

Infratil Market Update

5 February 2018

This report outlines recent trading activities at Infratil's businesses, how their growth initiatives are tracking, and salient market events.

As noted in November's Interim Report, over the last decade Infratil has invested \$4,230 million. 25% went to buying shares in companies and 75% was spent within Infratil's companies building and buying real assets such as power stations, buses, and airport terminals. This investment is the source of Infratil's earnings and value growth, and the 17% per annum compound return delivered to shareholders since 1994.

Given that investment in bricks, mortar and equipment averages about \$320 million per year, 2017's outlay was on the low side, but as explained below, there are reasons to anticipate a pick up.

Notwithstanding a lower than hoped for level of investment, 2017 was a very good year for Infratil's shareholders who received a return of 26.8% (NZX50 22.0% and ASX All Ords 19.1%).

Holiday Reading & The Year Ahead

A benefit of the internet is being able to sit on the beach reading the annual forecasts contained in the Financial Times, New York Times, Economist, etc.

Given that forecasts for 2017 proved to be largely off the mark, this year's crop were more nuanced and hedged. Bitcoin was covered extensively, and while no credible analyst put forward a price forecast, there was an interesting estimate of the electricity required to process Bitcoin transactions in 2018, which was 130,000GWh, about the same as Argentina's entire electricity consumption. The estimated Bitcoin electricity consumption in 2017 was about the same as New Zealand's 40,000GWh.

A salutary lesson in forecasting was provided by a Financial Times article from late in 2017. Before reading further, see if you can guess which sorts of companies have created and destroyed the largest amount of shareholder wealth this century? If the past is a surprise, don't be surprised if the future is too. The following table shows the five US, UK and Japanese companies which have had the greatest positive and negative impacts in their respective markets (the top company had the greatest positive impact, the bottom one the greatest negative impact).

S&P500	FTSE-100	MSCI-Japan
Apple	British American Tobacco	Japan Tobacco
Exxon Mobil	HSBC	Toyota Motor
Phillip Morris	SABMiller	Nintendo
Johnson & Johnson	Diageo	NIDC
Chevron	Reckitt Benckiser	Shin-Etsu Chemical
Nortel Networks	BP	NEC
Cisco Systems	Cable & Wireless	Rohm
Lucent Technologies	Marconi	Sony
Time Warner	Vodafone	Fujitsu
General Electric	BT	Nippon T&T

13 of the 15 biggest losers were telecom or equipment companies, with one each from oil and media. Four winners provide alcoholic drinks or domestic products, three are oil companies, three tobacco companies, with the rest producing smart phones, cars, computer games, specialist chemicals, and trading commodities.

Investment Themes

Infratil seeks to invest capital in sectors driven by predictable long-term demand growth. Our current businesses are well positioned to benefit from fairly predictable long-term developments in population aging, air travel, decarbonisation, and data. Each continues to perform robustly which is why Infratil's level of investment is expected to increase in the year ahead.

Aging: NZ Department of Statistics figures indicate that at the end of 2017, New Zealand's population was 4,840,000, up 1.9% or 90,000 people over the year. The population of people 85 years and older reached 85,070, up just over 2,000 people from a year earlier.

The Australian Bureau of Statistics' figures show that for Australia, the population was 24,770,000 in December, up 1.6% or 388,000 people in a year. The number of people aged 85 years and over reached 494,300, up 11,600 people.

Air Travel: During the year, Boeing and Airbus released updated long-term demand projections for global and Asia Pacific air travel.

Global air travel growth has averaged 4.7% per annum which means doubling every 15 years and this is projected to continue. Asia-Pacific growth is projected to do a little better than this with travel doubling every 12 to 13 years, driven by an expanding Asian middle class.

- At present, similar numbers of passengers travel China–Australasia and North America– Australasia. But the former is forecast to grow 5.6% per annum and the latter 3.3% per annum.
- Australia had 1.2 million Chinese visitors in 2017, which is forecast to rise to 3.3 million visitors by 2026.
- New Zealand had 414,000 Chinese visitors in 2017, and a forecast of 1 million visitors by 2023.

Fortunately, figures also indicate that aircraft fuel efficiency is improving 1.5% per annum which meant that last year's 5% per annum air traffic growth "only" resulted in 1.8% per annum CO_2 emission growth.

