

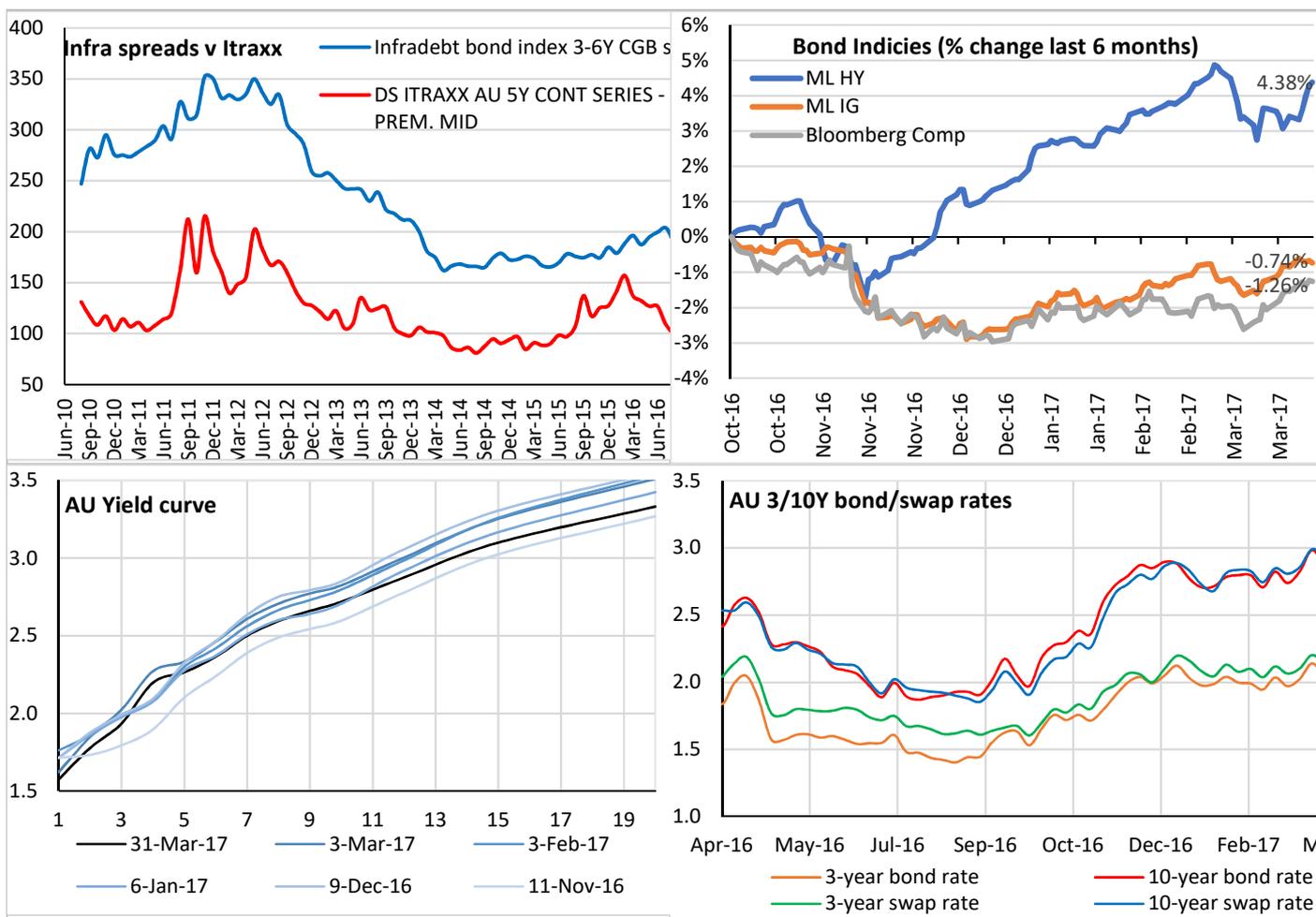
## Introduction

It's been a fairly calm quarter in markets (debt and equity) despite ongoing macro uncertainty (Trump, Brexit, US interest rate normalisation). Domestically within infrastructure, energy has dominated the headlines with concerns relating to existing and future policy, renewable targets relative to generation mix. Hazelwood – Australia's oldest brown coal generation facility commenced shutdown, but at the same time a raft of new energy projects were announced including large scale storage.

