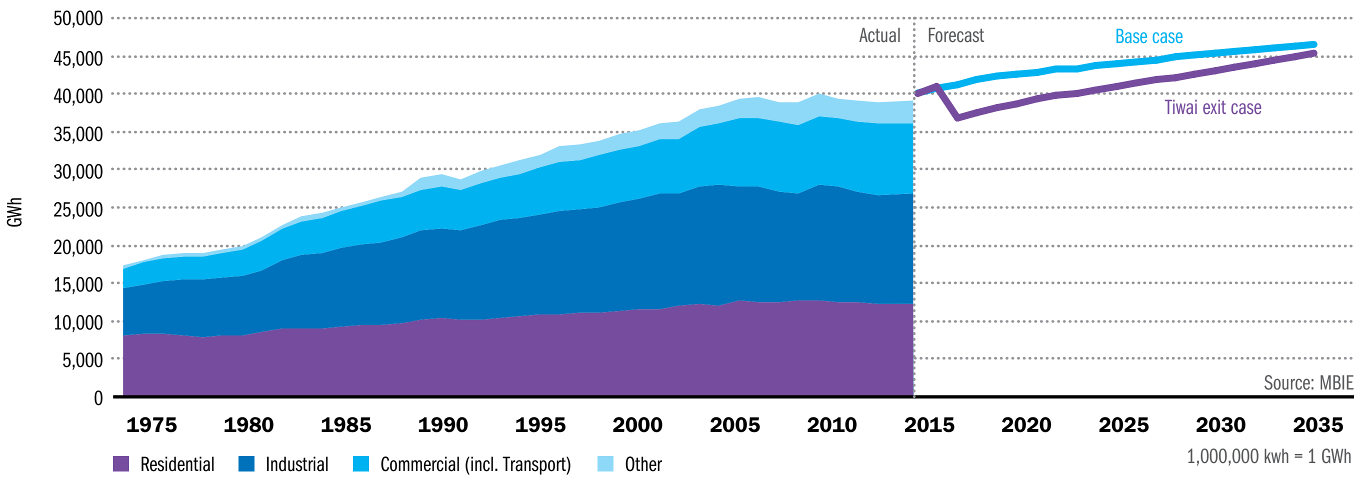
Even with little demand growth new power stations will have to be built. New Zealand will almost certainly need additional flexible gas fired thermal capacity to meet winter peak demand and as back up in dry years. And wind and geothermal power stations have limited lives and need to be replaced over time.

To illustrate how the economics of new generation sets the long term electricity price. If the most efficient new generation happens to require 20 cents/kwh for its output to attract capital for its construction, then at some point the market price of electricity would be forecast to rise to 20 cents/kwh (if prices did not get to that point, no generation would be built and the lights would go out). On the other hand if new generation was viable at 5 cents/kwh then market prices would eventually arrive at that point.

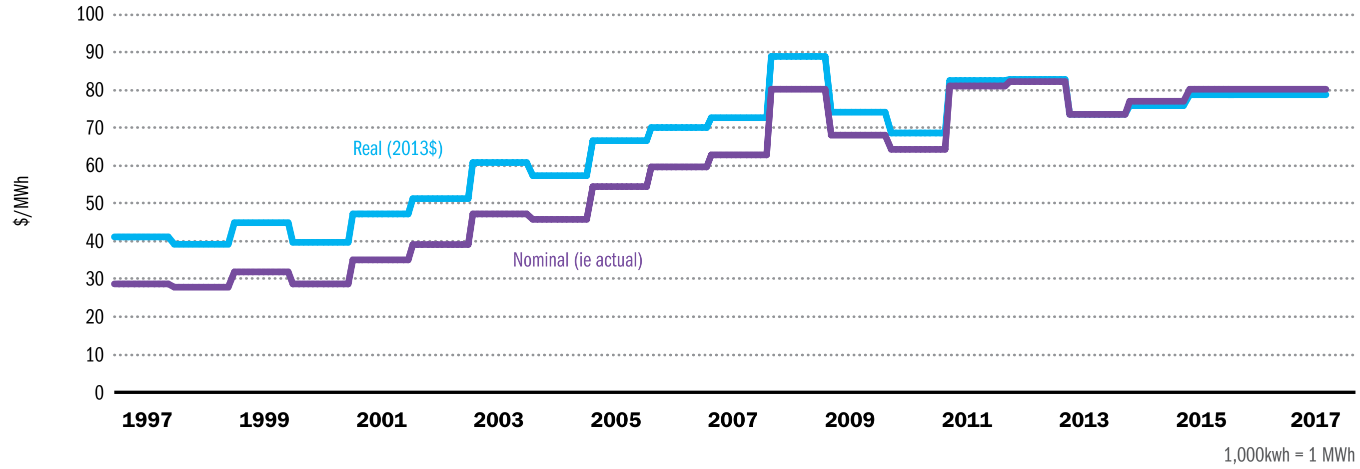
In New Zealand relatively few barriers stop anyone from building a power station and plugging it into the grid. Some homes with rooftop photovoltaic panels sell their tiny excess into the system while the Waitaki River System of eight power stations generates almost enough for 1,000,000 homes. With this very open market, there is plenty of competition to build the next power station and a high probability that what gets built next will provide the cheapest electricity.

This is a reliable model for producing the cheapest electricity over the long term. It has worked in New Zealand to provide both sufficient generation capacity and prices that have reflected the economics of new generation capacity.

New Zealand Electricity Consumption: 1975 to 2035



New Zealand Wholesale Electricity Annual Hedge Prices 1997–2017



Forecasting Wholesale Electricity Prices

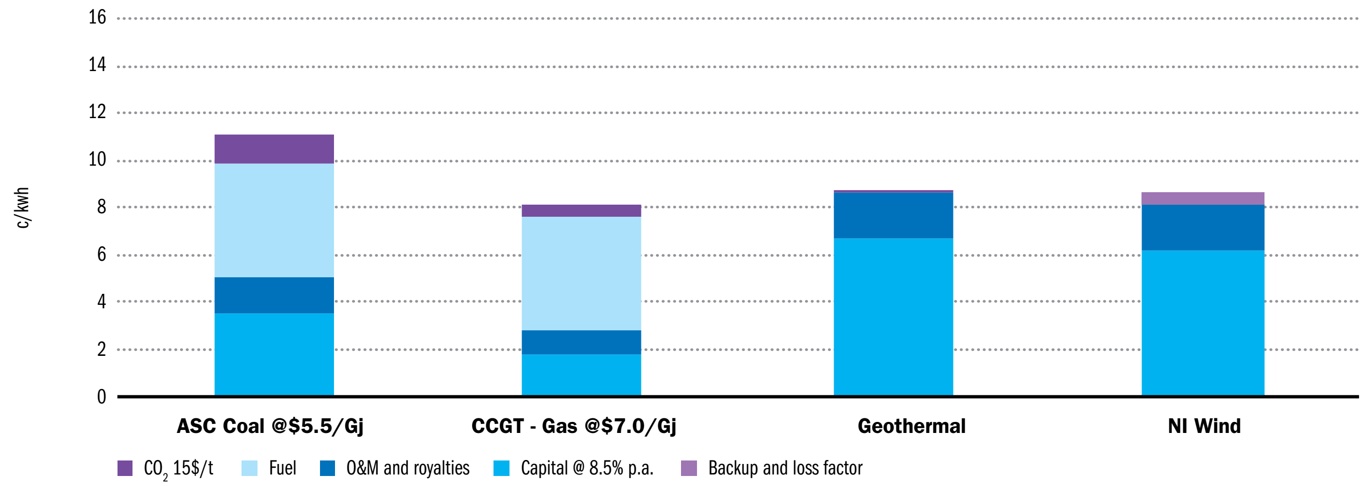
Forecasting long term electricity prices involves forecasting when new stations have to be built and the electricity price they will require when selling their output.