Decarbonisation: In November, Syria signed the Paris Agreement bringing to 197 the number of country signatories, albeit, the USA will leave the agreement in November 2020 following President Trump's decision to withdraw.

Atmospheric carbon is estimated to have risen by 173 billion tonnes (to 0.0405% of the total atmosphere) over the last decade and 14 billion tonnes in 2017 (by way of comparison, all NZ's exports last year weighed about 1/350th of this amount). The Paris Agreement requires that this increase in carbon cease with each signature country required to take appropriate steps.

France, for instance, has announced that petrol and diesel cars will be banned from 2040 and no electricity will be generated using coal after 2022. China requires car makers sell two million electric vehicles per year by 2020 (of 28 million cars that are forecast to be sold in China that year).

The New Zealand Government has announced that the national goal is to have no net emissions by 2050 and a Climate Commission is to be established to work out how to do this. The National Party opposition has indicated that it could support the initiative. It will not be easy to achieve the zero emission goal. In 2015 (the most recent year for which New Zealand statistics are available) New Zealand's net emissions were 56 million tonnes, up from 34 million tonnes in 1990. Over the 25 year period New Zealand's emissions have risen 900,000 tonnes a year and will now have to fall by 1,600,000 tonnes a year if they are to get to zero by 2050.

The following graph shows New Zealand's annual CO_2 emissions from 1990 to 2015 excluding the emissions and sequestrations attributed to agriculture and land use. In 2015 these emissions totalled 41,735 million tonnes and in 1990 31,451 million tonnes. Of the annual increase, 5,997 million tonnes came from transport and 4,287 million tonnes from everything else.



Data: The explosion of electronic data has generated new names for numbers and new ways to express scale. Ironically, an excellent book on the topic is the Oxford University Press 125 page, "Big Data A Very Short Introduction". It includes this helpful table.

Data Amount	Meaning	Maths
Bit	1 binary digit. 0 or 1	
Byte	8 bits	
Kilobyte Kb	1,000 bytes	Byte x 10 ³
Megabyte Mb	1,000 kilobytes	Byte x 10 ⁶
Gigabyte Gb	1,000 megabytes	Byte x 10 ⁹
Terabyte Tb	1,000 gigabytes	Byte x 10 ¹²
Petabyte Pb	1,000 terabytes	Byte x 10 ¹⁵
Exabyte Eb	1,000 terabytes	Byte x 10 ¹⁸
Zettabyte Zb	1,000 petabytes	Byte x 10 ²¹
Yottabyte Yb	1,000 zettabytes	Byte x 10 ²⁴

Because data has grown colossally, we do need to know that 1 exabyte equals 1,000,000,000,000,000 bytes (one billion billion bytes). For instance, the 1969 Apollo 11 moon landing vehicle had computers with 64,000 bytes of memory, while its now estimated that 2,500,000,000,000,000,000 bytes (2.5 exabytes) are created every day.

This is occurring because, amongst other things, every day Google is searched 2,500 million times. 500 million tweets go out. Over 1,000 million people check Facebook. And the rate of data generation is growing, in 2020 ten times more data is expected to be generated than was produced in 2013.

One autonomous vehicle generates 10 terabytes of data per day, that's 156 million times as much data as was required to help Buzz Aldrin pilot Apollo 11.

And all this data has to be accessibly collected, transported, stored, and protected.

Wellington Airport: 66% Infratil

In the year to the end of December 2017, Wellington had 6,114,666 passenger movements, an increase of 156,780 over the prior year. October and November were the two busiest months ever experienced by the airport.



However, as the graphs show, it has been a story of two markets; a lengthy period of strong domestic growth, but two years of flat international traffic. Domestic traffic has benefitted from Air NZ up-gauging its domestic fleet, airline competition, and Jetstar adding services to Dunedin and Nelson. Wellington's next addition commences on 27 March when Jetstar reintroduces flights to Queenstown; Air NZ has already responded positively to this by increasing jet capacity on the route.

International traffic grew 14% in 2015, but since then has been flat. Wellington had only 5,775 more international passengers in 2017 than in 2016 as Singapore Airlines provided growth, but it was offset by the withdrawal of Jetstar on the Melbourne route.