This month we have three separate and unrelated articles. The first looks at traditional infrastructure lending and the term anomaly available to non-bank institutional investors. The second, provides a brief introduction to a new infrastructure subsector – specialty disability accommodation. The last, builds on the recently announced Snowy Hydro 2.0 pumped hydro storage and looks at generation risk in this new storage environment. Staying with electricity, we finish off with a chart showing the impact of solar on load profiles with an 11 year look-back.

Finally, I'd like to take this opportunity to welcome Future Super on board as a new Infradebt client

## Markets update

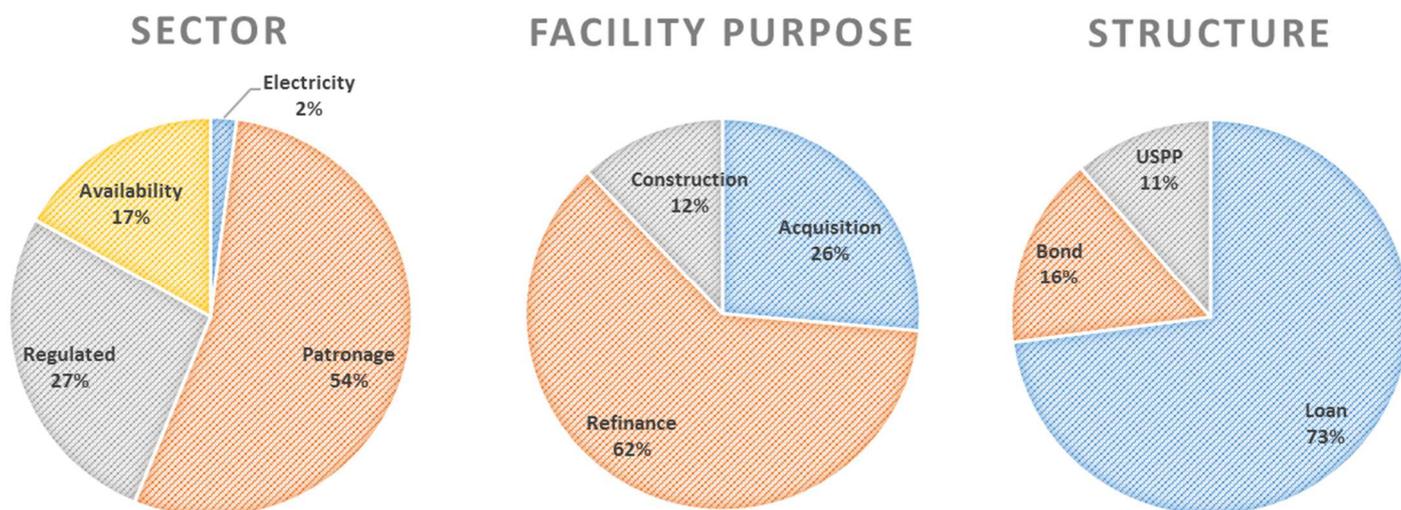


## New issuance and refinancing

The table below provides a list of publicly available deals.

Date	Borrower	Instrument	Size (m)	Term (Yrs)	Curr.	Pricing
Jan-17	Clare Solar Farm	Loan	185	4	AUD	BBSY+175
Jan-17	PARF Silverton	Loan	270	3	AUD	BBSY+180
Jan-17	Duet Group	Loan	1,000	1	AUD	BBSY+30
Feb-17	AusNet Services	Bond	425	10.5	AUD	Swap +165
Feb-17	Hallet 5	Loan	138	7	AUD	
Feb-17	Hornsedale Wind Farm	Loan	180		AUD	
Mar-17	APA Group	Bond	850	10	USD	UST + 180
Mar-17	WSO Finance	Bond	535	10/10.5	AUD	Swap + 172/177
Mar-17	Brisbane Airport	USPP	300	10/12/15	USD	UST + 130/140/150
Mar-17	Brisbane Airport	USPP	50	20	USD	UST + 195
Mar-17	Manildra Finco	Loan	75	5	AUD	