The graph below shows estimated breakeven electricity prices for a number of different power station fuel types (coal, gas, geothermal and wind). If the figures are accurate power stations fuelled by gas, wind or geothermal could all be built in New Zealand and provide a satisfactory return on the capital invested if the electricity they generate sells for about 9c/kwh.

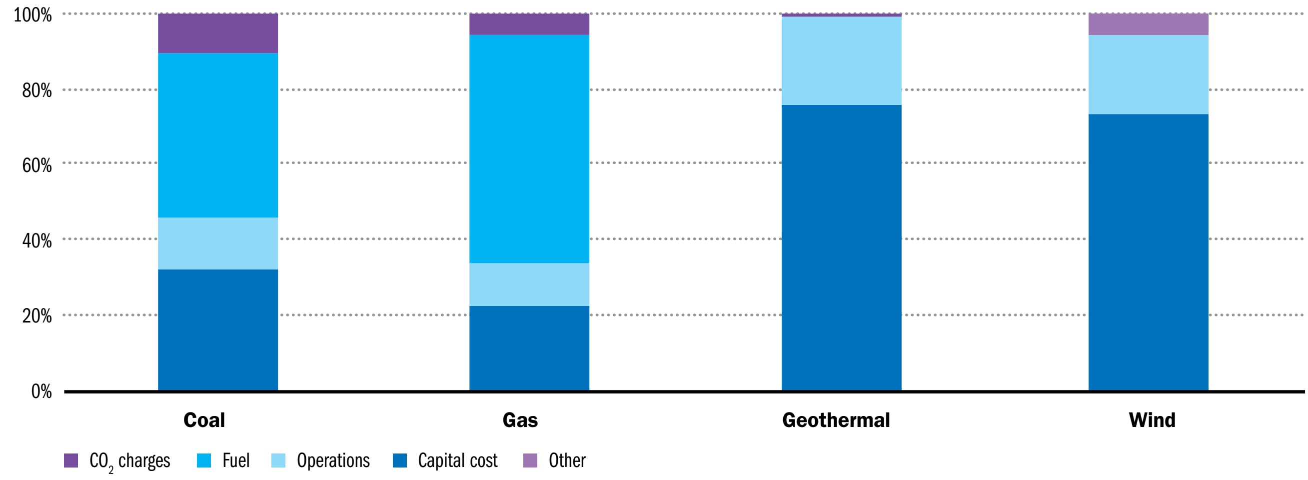
Costs will of course change over time and some changes will impact one form of generation and not another. Fluctuations in the cost of wind turbines, the price of gas, CO_2 charges, etc will have quite different consequences for different types of generation.

The effects of some possible changes are more subtle. For instance the construction cost of a gas-fired power station is a relatively small percentage of its total whole-of-life cost while it is by far the majority of the total cost for wind or geothermal power stations. If investors come to require lower rates of return it would improve the required breakeven electricity price from all forms of generation, but the impact would be larger for wind and geothermal because more of their total cost is the front-end investment. The effect will be similar if the value of the NZ$ rises and the cost of imported equipment falls.

New Generation Breakeven c/kwh

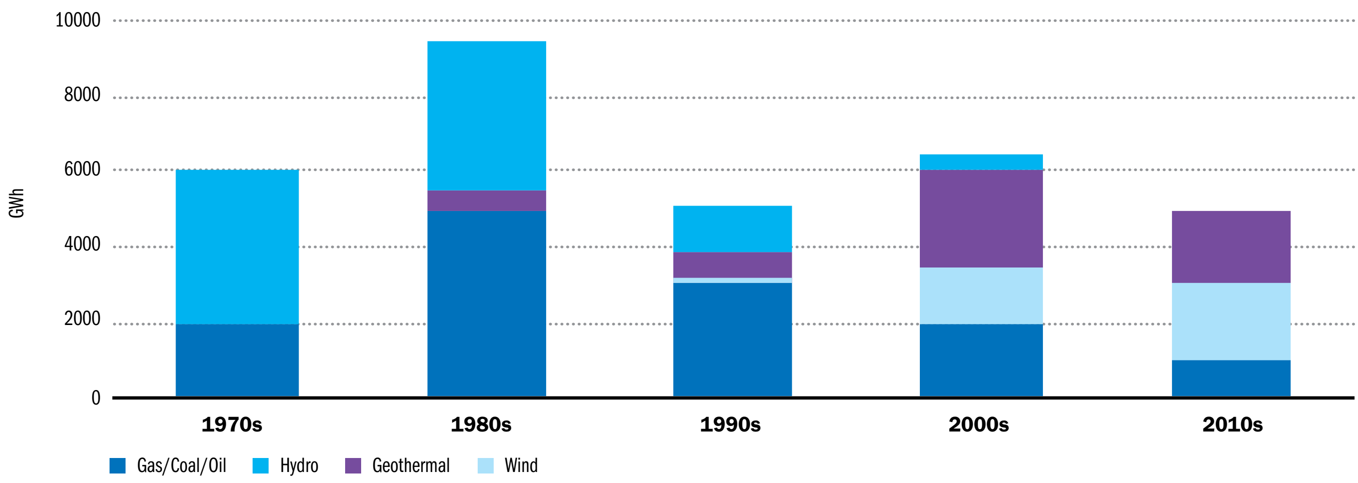


Components of New Generation Costs



The consequences of changing plant economics can be seen in the following graph which shows the sources of new generation over the last five decades. Changing plant economics has resulted in big changes in the types of new generation plant built over this fifty year period. Recognising that in the 1970s and 1980s the industry was government owned and factors other than plant economics influenced decisions.