The Wellington-Canberra-Singapore service is significantly stimulating travel between the capitals and, through Singapore, with the rest of the world. International visitor spending figures show that in 2017 people from Asia spent 15% more in Wellington than they did in 2016. The growth, and the potential for more growth, was behind Singapore Airlines recent decision to change the route by replacing Canberra with Melbourne.

However, while the Singapore service is a positive, overall flat international traffic reflects Wellington Airport's reliance on the Tasman. Australian Bureau of Transport figures indicate that about 85% of Wellington's international passengers flew to/from Australia, as against about 44% of Auckland's. Both Auckland and Wellington have recently experienced lower Australian traffic, but Auckland Airport still has robust overall growth because of North American and Asian traffic, which is not available to Wellington. It's the key reason Wellington is seeking to lengthen its runway to allow long-haul services.

The runway extension project formally started in September 2013 with the establishment of a joint venture between the City Council and the Airport. Now in its fifth year, the next step is to again seek Civil Aviation Authority approval for the configuration of the runway after its extension. This exercise is having to be repeated because just before Christmas the Supreme Court released its judgement about the previous CAA decision. The Court requires that CAA reassess Wellington's runway extension application, taking into account additional financial information and further analysis of alternative engineering solutions. Wellington Airport is now preparing this additional information for a new application.

In the meantime, the Airport has three major capital works programmes underway. The \$72 million parking and transport centre (completion anticipated mid 2018), the \$35 million 134 room hotel (completion late 2018) and the \$25 million renewal of the airfield taxiway.

On a very different front, Wellington Airport's energy use in 2017 was 2,500MW/h less than the prior year, a 19.8% reduction. This was achieved with the help of the Energy Efficiency & Conservation Authority and energy consultancy Enercon.

In another conservation initiative, the Airport's food and beverage outlets are taking steps which are expected to result in 750,000 fewer plastic cups and utensils being used and thrown away each year.

NZ Bus: 100% Infratil

NZ Bus has now concluded the re-contracting of its services in Auckland and Wellington. Although it will take some time before they are fully implemented, the changes are profound and cover fleet, routes, back office and management.

Consistent with previous estimations, NZ Bus will now be about two thirds of its former scale and provide about a third of the bus public transport in Auckland and Wellington. The fleet will decline to about 650 buses from just over 1,000; employees will fall to about 1,300 from 2,000 people.

From this base, growth is anticipated. Auckland's population is growing at 2% per annum and bus use at twice that rate (last year buses provided over 9 million more rides than was the case in 2012). The Wellington region population and bus use are both rising at about 1% per annum (about one million more rides last year as against five years ago).

The new contracts mean that NZ Bus will be providing services in accordance with the specifications of Auckland Transport and Greater Wellington Regional Council, which cover the vehicles, their livery, routes, timetables and fares. All fare income will go to the councils and in exchange, the councils will pay NZ Bus contracted sums to cover operating costs and to provide a return on the cost of the buses. The contracts are very long with an average term of over a decade and should provide a predictable stream of earnings.

As NZ Bus transitions to the new contracts, it is disposing of buses that don't suit Council specifications and purchasing buses that do. The new buses will include the latest single and double decker diesels. NZ Bus is continuing to develop options for electric buses, in particular to replace Wellington's 60 trolley buses.

Trustpower: 51% Infratil

The excellent summer weather continues to cause wholesale electricity prices which are two to three times the average for the time of year.

A more medium-term perspective of the sector is provided by the recent MBIE electricity generation figures. They show a total lack of national electricity demand growth, but substantial growth in the share of renewable generation.

Annual & most recent	2017	2012	Change
Total National generation	42,805GWh	42,804GWh	0.00%
Gas fired generation	6,096GWh	8,677GWh	-29.7%
Coal/oil fired generation	947GWh	3,388GWh	-72.0%
Renewable generation	35,762GWh	30,739GWh	+16.3%
Residential accounts	1,726,539	1,670,504	+3.4%
Residential consumption	12,285GWh	12,351GWh	-0.5%
Real GDP	\$278 billion	\$239 billion	+16.3%
Population	4,840,000	4,426,000	9.4%

Whether measured in absolute terms or per person, per household or per unit of GDP, the success of conservation measures and the switch away from carbon-based fuels has been impressive. As an aside, the lack of demand growth hasn't been due to consumers installing roof-top solar. Its relatively poor economics in New Zealand has resulted in a modest take up and generation in 2017 of perhaps 65GWh.