Infradebt maintains a database of all infrastructure lending that we are aware of (sourced from multiple locations). Since October 2013 we have recorded 150 transactions at a value of \$113 billion. The composition of lending to the sector has been as follows:



**Equity and other news**

- DUET Group has received a takeover offer from Cheung Kong Infrastructure – negotiations are still ongoing.
- Financial close was reached on the sale of AGL’s Silverton wind farm project to the Powering Australian Renewables Fund. AGL expects to recognise approximately nil profit on the transaction
- Three groups have been shorty-listed for the \$1.4b Melbourne roads PPP.
- APA Group has contracted with a subsidiary of Santos to commence the development of a new 450km pipeline, at a total construction cost of ~\$500m. The construction is still subject to final approval from regulators.

- The South Australian Government, in a bid to shore-up energy supply, has launched two separate projects the first being a new gas-fired plant, the second being a 100MW/100MWh battery. Both units are to be brought online for demand response purposes. It is expected the battery (one of the world’s largest) is expected to be operational by next summer. At this stage it is not known when the gas-peaking plant will be operational.
- APA Group has announced that it has entered into a 12-year offtake agreement with Alinta Sales that will underpin the construction of the 130MW Badgingarra Wind Farm. Alinta Sales will purchase all of the energy and large scale renewable generation certificates produced by the wind farm.
- Engie, owner of Pelican Point CCGT plant, has contracted with Origin Group for three years. This brings the previously dormant plant back into production and will fund capital costs to bring the new back to full capacity.
- Staying with South Australian energy, as part of the Company Tax-cuts deal pushed through last week, the NXT party negotiated for a concessional finance package for solar thermal and storage plant for South Australia
- Prime Minister Malcolm Turnbull announced during the quarter that a feasibility study would be undertaken Snowy Hydro 2.0 – a 2,000 MW pumped hydro facility.

## Term anomaly

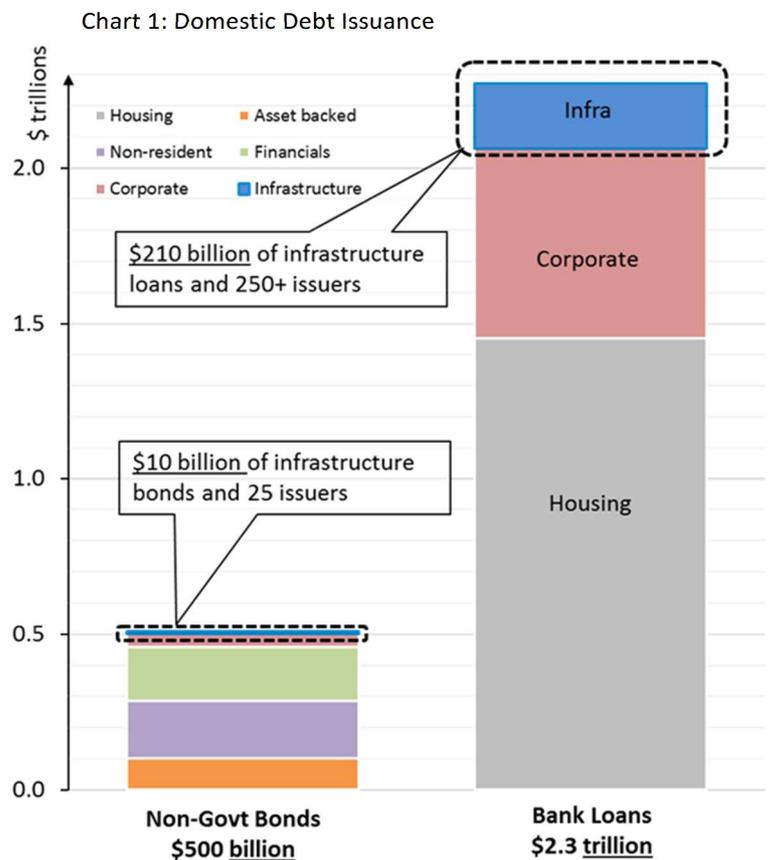
We’ve touched on this topic in the past – the extra compensation for providing medium to long dated finance in Australian dollars to Australian borrowers.