New Power Station Generation by Decade

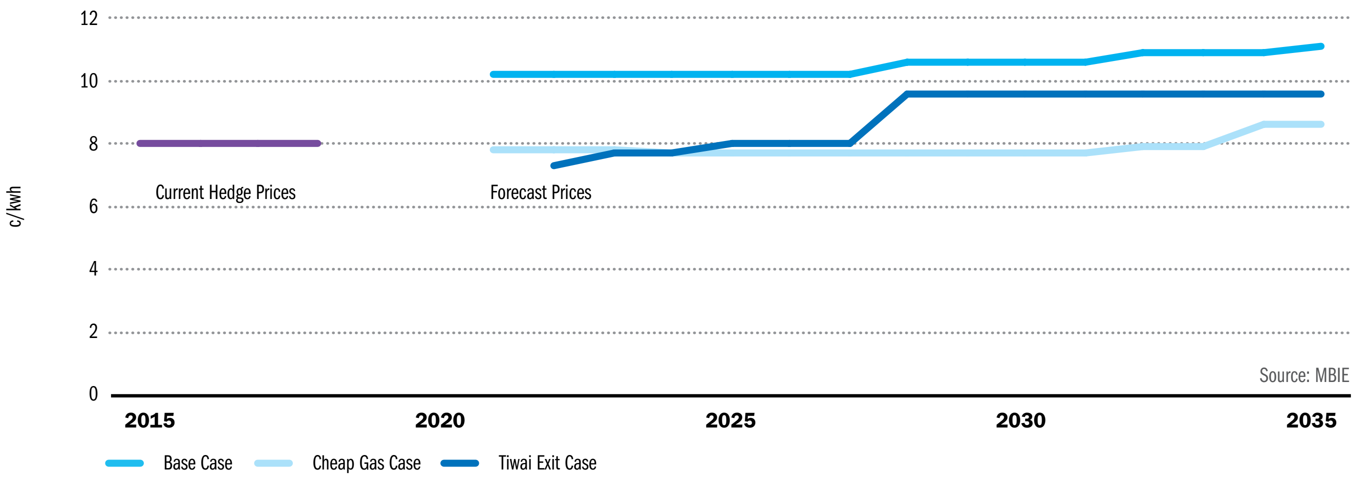


What Does This Mean (for investors)?

Wholesale electricity prices in New Zealand are now about 8c/kwh, and this price can be fixed by a generator for the next three years through the forward contract market.

But for investors, what then? Over the longer term when new power stations have to be built to meet demand, if their economics haven't changed appreciably from current levels, wholesale price of approximately 9c/kwh can be anticipated. This is a real price and if the CPI were to rise 20% over the next decade (that was the increase over the last ten years) then that would lift the future nominal price to about 11c/kwh.

Wholesale Electricity Price Forecast (Real) 2020-2035



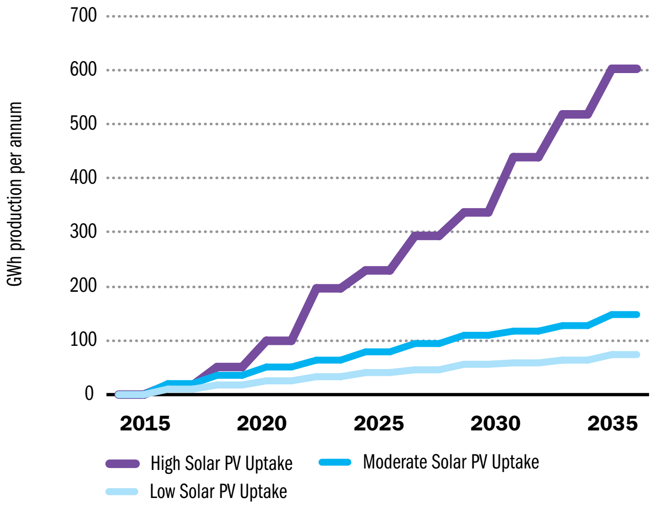
Could Wholesale Electricity Prices Rise More?

Given that the earth's core isn't likely to cool and winds are unlikely to stop blowing the main factors driving future price increases in New Zealand would be higher construction costs (resulting from more onerous consenting processes or a fall in the value of the NZ$) or investors setting higher return requirements. Over the very long term "fuel" costs are expected to rise as generation has to take advantage of less advantageous wind sites and geothermal resources.

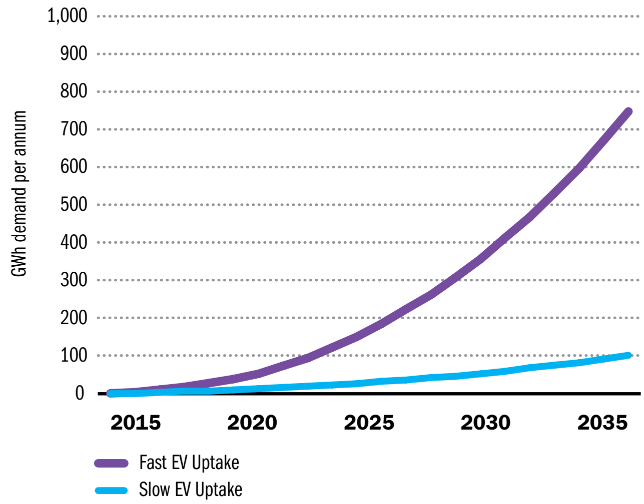
The Ministry of Business, Innovation, and Employment publishes estimates of future wholesale electricity prices (copied above) based on a range of scenarios. For 2025 they forecast electricity prices as low as 8c/kwh (in 2011 dollars) if there is abundant cheap gas ($5.50Gj) and low CO_2 prices ($5 tonne), but most of their scenarios result in prices of about 10c/kwh.

The Ministry uses (and provides information) on a wide range of assumptions, about equipment and construction costs, fuel and carbon prices, population and demand, etc. A couple of their assumptions are copied below and clearly show the enormous ranges that are possible with some variables. In 20 years there may be 50,000 electric cars in New Zealand or 500,000. There is a similarly wide range to the number of householders forecast to have their own photovoltaics by 2035. But in any case the impact on wholesale electricity prices of either technology is expected to be modest because their consumption (cars) and production (photovoltaics) will never be a major part of the total.

Photovoltaics Generation Installation



Electric Vehicle Uptake



Could Prices Rise Less Or Fall?

Exactly the same factors which could cause prices to rise, can be flipped to explain how they could fall, and there are at least two additional ways prices could sustainably decline below current levels: New technology or Government intervention.

New Technology = (at least for now) Rooftop Photovoltaics

Because of media coverage at the top of the list of concerns for power company shareholders is probably rooftop photovoltaics (converting the sun's rays into electricity). In fact this form of generation is unlikely to have a material impact on electricity prices in New Zealand.

The gap between "scariness" and "actual impact" is illustrated by two Ministry statistics which show that in December 2014 New Zealand had 18.8 MW of photovoltaic capacity installed and estimated annual generation of 16 GWh (MBIE Energy Outlook).

Both 18.8 MW of capacity and 16 GWh of output are substantial quantities. However, had the 18.8 MW of capacity been geothermal it would have been expected to produce about 130 GWh. Had it been wind turbine capacity it would have been expected to produce about 70 GWh.