One development not reflected in the above table is the rise in the price of NZ Carbon Units over the period. In 2012 their price was about \$1/tonne, and is now \$22/tonne. Although this will now be an appreciable cost for generators using coal, oil or gas, the shift away from

thermal generation over the last five years reflects the overall higher operating costs of such plant, especially when they become older.



New Zealand Carbon Unit Prices per Tonne: January 2016 to January 2018

The performance of the industry is important in the context of the Government's intention to hold an inquiry into the electricity sector, although its focus seems to be mainly on prices: "The review will examine whether the price paid by end consumers for electricity is fair and equitable".

The last Labour-led Government undertook a similar review and in October 2006 the then Minister of Energy David Parker reported:

- "I have recently undertaken a review of the electricity market prompted by ongoing concerns about security of supply and price increases"
- "the review concluded that... some improvements are possible; alternative arrangements do not appear to offer marked improvements overall and involve transition costs and risks."
- "regulatory stability and certainty are important for investor confidence"
- "current market arrangements should be retained but improvements, particularly relating to security of supply, should be pursued;"

Interestingly, while the then greatest concern was about certainty of supply (that Government provided guarantees to enable the construction of a large gas fired power station), the paper's forecast demand growth has proven to be a colossal over-estimate. In 2006 electricity consumption was 39,269GWh and the Ministerial inquiry forecast demand to approach 50,000GWh by 2012 with no signs of flagging. In fact, electricity consumption flatlined after 2006 and 2017's national consumption was less than 2006's. There is a lesson about central planners' ability to beat the market.

Comparing Trustpower's results for the three months ended 31 December 2017 against the same period five years ago clearly shows the success of its strategy to sell more than just electricity. It also shows that even when average per-customer consumption is falling, it's still possible to lift total sales.

Trustpower's power stations are geographically diversified which is a positive when it's dry in the key South Island hydro catchments. 91% of Trustpower's increased generation relative to five years ago came from its North Island hydro power stations.

December Quarter	2017	2012	Change
Electricity customers	273,000	205,000	33%
Retail sales	392GWh	358GWh	9%
Total utility accounts	395,000	246,000	61%
Multi-utility customers	98,000	40,000	145%
NZ hydro generation	484GWh	404GWh	20%
Av. Spot wholesale price	8.8c/kwh	4.2c/kwh	-

Over 2017, Trustpower's good operating performance was reflected in an excellent share market return, but its share price fell 40 cents last week (\$125 million in market capitalisation) on the revelation by the trustees of the Tauranga Electricity Consumers Trust (TECT, which owns 27% of Trustpower) that they are considering winding the Trust up.

Trustpower was formed in1993 from the operations of the Tauranga Electric Power Board with the ownership being vested with TECT. Over the subsequent 25 years Trustpower's evolution (and location) has been strongly influenced by the foundation relationship with TECT. The possibility of this link ceasing has caused uncertainty and Trustpower have noted that it does not support TECT's proposal and is taking advice as to whether the trustees' proposed actions are lawful.

What happens from here will depend on the consultations being undertaken by Trustpower and the Trust, which is likely to take several months.

Another positive event which has been offset by the Trust announcement was Trustpower's sale of its two Australian hydro power stations. They were purchased in 2014 for approximately A\$65 million or A\$270,000 per GWh of average annual output. Reflecting the subsequent increase in Australian market electricity prices, the sale price of A\$168 million or \$690,000 per GWh was a very good result.

The buyer, a subsidiary of Meridian Energy, has a substantial Australian business which will be able to extract synergy benefits from the hydro generation which were not available to Trustpower which has no other Australian operations.

Tilt Renewables: 51% Infratil

As shown by the following graphs, Tilt's quarterly generation over this financial year has been affected by low wind speeds in both Australia and New Zealand. Only the September quarter in Australia was better than average and as at 31 December 2017 total annual generation was about 135GWh below long run averages, which would have reduced revenue by about \$12 million.



While generation has been impacted by the weather, Tilt has been progressing its development initiatives.

