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Barriers to storage and some **bold** ideas to overcome them

By Ryan Wavish

While the cost of battery storage technology is the usual point of discussion when it comes to barriers to its widespread uptake, there are other equally significant commercial barriers standing in the way, generated by existing regulatory and policy settings – some of which would prevent uptake even if batteries were free.

These barriers are not insurmountable and increasingly, international markets are providing some bold ideas to overcome them.

By highlighting these barriers and ideas, we hope to spark debate and inspire broader thinking on what is possible to support the widespread adoption of affordable, scalable, controllable and safe energy storage technologies.

So if you have a strong view on this topic – please get in touch with us at ryan@marchmenthill.com and join the debate, we'd love to hear from you.

1. Premium feed-in tariffs

Premium feed-in tariffs (FiT) provide a major disincentive for the uptake of storage as the incentive to export to the grid is often far greater than the retail rate for grid supplied electricity.

Below is a summary table of the state of premium feed in tariffs in Australia and the estimated number of customers on them.

Table 1 – Premium FiTs and Customer Numbers

State	FiT value	FiT Expiry	Approx. number of customers*
VIC	25-60c/kWh	Nov 2024	90,000
SA	44c/kWh	June 2028	100,000
ACT	40-50c/kWh	2028 – 2031	10,000
WA	20-59c/kWh	Aug 2021	60,000
QLD	44c/kWh	Jun 2028	280,000
NSW	20-60c/kWh	Dec 2016	160,000
NT	22-46c/kWh	-	5,000
TAS	28c/kWh	Jan 2019	10,000

* Source: MHC analysis of various sources including APVI data, DEDJTR, Clean Energy Regulator, OTER and various media reports.

MHC analysis indicates that more than 700,000 customers across Australia are on premium FiTs, which translates to almost 50% of solar PV customers. Additionally, many of these tariffs do not expire until 2028 or even later, providing the customer with a

long-term disincentive for storage, despite the benefits this technology may have to support an efficient energy delivery system.

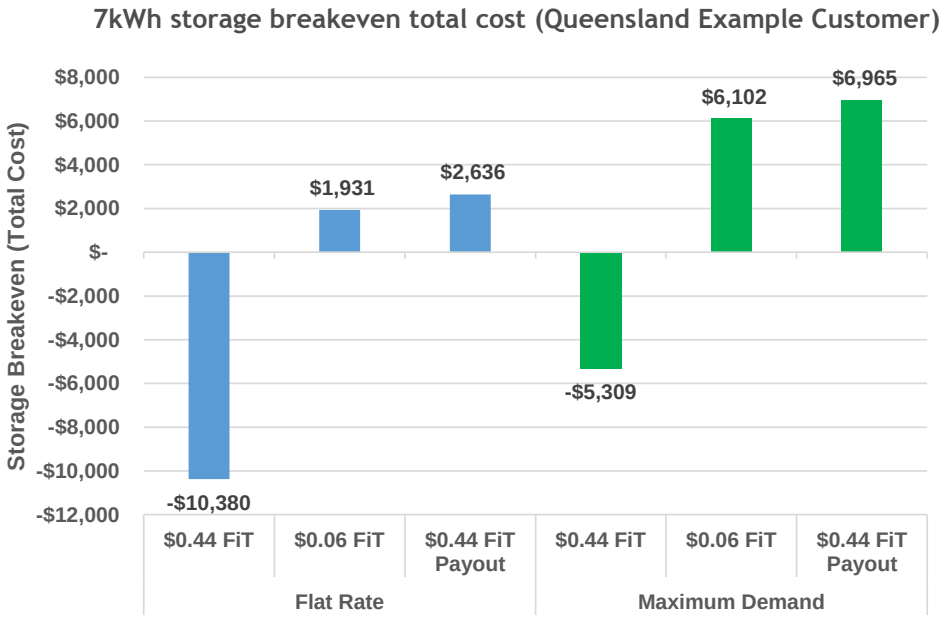
As many of these customers were the "early adopters" of solar PV, it is not unreasonable to assume they would also be interested in new storage technologies were it not for the barrier of forsaking premium FiT revenue.

Bold idea: Restructure this existing, committed subsidy to support the uptake of demand management technology (including storage).