Expressed another way, 18.8 MW of roof-top photovoltaics is likely to have cost approximately $150 million to install. 16 GWh of generation at a price of 8c/kwh is worth about $1.3 million (giving a 1% return on the $150 million investment). If the relevant households also avoid paying line and retailing charges they may shave a total of $4.5 million from their power bills (3% return on the $150 million investment). Photovoltaics at the household level are expensive relative to centralised generation and before this source of energy could have an appreciable impact on wholesale electricity prices a lot would have to change.

The economic equation (cost Vs. saving) is set out in the following table which uses a mixture of international data (cost and generation) and local data (electricity price). It illustrates the economics for a household that installs a 2,000 watt system to generate a part of its electricity requirements and an industrial consumer that installs 400,000 watts (ie. 400 kilowatts) of capacity to meet some of its needs.

	Home	Industrial	Comment
Size (capacity)	2,000 watts	400kw	1,000w = 1kw
Output	2,200kwh	447,000kwh	12.5% efficiency[1]
Capital Cost	$9,500	$1,200,000	Note the economies of scale
Annual maintenance	$100	$10,000	
Grid power price	8c/kwh	7c/kwh	Wholesale electricity price
Electricity billed price	28c/kwh	18c/kwh	Energy, line and retailing costs
Net annual saving all costs	$516	$70,460	Saving 28c/kwh and 18c/kwh
Net annual saving excl. line	$296	$34,700	Saving 18c/kwh and 10c/kwh

1. 12.5% efficiency means 12.5% of what could have been generated had the sun shone brightly on the units for 24 hours, 365 days a year.

- The household system is assumed to save a net $516 a year (2,200kwh x 28c/kwh less the $100 annual maintenance cost) by avoiding all line, energy and retailing charges. If the household's line costs remain fixed the saving drops to $296 a year.
- Put differently, the household payback period on a $9,500 investment is over 18 years, even if all the costs of grid power are avoided. If line charges are not avoided the payback period is longer.
- On the same basis, the industrial installation has a payback period of over 17 years.

New Zealand's Ministry of Business, Innovation and Employment (MBIE) has published slightly different household figures (its are for 1,000 watts but here are doubled to make it easier to compare against the figures given above).

	Home	
Size (capacity)	2,000 watts	
Output	2,452kwh	14% efficiency
Capital cost	$8,288	
Annual Maintenance	$82	
25y cost amortisation @ 8% per annum	$776	See below for an explanation
Breakeven price	35c/kwh	See below for an explanation

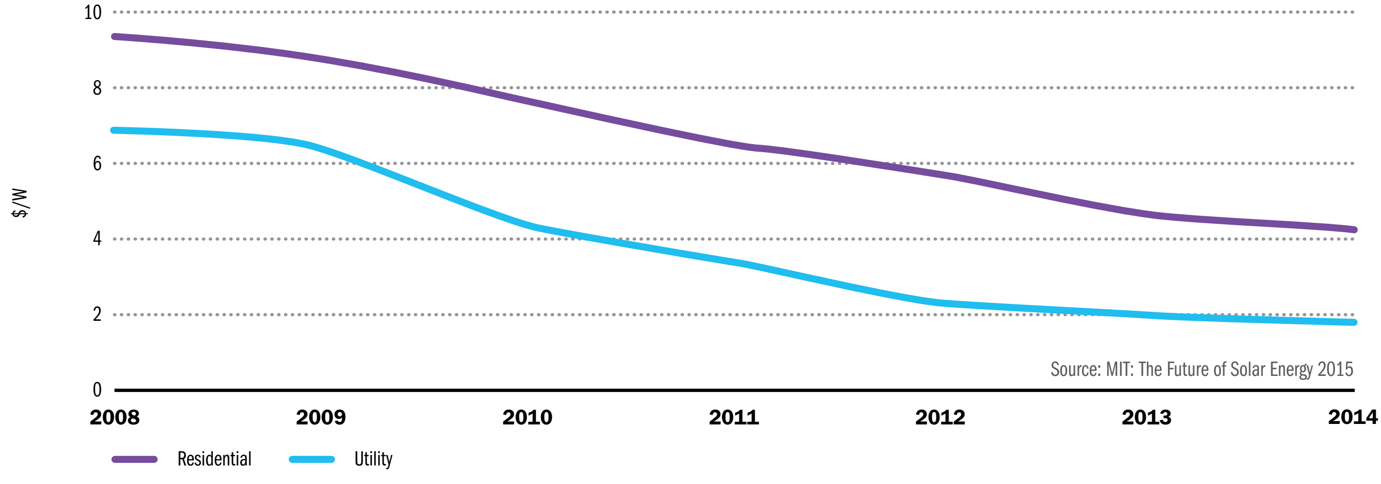
- The estimate of 14% efficiency is location dependent and around New Zealand cloud cover means that few locations will provide this level of output (although some may also do better).
- Costs are estimated based on a 3,000 watt system, but for reasons noted below this is unlikely to be efficient for most homes unless the home has batteries (which add cost) or can find uses for electricity generated in the middle of summer days.
- The Ministry's capital cost calculation involves someone borrowing $8,288 at a rate of 8% per annum and repaying the loan in equal instalments over 25 years. Each annual instalment will be $776 which together with $82 of maintenance costs gives annual outgoings of $858. As the units are assumed to generate 2,452kwh a year that gives a breakeven price of 35 cents per kwh. (Using the higher capital cost and lower generation figures in the first table, the same breakeven calculation gives a price of 45 cents per kwh.)

Could this change so that photovoltaics became cheap relative to geothermal or wind and could reduce wholesale electricity prices?

Rooftop photovoltaics will certainly become cheaper, but a major part of the cost reduction over recent years has come from the falling price of rooftop panels. However these now make up only about 15% of a system's total cost and future cost reductions will have to come from installation labour, wiring, inverters and so on.

That reducing costs is becoming more difficult is illustrated in the following graph from a 2015 report from the Massachusetts Institute of Technology. It shows that US costs are falling, but at a slowing rate. They have to fall much further to really impact the breakeven economics described above.