Under construction		
Victoria	Wind	54MW (172GWh)
Near to commencement		
Victoria	Wind	300MW
Consented		
Queensland	Solar	350MW
New South Wales	Wind	300MW
Western Australia	Wind	105MW
Western Australia	Solar	40MW
New Zealand North Island	Wind	130MW
New Zealand South Island	Wind	400MW
Consenting underway		
Australia	Wind	1,000MW
Australia	Solar	250MW

• Tilt's A\$105 million Salt Creek wind farm in Victoria's south west is under construction with commissioning anticipated in July 2018. This wind farm is forecast to increase Tilt's Australia generation by about 14%.

The output of this power station has been sold under a long-term contract to an Australian subsidiary of Meridian Energy.

• Tilt will bid output from its planned, and fully consented, 300MW Dundonnell wind farm into the Victorian State government's renewable energy auction, which closes on 14 February.

The government is offering to hedge the price on up to 650MW of new renewable generation capacity for 15 years. If Tilt's bid is successful, it would entail a very substantial investment and matching funding requirement.

Infratil has indicated a willingness to support Tilt's need for additional equity.

- Tilt has added to its portfolio of consented sites with 350MW of Queensland solar and 130MW of New Zealand wind.
- Tilt is also investigating ways to add certainty of supply to its renewable generation, for example with storage and pump-hydro.

In December, Tilt announced the retirement of its establishment CEO Robert Farron and the appointment of Deion Campbell to the role. Both individuals had previously worked for Trustpower and on the development of its Australian operations. Deion was previously Tilt's generation and trading general manager.

Robert had a fifteen year career with the Infratil group as one of its most respected executives.

Longroad Energy: 45% Infratil

The US market continues to be the world's most newsworthy, and dynamic.

- President Trump imposed a 30% tariff on imported solar generation panels. For utility scale projects this may increase costs by about 10% which will harm their viability relative to alternative forms of generation. US regulators have however rejected the President's plans to subsidise coal and nuclear generation.
- US corporate tax changes have reduced the value that was previously available to some US tax paying companies from investing in renewable generation projects. This could cause an increase in the breakeven price required for a project's output, but the impact appears to be marginal rather than fatal. In a fascinating public seminar hosted on 11 January by a US law firm, five financiers gave their individual perspectives, all of which underlined the scale and depth of the US market and the strong appetite of capital providers.

http://www.webcaster4.com/Player/Index?webcastId=24015&uid=4308591&g=29ad67c 5-83ab-496a-981a-1ee306259e35&sid=

• Meanwhile, developments outside of the US underlined how mainstream renewable generation development has become, and how it is attracting the interest of traditional energy companies.

In Europe, offshore wind projects have been announced that will not require renewable subsidies, indicating the ongoing improvement to the economics of wind generation.

A spate of investments by oil companies signals their thinking. BP invested US\$200 million acquiring a shareholding in Lightsource, Europe's largest solar electricity developer. Shell contracted to buy all the output of the UK's largest solar power plant

(68MW). Along with Total and Statoil, they have also invested in several other parts of the renewable energy generation and distribution chain.

A comprehensive description of Shell's strategy is provided in http://fortune.com/2018/01/24/royal-dutch-shell-lower-oil-prices/

The key point is that Shell sees the cost of oil rising and the cost of renewables is falling. They are seeking to shift capital into the lower cost sector and out of higher cost projects.

• In November, Lazard released its annual Energy Analysis report. https://www.lazard.com/media/450337/lazard-levelized-cost-of-energy-version-110.pdf

While their estimates for the generation costs of wind and solar plant depends on wind conditions and sunshine hours, which vary greatly between locations (for instance the solar generation Lazard assumes for the best US sites is about twice what would be expected in New Zealand), the following graph of the average break-even electricity prices required to provide a satisfactory return on new US wind and utility-scale solar shows why these sources of energy are supplanting thermal and nuclear.



Lazard's numbers show that the breakeven cost of wind generation has fallen 67% since 2009 and utility-scale solar by 86%.

By way of comparison, Lazard's calculate that the required US\$ break-even of wind generation is 30-60 cents/kwh, utility-scale solar is 46 to 53 cents/kwh, gas is 42 to 78 cents/kwh and coal is 60 to 143 cents/kwh.

The Longroad team continue to progress a portfolio of generation projects, with the two most material and imminent being for 240MW of wind and 250MW of solar generation in Texas. However, as will be obvious, while projects progress, they only actually happen once all the ingredients (site, consents, grid access, funding, plant, construction, the sale of output) are locked in place.