This approach essentially entails a customer having the ability to choose to convert their existing premium FiT subsidy to an annual subsidy which contributes to the financing of a storage solution, or similar demand management technology. Of course, the size of the subsidy would need estimate the future premium FiT payments discounted to take into account the many associated risks to this revenue stream. This approach does however produce something of a win-win as storage has the additional benefit of enabling reduced network expenditure (by reducing the technical impacts of solar PV and peak demand), hence putting downward pressure on electricity prices, compared to the cross subsidy from non-solar to solar households under the current arrangements.

Figure 1 shows the resulting breakeven cost for storage under different tariff structures, FiTs and payout options.

Figure 1 – Storage Breakeven Cost under various Tariff and FiT arrangements



Source: MHC analysis

As shown in Figure 1, the premium FiT provides a significant disincentive for storage investments (you wouldn't use it, even if it was free), while the opportunity to pay out this subsidy improves the business case for the customer.

2. The lack of variable price signals

As highlighted above, the cost-effectiveness of a storage investment improves under more cost-reflective demand tariffs. All DNSPs in the NEM recently issued their proposed

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cost-reflective tariffs as part of their Tariff Structure Statements, with the majority taking a relatively simple approach of transitional opt-in arrangements, monthly maximum demand measurement and a comparably low demand charge components. This may be due to many networks currently being relatively unconstrained, which may also limit the need to implement more aggressive demand charges going forward.

A very basic summary of the proposed residential cost reflective tariffs is provided in Table 2.

Table 2 – Maximum Demand Tariff Summary

State	Tariff Approach
NSW	"wait and see", Opt-in TOU tariffs at best
QLD	opt-in demand/fixed/usage tariffs available
VIC	opt-out demand/fixed/usage "transitional" tariffs[1]
SA	mandatory assignment to demand/usage tariffs for some customers[2], opt-in demand/usage tariffs also available
ACT	New demand/fixed/usage tariff which is: • default and mandatory for new customers • default for existing customers whose meter is replaced with a remotely read meter, with the option to Opt out (until 2019) to a TOU tariff • opt-in for existing customer willing to pay for a remotely read meter

1 The Victorian government recently made a statement rejecting the proposed opt-out approach, stating that only opt-in residential tariffs would be allowed in Victoria.

2 Customers with advanced interval meters and all customers who request a significant alteration to their metering arrangements i.e. physical supply changes; new inverter approval; and new major appliances >25 amps (such as a very large air conditioner or an Electric Vehicle fast-charger)

At this time only United Energy in Victoria offer a full demand tariff (no consumption or fixed charge), however this still has a 1.5kW minimum chargeable monthly demand. Additionally, most demand charges have a relatively long peak window (e.g. 3pm to 9pm), which further reduces the effectiveness of storage through the requirement of larger systems and difficulties targeting customers' peaks.

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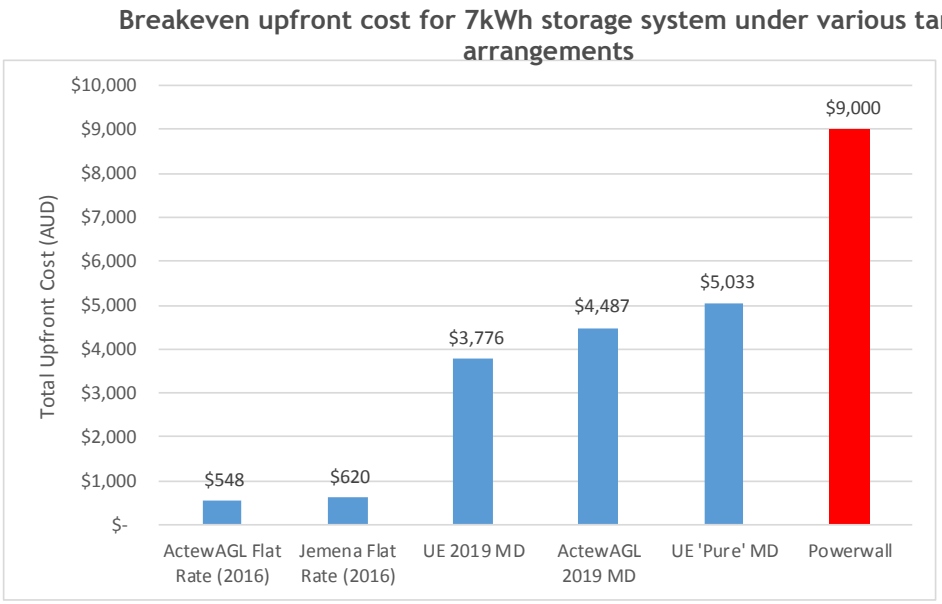
Figure 2 – Storage Breakeven



Source: MHC analysis (assumes 15 yr investment at 5% discount factor, 6c FiT

Demand tariffs are a prerequisite to encourage storage uptake, however, as shown in Figure 2, even under relatively aggressive demand tariffs, MHC's modelling has found that storage is not currently cost-effective.