Average US Prices (in US$) for Residential and Utility Scale Photovoltaic Systems

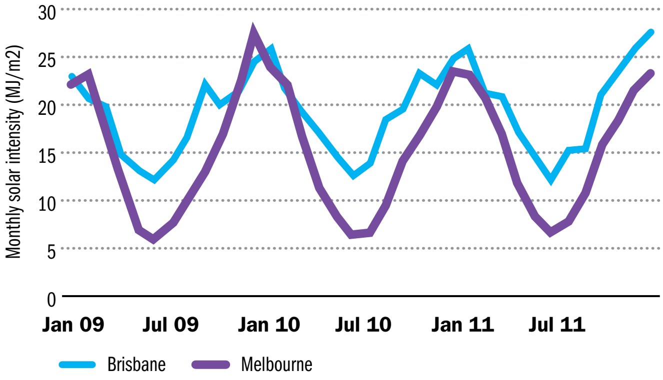


- There are alternative rooftop generation technologies such as "thin film" as opposed to silicon panels. However this technology uses toxic chemicals, rare and expensive minerals, and lags silicon panel efficiency.
- Rooftop systems may become more efficient, but the Land of the Long White Cloud presents intractable challenges as even thin cloud cover materially impedes generation. The efficiency of photovoltaics in Blenheim and Dunedin are very different.
- Perhaps the biggest problem with photovoltaics in New Zealand is the time of year and time of day they generate. The following graphs taken from a 2012 report published by the Australian Energy Market Operator shows that photovoltaics generation peaks in the middle of the day in the middle of summer and is much lower at other times of the day and in winter.

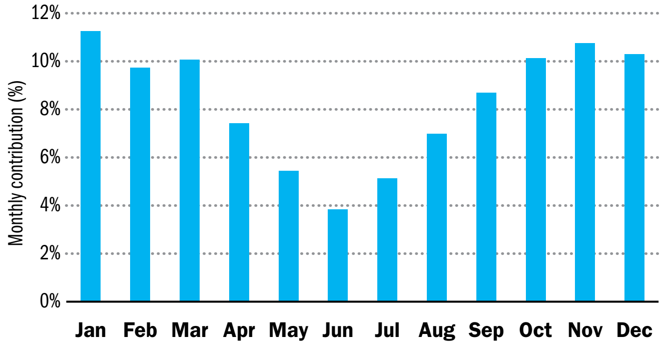
  This pattern of generation may suit Australia thanks to their heavy use of air conditioning on hot days. In New Zealand consumption peaks are in the morning and evening and in winter rather than summer.
- The "wrong time of the day" issue means that a home with more than about 1,000 watts of photovoltaics capacity is going to need appliances such as dishwashers and clothes washers to be timed to come on in the middle of sunny days. In an empty house consumption will be substantially less than 1,000 watts except when the refrigerator is running.
- Another problem for rooftop photovoltaics is whether the generation should allow the household to avoid line charges as well as those for energy and retailing. A typical household bill will comprise approximately 10c/kwh of distribution/line charges, 8c/kwh for energy and 10c/kwh for metering, information and billing, hedging, etc.

  Some of these costs are variable and will fall if a household's consumption of externally supplied electricity drops, but some will not. The cost to a distribution company of connecting a home to the grid are fixed once the line is in place and recognising this, line companies and the sector regulator is now looking to introduce "cost reflective" charges so that homes with photovoltaics will have to pay the full cost of being connected to the grid.

Solar Intensity Melbourne and Brisbane

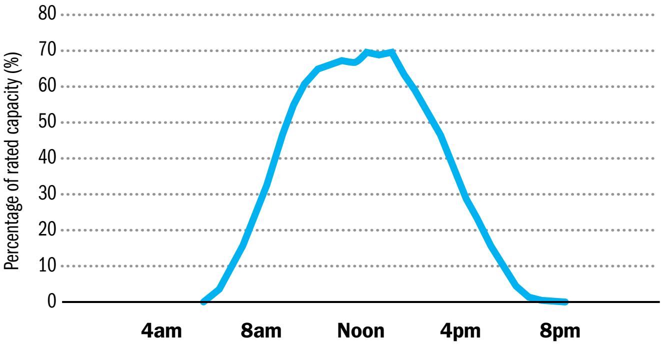


Monthly PV Generation Melbourne

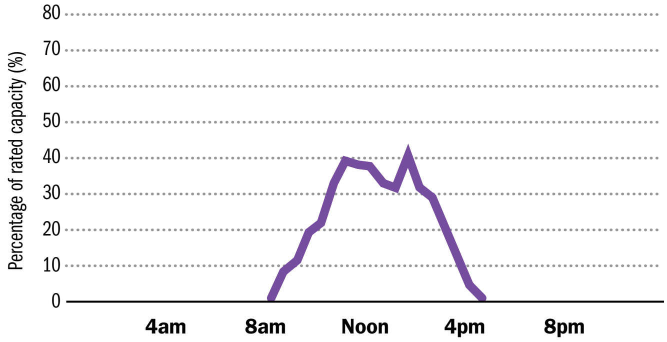


Source: AEMO Rooftop PV Paper 2012

Summer Day Generation Profile (NSW, ACT)



Winter Day Generation Profile (TAS)



The "fixed cost" issue does not just pertain to distribution companies, retailers also have a level of fixed cost connecting customers to the energy market and they collect the revenue for the distribution company and the generators. The issue is more complex than just having distribution companies switch from charging, say, 10 cents/kwh (ie. entirely variable) to $2.20 a day (which for an average household will have little impact on the total cost but would mean a fixed charge rather than one related to consumption). Technology in the form of smart meters (which allow households to buy electricity at cheaper times of the day) will also play a role.

Of course a household can entirely disconnect from the grid and rely purely on self-generation, but that adds additional costs for energy storage (batteries) or petrol generation back up which will push the breakeven value to well above the 35c/kwh level calculated by MBIE.

How far does the cost or efficiency of rooftop photovoltaics have to shift for it to be competitive with grid energy (inclusive of retailing charges) of say 15c/kwh? The table below shows how this could come about.

Is this plausible? Certainly, but a lot has to go right for rooftop photovoltaics to become cost competitive with grid power for most households. A more likely route to their becoming economic is subsidies. These could be straight government payments, or structure as a tax on other electricity users.

Given that in New Zealand photovoltaics would have almost no effect on the burning of coal or gas in power stations and would tend to tax everyone and benefit those able to afford photovoltaics, the imposition of such subsidies is problematic.