Alongside the greenfield development programme, the Longroad team are building a significant, and growing, services business which now manages 1,248MW of wind and solar generation.

Infratil's initial commitment to Longroad's development activities was \$65 million, and additional commitment would be required if it was decided to retain and grow the operational generation portfolio.

As at 31 December 2017 Infratil had provided \$56 million to Longroad. The funding covers acquisition of wind turbines and solar panels, operating costs, working capital, and the operational investments discussed above.

Perth Energy Holdings (PEH): 80% Infratil

PEH's energy retailing subsidiary, Perth Energy, continues to improve its financial performance after cost pressures pushed it into losses in recent years. To remedy this, management are reducing overheads, renegotiating power purchase terms to reflect lower wholesale energy prices (a different problem to what is happening in Australia's east), and focusing on customer segments where Perth Energy has a competitive advantage.

PEH has appointed Giles Redmile as CEO following the departure of Andrew Rowe. Andrew did an excellent job developing and implementing the plan to return Perth Energy to profits and Giles is ideally equipped to continue.

PEH's generation activities continue to perform to budget.

As at 31 December, PEH's drawing on the bank facilities guaranteed by Infratil were A\$40.7 million (A\$41.6 million as at 30 September and A\$43.6 million on 31 Mach 2017).

Canberra Data Centres (CDC): 48% Infratil

Following September's announcement that Microsoft subsidiary Azure had contracted to use CDC's data centres for its cloud-based Australian services, CDC started construction of a fifth, A\$150 million, Canberra centre. Construction is progressing on budget and the new centre is expected to be commissioned in late 2018.

Funding for the new centre is coming from CDC's long-term debt funding facilities, which have recently been expanded and extended in term to seven years.

Commissioning Fyshwick 2 will give CDC a total of 60MW of capacity at its two Canberra campuses, sufficient to accommodate two to three years of growth. CDC is the only provider of data centres which meets all Australian government security criteria, and the new centre will incorporate additional security and efficiency features.

As CDC CEO Greg Boorer noted in an interview; "We are completely different to commercial data centre operators ... because the data doesn't have to leave our four secure walls a lot of the challenges and the hurdles that government has getting in front of technology and innovation, melt away."

Hume 1	6MW	1,500m ²
Hume 2	6MW	2,000m ²
Hume 3	9MW	3,100m ²
Fyshwick 1	18MW	5,000m ²
Fyshwick 2	21MW	6,200m ²

One recent notable market development was the A\$1,035 million purchase in December of Australian data centre company Metronode by US Nasdaq listed Equinix. The price was in excess of 20x Metronode's earnings, and the addition of 10 centres gives Equinix 15 in Australia and 40 in the Asia Pacific region.

The transaction, and the stream of announcements by other Australian data centre companies, underlines both the sector's growth and increasing investor interest.

RetireAustralia (RA): 50% Infratil

The Australian residential property market cooled over the latter part of 2017 although all the states where RA owns villages had full year value gains. After the price surge that occurred in 2016, the flattening was predictable.

As tends to happen in any weak housing market, the main causality is turn-over. Along with other village operators, RA is waiting longer to reoccupy units that become available. The effect is evident in all states and types of villages.

Notwithstanding, RA is progressing its programme to build new villages that combine the provision of care and accommodation and is continuing to develop the villages it has planned for Sydney and Brisbane.

Infratil and the NZ Superannuation Fund (each are 50% shareholders) have jointly committed to provide A\$100 million to enable this to occur. While the residential market is slower now, these villages will only start being available for occupation in two to three years' time.

In addition to acquiring land for future development, RA has also partnered with Brisbane's Ashgrove Golf Club to use land surplus to the needs of the Club. The village residents will benefit from both the beautiful surroundings and access to Club facilities. The Club gains the financial support to upgrade its clubrooms. The approximately 150 units to be built on this site will not be available before 2020.

ANU Student Accommodation (ANU): 50% Infratil

After achieving 99.8% occupancy in 2017, ANU is anticipating similar levels of demand in 2018.

Work is under way with the university to add student facilities and additional accommodation to the 3,760 apartments currently provided.

Snapper Services: 100% Infratil

The Snapper team's accomplishments were recognised in January when they were runner up for the supreme Transport Ticketing Technology Award granted at London's Transport Ticketing conference.