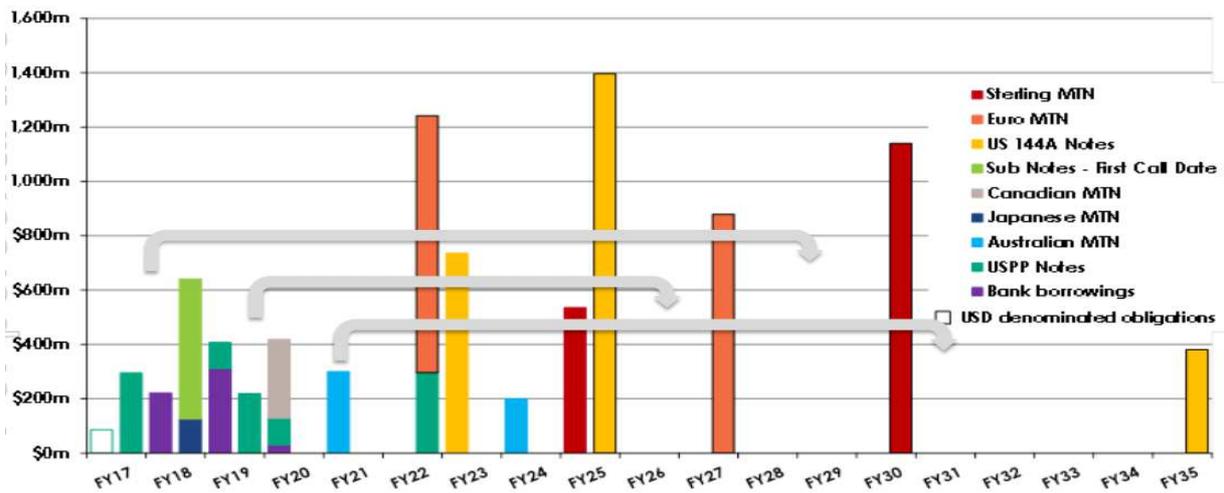
Excluding sovereign and semi-governments, Australia’s debt market is approximately \$2.8 trillion – but as can be seen from Chart 1– this market is dominated by bank lending.

Bank regulation encourages banks to match loans with the tenor of wholesale funding. Loans that are longer than the underlying funding are penalised with higher capital requirements. This encourages loans to be 3-5 years. Banks can lend longer – for example, for PPPs with long construction phases – but generally don’t.

Compared to the bank loan market – the Australian bond market is tiny – particularly for infrastructure borrowers (\$10 billion vs \$200+). The bond market is only practical for issuers with a rating and able to issue in large individual maturities. This limits the bond market, as a practical source of funding for all but the larger Australian infrastructure projects (think Sydney Airport and Transurban). Even then, the limited liquidity of the Australian market – and consequent higher margins – limits the appeal of the local market.

Whilst infrastructure projects have high operating margins (~70%+), many have relatively fixed cashflows. The GFC highlights that a 30 year project with 3-5 year debt can be very severely impacted by a credit shock, thus depending on their leverage, projects seek to reduce refinancing risk through diversifying their debt stack by maturity and market (economic infrastructure) or seeking finance that matches the length of cashflows (availability projects). APA provides a good example:





So, aside from the domestic bond market (which caps out at 7-10 years), where can borrowers go to get this longer tenor? Simplistically, there are two markets: offshore public markets (e.g. US 144A) or the US Private Placement market. Offshore public market bond issues typically have a minimum issue size of \$250-500 million. This means they are really only for the very largest Australian infrastructure issuers (e.g. APA, Transurban or Sydney Airport).

The vast majority of infrastructure projects (EV < \$2 billion) can't access these markets efficiently. The USPP market is relatively efficient, whilst the last 12 months seems somewhat slower than previous years, there continues to be a steady stream of Australian projects seeking multi-tranche loans (typically 10-15 years, with a few 20 year loans). The majority of USPP lending is in USD, with occasional small AUD denominated tranches. For example, Brisbane airport recently issued USD 300m in 10,12,15 year tranches and a AUD 50m 20 year tranche.