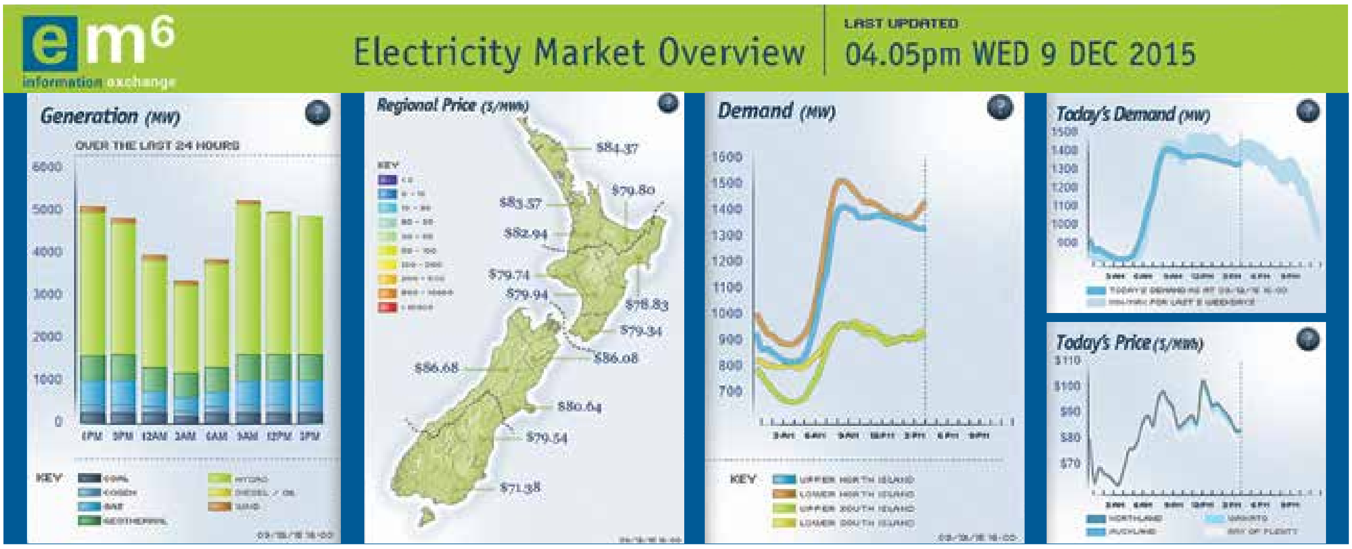
	Today	Eventually?	Comment
Size (capacity)	2,000 watts	2,000 watts	
Output	2,452kWh	2,800kWh	From 14% to 16% efficiency
Capital cost	$8,288	$4,845	42% lower capital cost
Annual maintenance	$82	$41	50% drop in maintenance cost
25y cost amortisation	$776 per annum	$379 per annum	Dropping the yield from 8% per annum to 6% per annum
Breakeven price	35c/kwh	15c/kwh	

The Value of Generation Over the Short Term

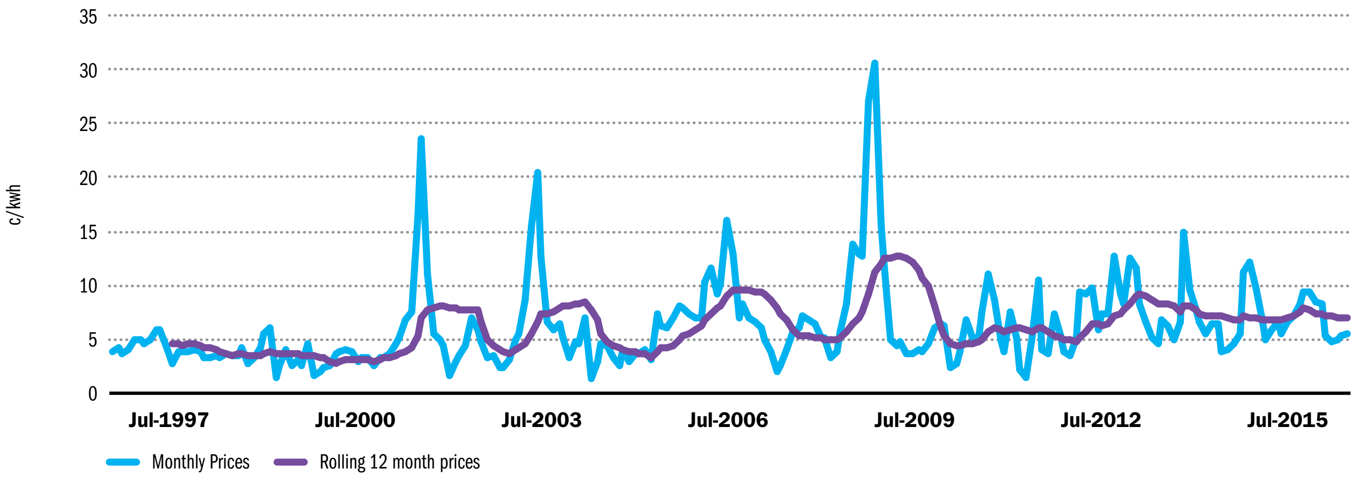
There is an excellent website em6live.co.nz (copied below) which gives moment by moment information about the New Zealand wholesale energy market. It gives that day's consumption and prices. It shows how much of the electricity is coming from each of coal, gas, co-gen, geothermal, wind and hydro power stations.

This close up picture of New Zealand's electricity supply and demand provides an insight into its key features:

- Consumption follows people rising, going to work and returning home. On a daily basis prices follow consumption. (Not shown in these snapshots is the seasonality of demand. Consumption is substantially higher in winter than in summer.)
- Generation is heavily reliant on the availability of water.



NZ Wholesale Electricity Prices: Monthly and Annual 1997-2015



The daily and seasonal pattern of demand on the one hand and the reliance on hydro on the other are defining features of the New Zealand electricity market. While the daily variability in wholesale prices can be seen from the prices shown on the em6live.co.nz website, the monthly pattern is clear from the above graph.

Cold, still, dry winters (strong household demand, limited hydro and wind generation) have dramatic consequences for spot electricity prices. And those weather conditions are hard to forecast which is shown by the price fluctuations over the years between March and July. Over that start of winter period, in 13 of the 19 years shown in the graph, wholesale prices rose or fell by more than 2c/kwh. Twice prices rose by over 18c/kwh and three times they fell by over 9c/kwh.

Because of this volatility generators and retailers hedge the price at which they sell/buy electricity, which is why it is the hedge price that matters for consumers and investors.

Hedge prices will move up if the weather forecast for the next winter is cold/dry and down if it's expected to be wet and warm. How far they move up or down will depend on the level of generation headroom or surplus capacity. Right now the level of headroom is hard to forecast; a number of large electricity consumers have indicated they will or may close. On the other side of the ledger 1,040MW of thermal generation (Otahuhu and Southdown power stations in Auckland and Huntly in the Waikato) are scheduled to be decommissioned over the next three years. Old thermal plants are expensive to maintain and they lose money if they are idle and no one is paying for them to be available.

The market is demonstrating that it will send the right signals to generators to both exit and enter the market. Investors can reasonably assume that for the most part the system headroom will be efficient and prices over the short and medium term will also be efficient.

Retailing

Last year Infratil sold its Australian energy retailing business, Lumo, for a price that represented a per customer value of about $1,100. At the time of its sale Lumo was earning (before interest and tax) about $100 per customer per year.

Assuming that Australian energy retailing is a guide to what is happening in New Zealand, the retailing part of New Zealand's generator-retailers would make up about 10% of the total corporate value and contribute a similar percentage of earnings.

For an average household paying 27c/kwh for electricity, about 18c/kwh pays for energy and distribution, about 3.5c/kwh pays GST leaving 5.5c/kwh to cover the retailing costs; metering, billing, information systems, call centres, bad debts, working capital, etc. Roughly (for a good retailer) 4c/kwh covers costs and 1.5c/kwh provides a return on capital (for an average household 1.5c/kwh = $100 per annum which matches the Lumo number).