While relatively simple, stable partial demand based tariffs may provide a nudge in the right direction for most customers, technologies are available today to allow customers to respond to strong price signals for their own benefit and the benefit of the network. In fact, in the case of storage, it very much relies on them.

Bold idea: DNSPs could be encouraged to offer strong, opt-in localised and time critical cost-reflective tariffs, which coincide with periods of network constraints. This would accelerate innovation in products and services to support efficient network investment.

3. Disincentives for networks to invest in non-network solutions

The effectiveness of revenue incentives (such as the CESS, DMIA, DMIS and STIPIS) and regulated investment requirements (such as the RIT-T and RIT-D) to create a level playing field for network vs. non-network solutions (including storage) is widely debated and the subject of ongoing policy and regulatory reform.

Although a shift in thinking is occurring (e.g. most RIT-Ds now include a solution incorporating storage in some way), the financial incentives are still imbalanced and there is still an overriding preference for the financial returns secured by investments in the regulated asset base as compared with non-network options.

This issue is evident in the AEMC's recent report[1] on the integration of storage, which includes recommendations to review the incentives on network businesses to substitute Opex for Capex, as well as the thresholds and lead times in the planning process (e.g. for RIT-T and RIT-D).

Although the process has only started in Australia, progress has been made overseas which could provide key learnings for our local regulators and policy makers.

Bold ideas:

- **In the UK**, the RIIO (Revenue = Incentives + Innovation + Outputs) reforms have introduced the concept of "totex" to enable capital and "slow" operating expenditures to be treated equally and recovered under the same cost of capital formula. This effectively enables long term contracts for non-network solutions to be included in the regulated asset base.
- In **New York State**, the Reforming the Energy Vision (REV) initiative is looking to modify their "clawback" mechanism to be more like our CESS incentive. However, the Public Service Commission (PCS) admit that this still may not be sufficient to fully address the objective of removing the disincentive for utilities to use operating resource or third-party assets in lieu of capital investment. Stakeholder feedback is currently being sought on alternative approaches.

  In addition, the REV initiative is proposing new performance based regulation which includes incentives for improved returns based on several key performance measures including reductions in peak demand and the connection of distributed energy resources.

4. The inability for stakeholders to readily access multiple value streams

To truly unlock the full potential of storage, the multiple sources of value it can provide to the electricity supply system will need to be readily accessible, including:

- Network support services, including augmentation deferral and voltage support;
- Supply of energy into the wholesale market;
- Ancillary services;
- Reliability and system security services; and
- Retail bill optimisation.

While Reposit Power is leading the way in tapping into a couple of these value streams, many of the markets for the others either do not exist or are not accessible to residential customers e.g. the ability for distributed generation aggregators to access the ancillary services market.

[1] AEMC, Integration of Energy Storage – Regulatory Implications, Dec 2015

Additionally, with regard to network services there is currently no universally applied framework to calculate these benefits (as well as the costs).

Given the multiple value streams available, as well as their variance by time and location and the complexities involved in calculating them, this further raises the question how customers can make informed decisions regarding whether they are better off using the energy from their storage system in their home, exporting it to the grid, or topping it up from their solar PV system?

The missing component is a common platform for small-scale customers to efficiently and effectively trade these value streams to optimise operation, location and scale and value of their storage investment.

This brings with it its own set of issues and complexities, most pressing of which: who builds, maintains and operates this consumer facing platform? And how do they get paid?

Bold idea: The New York REV program has determined that the utilities should act as Distributed System Platform providers, develop this "digital marketplace" and derive platform service revenues from market participants via (regulated) participation and transaction fees.

The NY State Public Services Commission argues utilities are particularly well suited to provide platform services and this enables utilities to diversify their business, protect against the concern of lost sales from, and potentially stranded investment in conventional business units as more third party investment enters the system.

There are more non-commercial barriers of course, including developing robust technology, installation and connection standards and processes not to mention the issue of the pace of the regulatory reform process and the general uncertainty around the policy landscape.

While the biggest barrier in the short term will remain battery cost, these additional commercial barriers highlighted above all need to be addressed to some extent to unleash the full potential of storage on Australian energy markets.