As you would expect longer dated lending receives a term premium, but in addition, borrowers in offshore currencies require hedging. Swap lines are disproportionately provided by Australian banks, resulting in some crowding effects (domestic lending and ability to access long-dated swaps). They also incur costs. Typically swap costs are 40-60 bps pa – this includes the credit/execution margin and the cross-currency basis.

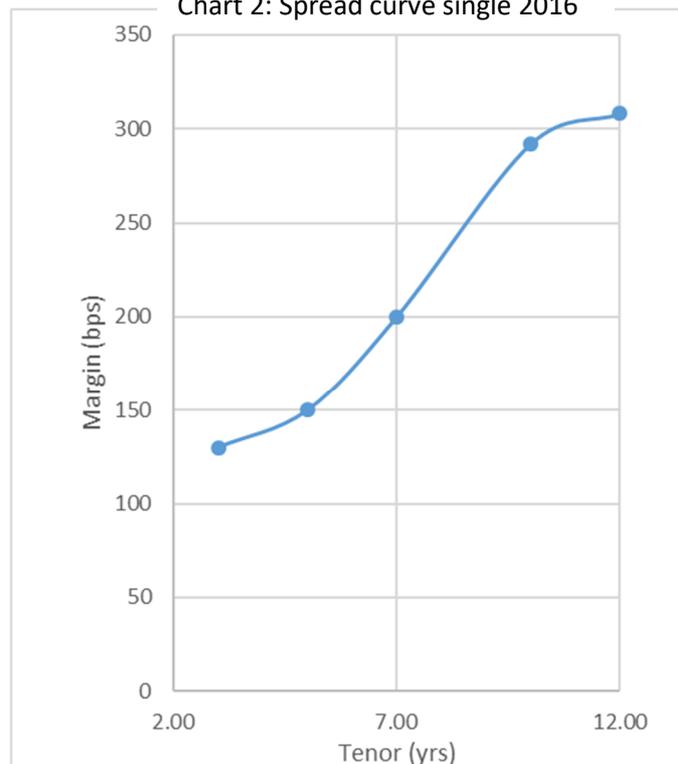
Thus for investors, in addition to obtaining additional margin for term, lending in AUD also receives an additional boost through avoided swap costs.

To illustrate we have selected one domestic economic infrastructure project who issued debt in 2016. Chart 2 shows the spread curve over the term provided across all tranches (3 – 12 years – 5 tranches in total).

You can see a significant step up in margin for providing tenor. This margin reflects the full cost to the borrower (ie margin plus swap costs) – all issuance took place on the same day and was a combination of bank debt and USPP issuance swapped back to AUD.

We've used a single project to highlight the term premium, we've also chosen a period when spreads are relatively tight (as evidenced by the 3 year margin). The project, whilst not rated, would meet the characteristics of investment grade, and importantly, relative to its sector peers and the broader infrastructure sector, it has low leverage.

Chart 2: Spread curve single 2016



Each tranche takes the same exposure to the project, and ranks equally. The key differences are liquidity (earlier maturity) and repricing (short term lenders effectively get to reprice their margin).

Banks are arbitrage lenders. That is they are focused on maximising the return from the difference between the rate they lend and the rate they borrow. Short-term lending lowers the risk of this arbitrage as they are able to match the term of the loan with their underlying funding.

Super funds are fundamentally different investors. Their objective is to maximise the long-term returns of members capital within risk/liquidity constraints. Super funds don't have the option of returning members funds if spreads have decreased. This means shorter dated lending – while more liquidity – inherently involves significant reinvestment risk.

Importantly, at today's swap rate, the longer dated pieces deliver an all in return 5.5% -6.0% or a real post tax return of 2.5-3%. Given where most fund's overall return targets are set – this is a pretty attractive long-term return. This highlights the opportunity for super funds who can accept lower liquidity and are to lend to quality Australian infrastructure projects.