Most forecasts of energy retailing assume that net per customer earnings will gradually fall over time; because of competition, technology and greater efficiency. But unlike generation earnings, the forecasts are largely guess-work.

However, what can be identified is that there are constraints on per customer earnings falling too far and too fast. Electricity retailing requires substantial capital per customer to pay for systems, for working capital and to cover risks.

Investors are not going to be attracted to providing capital to retailers (to fund their costs) unless there is the prospect of a compensating return. Illustrating the challenge for start-ups, it took Infratil 14 years to build Lumo up to 5% of the retail market in the four Australian states where it operated.

Mangahao Hydro Power Station Commissioned 1924

Financial Markets Risk and Hedging

Since 2007 Infratil has four times been shortlisted and twice won the INFINZ Best Treasury award. On this measurement Infratil has one of New Zealand's most capable treasury operations. The judging panels looked for management that is good at looking after risks, minimising liability costs and being innovative.

Innovation is a good criteria given the change and volatility of the financial and commodity markets over the last decade. While many factors have contributed to this, one which now stands out is how central banks have driven interest rates to their lowest levels since reliable records become available (early 14th Century Netherlands). But what next?

Central banks in Asia, North America and Europe have injected billions into financial markets, what happens when they stop injecting and start withdrawing? There are many theories.

The following graph shows both how volatile the US share market has been over the last two decades and a concerning fact about current share prices. This is contained in the line that shows the adjusted Price/Earnings ratio as calculated by Professor Robert Shiller. The ratio uses current market share prices and a ten year average of the relevant companies' earnings to remove the effect of short-term earnings fluctuations. At present this ratio is well above its long-run average and a return to average would require either the S&P500 companies sustainably increasing earnings or by their share prices falling.

A beguiling way to deal with uncertainty is hedging. Invest for the long term and buy insurance (ie. a hedge) against short term risks. This was the approach Infratil took in 2007 when $25 million was spent buying insurance against a financial markets collapse (actually a contract that would deliver a profit if the US share market index fell markedly). As the global financial markets crisis evolved the insurance provided a gain to Infratil of $48.4 million (from a mixture of the fall in the US share market and the fall in the value of the NZ$).

A 194% return on a $25 million investment can be counted a success and it was certainly innovative, but the experience is unlikely to be repeated. Hedging has limitations.

The Big Impediment (to effective hedging of macro risks)

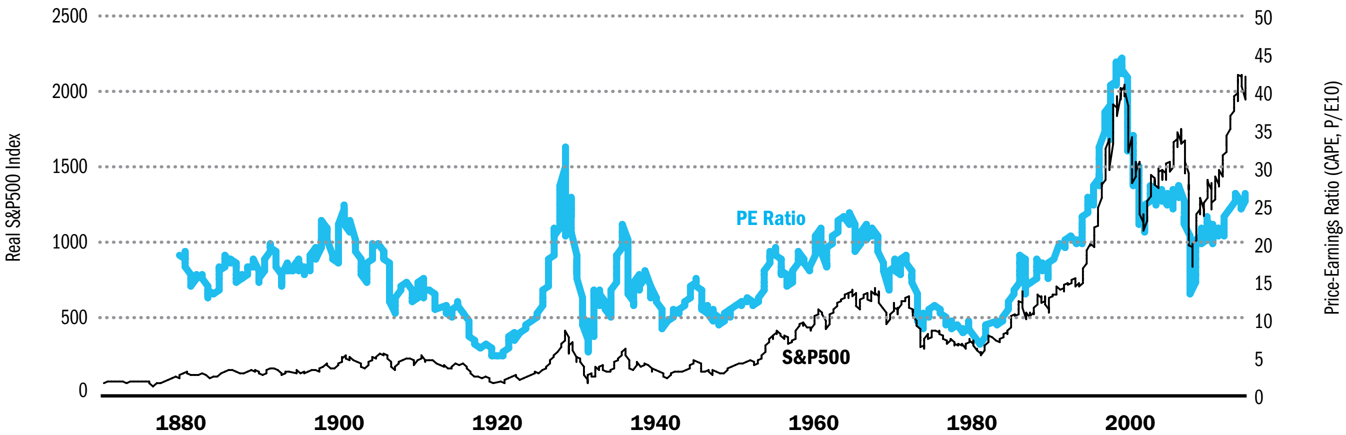
Brad Pitt has a part in the forthcoming film The Big Short, based on a book of the same name. The book is a highly readable blow by blow description of a US fund which achieved a return of 726% (gains of US$825 million) hedging the 2007 fall in the US housing market. The Greatest Trade Ever is another book about another fund manager, John Poulson, who reaped a gain of US$15 billion in 2007 from similar hedges.

Both stories begged the question of Infratil, why didn't it do better in 2007? Why didn't it make $480 million rather than "only" $48 million? Both The Big Short and The Greatest Trade are investigations of how the two investment teams went about the task of hedging against the possible US housing market collapse. Deciding that the US housing market was a bubble in 2006 wasn't that difficult, putting in place efficient and effective hedges was.

- The price of hedges or insurance is determined by what insurers believe is the likelihood of the insured event occurring and their exploration of the resulting cost. In 2006 "insurers" did not believe the US housing market would collapse hence insurance was cheap.
- If risks and costs are well understood the price of insurance will be fair as opposed to cheap. Hence the price of insurance against the collapse of the US housing market went from very cheap in 2006 to very expensive in 2007/8 as the probability of the event rose and the potential costs better understood.

Needless to say, Infratil's management are disappointed to not be portrayed by Brad Pitt in the forthcoming film. But the choice of an action star illustrates the point, while Infratil did well with its hedges, hedging market or systemic failures is a long way from business as usual, other approaches have to be used to address risks.