## A new sub-sector: Specialist Disability Accommodation

While the core of most infrastructure portfolios has remained reasonably constant over time, dominated by PPPs, utilities and transport infrastructure assets such as ports, toll roads and airports there are a range of non-core infrastructure opportunities that arise from time to time. These range from mobile phone towers, tank storage facilities, hospital carparks, registry businesses and rail rolling stock leasing. A new sector to emerge in Australia is specialty disability accommodation (SDA).

SDA is specialist residential accommodation for disabled people. A core element of the National Disability Insurance Scheme (NDIS) is a move to provide disabled people with more choices over their accommodation. In particular, more residential style accommodation with less focus on large institutional facilities. SDA will be distributed through residential neighbourhoods and provide greater opportunities for disabled people to have broader social and economic engagement within the community.

There is a chronic shortage of SDA. For example, the Productivity Commission estimates there is a national requirement for 28,000 high care places against a stock of 16,000 places. This shortfall sees over 6,000 young people living in aged care homes (as this may be the only place they can access the high levels of support they need) and a further 5,800 in inappropriate care arrangements. Many disabled people are dependent on their aging parents for care – creating a further need for SDA once their parents are no longer able to provide full time support.

Part of the NDIS is to respond to this requirement for SDA and to harness institutional capital for the funding of SDA (historically SDA has been provided by the States and the not for profit sector). To facilitate this the NDIS provides for a system to subsidise the provision of SDA. Interestingly for infrastructure investors, the subsidy framework has drawn on the regulation of utilities, with



subsidies calculated based on a weighted average cost of capital (WACC) applied to the estimated capital cost (both land and building).

This is a significant departure from other social housing approaches, as subsidies are not linked to market rents of residential properties. This is important because the residential rental market is dominated by individual investors, with very different return expectations (and motivations) than institutional investors.

This is a new space with few transactions to date but one to watch as it is likely to grow substantially over the decades ahead given the substantial supply shortfall facing the sector.

## A new word for electricity generators – overspill.

Here's a word that hasn't been part of the of the electricity generation lexicon – Overspill



In the history of Australian electricity generation the dominant forms of generation have had significant fuel costs. As a result, generation has always been equal to demand. That is, if demand has fallen, some generators have been shut down (or wound back) to save fuel costs.

In the future, where generation sources will be increasingly dominated by technologies with no marginal cost – for example, wind and solar – this won't necessarily be the case. In fact, it would be quite realistic to imagine situations where high periods of solar or wind generation result in greater production than is able to be used or stored.

For example, ANU researchers Andrew Blakers, Matt Stocks and Bin Lu modelled scenarios of a 100% renewable NEM, where power was supplied by solar and wind, and the matching of the variability (and vagaries) of supply to demand was undertaken by high voltage DC transmission as well as pumped hydro storage. This analysis is interesting in that it shows that a 100% renewable grid is possible with today's technologies, that the amount of storage is not impractically large (less than a day of NEM demand would be required) and that the costs are quite manageable (\$93/MWH in 2016 prices – which is quite competitive with today's baseload futures prices).

An interesting aspect of this modelling is that the scenarios involved 7-24% annual spillage. That is, a significant proportion of electricity produced was wasted.

This is a quite rational outcome. The lowest cost way of ensuring there is sufficient electricity production to meet demand is to:



- pursue a diversified basket of solar and wind generation (with this diversified by location to take advantage of the differences in weather across states); as well as
- energy storage/transmission (so that energy can be shifted through time and space to meet mismatches between supply and demand).

The optimal mix aims to ensure there is sufficient supply to meet demand – it is not to ensure that there is no un-stored surplus power. When the marginal cost is zero – it doesn't necessarily matter that some power is wasted. Costs are driven by capacity – not output.

What does this mean for investors in renewable generation? It means that forecasts of revenues should contemplate the possibility that a significant portion (maybe 10-20%) of output might attract very low (or zero) prices. There is already some evidence of this in South Australia – where prices quite frequently go negative during periods of strong wind and low demand.<sup>1 2</sup>. Over the next few decades it is likely to happen more broadly.

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## Contact Us

We're always happy to chat (and learn new things!) if you want to know more, contribute more on a particular topic, or wish to discuss any of the above topics in greater detail feel free to drop us a line. Also, please don't hesitate to send us ideas for future articles.

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