Real S&P500 and the Adjusted Price/Earnings Ratio



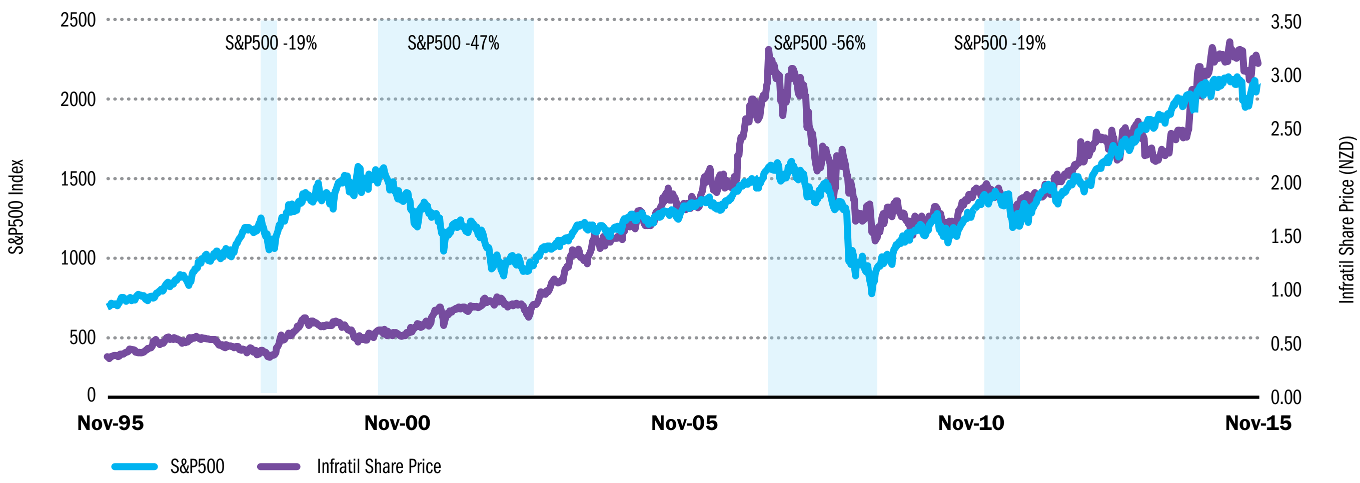
Next Time

Anyone who reads The Economist magazine, the Financial Times newspaper, the Wall Street Journal or any of innumerable investment manager newsletters would be aware that there is a strong case that the values of many assets have been inflated by the availability of cheap money. And that there are many opinions about what will happen to those asset values as money becomes less cheap (ie. as interest rates rise).

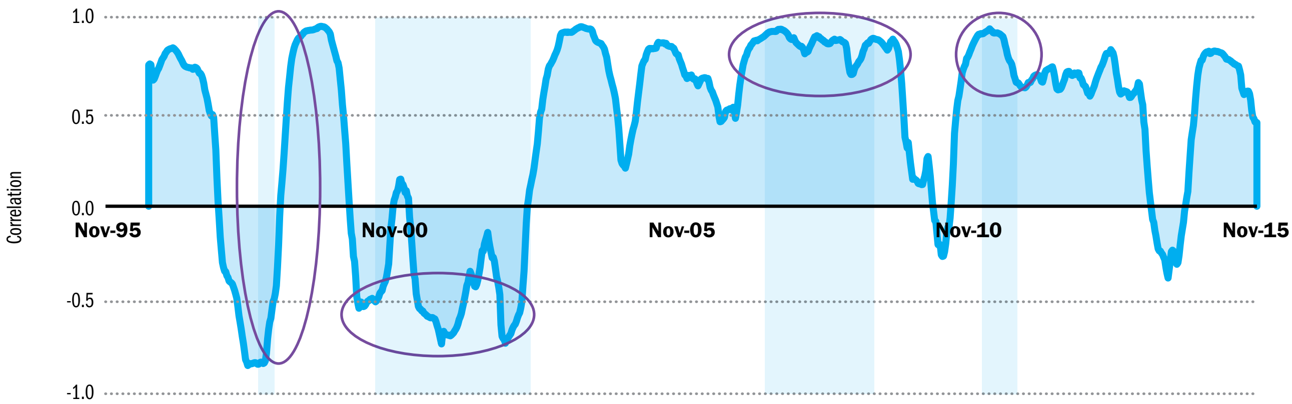
As Infratil's experiences in 2007 showed, being concerned about a risk and finding an effective hedge that is affordable is no easy thing. To help with the task this time, Infratil asked its bankers "we are concerned about the possibility of a major fall in international financial markets dragging down the value of Infratil. Is there a hedge you could suggest?"

1. The bank treasury team could not merely put a price on a hedge against a fall in the value of the New Zealand market. There is insufficient liquidity and few natural sellers. They had to find an instrument outside of the New Zealand share market with a value that is reliably linked with the value of Infratil shares.
2. They analysed the 20 year relationship between the Infratil share price and a number of indices and prices: the US share market, New Zealand long term interest rates, the NZ$, US interest rates, and some commodity prices. Did any rise and fall in value coincidentally with Infratil's share price?

Infratil Share Price Versus S&P500



Infratil Share Price Correction with the S&P500



3. A second question the bank sought to answer was whether any of these related indices/prices could provide a cheap "insurance premium". Ie. if they found a hedge which moved in unison with the Infratil share price, was it also affordable?

Regrettably, it doesn't seem that Infratil will be providing a sequel to The Big Short or a role for Brad Pitt. Our bank didn't find a suitable hedge. To illustrate, one of their findings is summarised below.

Infratil And The S&P500

The bank team calculated that over the last 20 years 69% of the Infratil share price daily movements could be "explained" by movements in the S&P500. Roughly, when S&P500 rises Infratil's shares rise 69% of the time and when S&P500 falls Infratil falls 69% of the time.

However, the overall returns were not related. The S&P500 return "explained" only 22% of Infratil's return. Ie while the Infratil share price usually goes up and down at the same time as the US share market, the longer term return provided by Infratil shares is not related to the long term return of the US share market.

As the lower graph on the left shows, even the linkage between the S&P500 and Infratil share price varies a lot over time. The S&P500 has had four material periods of falling prices over the two decades. During those four periods, twice the Infratil price also fell, once it rose, and once it went up and down.

The bank analysis also showed that hedges are expensive relative to the potential pay out. For instance a six month hedge which pays out if the S&P500 falls 20% over the period.

- If the S&P500 falls 20% the hedge will pay out $5.3 million. The premium for this cover will be $1 million.
- Over the last two decades, in only 18 out of 240 months has the S&P500 fallen by 20% (or more) over the subsequent six months.

This hedge has an unfortunate combination of a relatively low pay-out ratio ($5.30 return for each $1.00 of premium) and a low probability of occurring (7.5%, ie. 18 times out of 240 months).

If Hedges Are Too Expensive?

Infratil and its subsidiaries do undertake hedging transactions to cover movements in the value of the NZ$, interest rates and energy prices. The group also buys insurance against natural disasters, terrorism, and so on. But unlike 2007, it is now unlikely that hedges will be purchased to cover global financial markets' meltdowns.

However, Infratil does have other means of addressing this risk.

1. A major financial markets crisis could make it hard to raise new funds. Infratil makes sure that its debt needs are conservative and it has robust fall back positions. By far the majority of Infratil's debt is provided by long term bonds.
2. Interest rates and required rates of return could fluctuate materially. Most of Infratil's debt has fixed interest rates.
3. The most difficult challenge, but also the greatest opportunity, arises from the potential for asset prices to fall markedly. This is obviously a problem if assets have to be sold or have their values permanently impaired, but as shown with the acquisition of Z Energy in 2009, it can give rise to marvellous opportunities to make investments at very good value.

The last decade has been a period of financial markets unpredictability. The best approach to providing good long-term returns in such a period is to structure assets and liabilities to provide insulation against all eventualities. And to be prepared to take advantage of opportunities.