COST REFLECTIVE NETWORK TARIFFS
POSITION PAPER

Introduction

TEC is funded by Energy Consumers Australia to advocate for the equitable decarbonisation of the NEM in the long term interest of consumers. By 'equitable decarbonisation' we mean in particular that consumers (or prosumers) with distributed energy resources (DER—solar, batteries, EVs, smart meters, etc) are on the one hand treated fairly (not discriminated against and receive appropriate payments for the services they provide); and on the other, that non-DER consumers do not pay a disproportionate amount of ongoing network revenues and for new infrastructure investments required as a result of high bidirectional flows.

One of our projects concerns working across jurisdictions on distribution network tariff structure statements (TSSs) to further the rollout and uptake of more cost reflective network tariffs (CRNT). TEC supports the move to CRNT (pursuant to the AEMC's 2014 rule change) because they offer the opportunity to signal the cost of future investment and to respond to this price signal with energy conservation and demand management. They also potentially incentivise the economically efficient rollout of DER.

Given our limited resources, our interest is primarily in residential tariffs, since they cover the majority of customers, if not demand. We are influenced by the APVI's work on demand tariffs,[1] which shows a generally poor correlation between demand tariffs as currently designed and the small number of network critical peaks per year that drive the bulk of augex. To better reflect future costs, demand tariffs should be designed to more closely correlate customer and coincident network peaks. This suggests a more dynamic—temporal and perhaps locational—approach to demand tariff design.

As explained below, our support for CRNT does not mean we support the kinds of demand tariffs currently on offer from networks—especially when there are alternatives available which work better and are easier for consumers to understand and respond to.

DER and CRNT

DER have value not only to owners behind the meter but also, under certain circumstances, to the wholesale markets (eg, reducing peak spot prices) and to networks (eg, when batteries dispatch into the grid to meet evening peak demand). However, solar production often does not reduce network peak demand at the substation level (especially in residential areas). Further, solar can impose net costs on networks where high bidirectional flows result in the need of infrastructure upgrades. The lower overall energy consumption from solar households also means that under network revenue caps and anytime energy tariffs, the lower revenue recovery from solar households is effectively compensated by higher per kWh charges for all consumers.

While there are effective non-tariff ways to overcome the technical challenges of high bidirectional flows ('DER optimisation', including the dynamic control of inverters), well designed demand tariffs largely overcome the equity or cross-subsidy issue, by ensuring that DER and non-DER consumers pay equally for their contribution to peak demand. Unless they already have a flat load profile, the majority of solar owners will be worse off under demand tariffs; but if they can install batteries or reduce their load during the network peaks they may be even better off than they were under anytime energy tariffs.

Solar owners should not be forced onto different tariffs to other consumers. However, those with smart meters should be required to be on a CRNT in order to negate any cross-subsidy from non-solar consumers.

Transitioning

NSW networks are all proposing demand tariffs for the next, second TSS which are incremental improvements on the DBTs in their last TSSs, but which are still only moderately cost-reflective. MMD tariffs have the following shortcomings:

- Poor correlation with network critical peaks.
- Broad charging windows (over 4 hours for the peak period) make load-shifting difficult.
- Hard for consumers to remember and react to.

They can and should do better. There is a spectrum of cost reflectivity that in broad terms runs as follow:

DBT > flat > IBT > TOU > MMD > capacity > PTR/CPP[2]

We see little merit for DER prosumers or other consumers in moving slowly through each of these options over the next decade, and would prefer that networks moved more quickly to the endgame —ie, tariffs which fully signal the cost of meeting peak demand while maximising the potential for effective consumer responses. In particular, tweaking TOU tariffs to make them appear more like demand tariffs has not been successful (eg, in Victoria).[3] We are particularly keen on combining existing flat or TOU tariffs with rewards-based peak time rebates, as they are more easily understood and responded to than maximum monthly demand (MMD) tariffs.

Transitioning within the CRNT

LRMC

Long run marginal cost (LRMC) estimates should be based on at least a 10 year horizon, and should factor in repex as well as augex costs. In this way, even relatively unconstrained (or gold-plated) networks can produce tariffs that send meaningful price signals to consumers.

Sunk costs

We accept that networks are selling capacity rather than energy, and that (especially in NSW and Qld) there is extensive spare capacity, reducing their 10-year LRMC estimates. Networks are therefore attempting to ramp up fixed charges as a proportion of total revenue in order to recover sunk costs. However, fixed charges are regressive and do not encourage energy conservation; and sunk costs can also be recovered through energy charges. As the AEMC's 2014 Final determination for the CNRT rule change put it (emphasis added):

> ...analysis from both reports [Bratttle and NERA] demonstrate that this principle [minimising distortions to efficient usage decisions] *does not require that residual costs are recovered though increases to fixed charges.*

We therefore suggest that networks recover sunk costs through each of the charging elements: fixed, energy and demand.

Customer impact principle

In the current round of TSSs, networks are showing a commendable concern for the customer impacts of their proposed tariff reforms, in line with C.6.18.5(h) of the NER. However, the preceding network pricing objective and principles in the NER make it clear that this should not be the main or first consideration; that role belongs to the need for tariffs to reflect efficient cost of providing network services, which should be based on the LRMC of providing services. Considering and ameliorating customer impacts is also the responsibility of retailers.

It appears that some networks are using the customer impact principle as a rationale for making only minimal changes to their legacy tariffs. This is not what was intended by the rule change.

Innovative tariffs

Networks should be incentivising the more efficient bidirectional use of their infrastructure by the use of innovative tariffs such as solar sponges instead of overnight controlled loads, and fully cost-reflective demand tariffs which incentivise battery exports during evening peaks.

Solar sponges are a variation on controlled load tariffs. Instead of electric hot water systems and pool pumps operating overnight when total system demand is low, they are set to turn on and off in the middle of the day on sunny days where there are large or even excess (ie, more generation than load) solar exports on local feeders. SAPN is considering such a tariff for its 2020-25 TSS.

Alternately, networks could offer positive tariffs (ie, payments) for DER exports (especially battery exports during evening peaks) where these would help to reduce congestion and thus reduce augex costs. Such positive tariffs do not contravene C.6.1.4 of the NER, which prohibits networks for charging customers for exports to the grid. (Networks have alternative solutions available where DER exports would impose a net cost, such as export limits and the dynamic control of inverters.)

Assignment

Ideally, we favour maximising consumer choice and control. This suggests that demand tariffs should be opt-in, or at least opt-out. However, there is a strong case for mandatory tariff assignment, as CUAC argued in 2015:

> Mandating uptake of cost reflective tariffs is crucial to the success of network tariff reform. If, at the conclusion of the reform, consumers are not required to have a cost reflective tariff, they will naturally seek to avoid it where it is not in their interests. Consumers whose behaviour would be more expensive under cost reflective tariffs will avoid them, and the costs they incur will continue to be borne by the broader system. This would be an inequitable outcome that damages the justification for the reform.[4]

The ACCC reaches a similar conclusion in its Retail Electricity Pricing Inquiry—Final Report:

> The ACCC supports moves to accelerate the transition of small customers onto more cost reflective network tariffs. This is best achieved through mandatory assignment of cost reflective network tari s on retailers under the next stage of tariff reform, for all customers with a smart or interval meter. With the retailer facing the cost reflective tariff, it is up to them to decide whether, and how, they pass those signals through to customers in retail tariffs.[5]

Tariff assignment should also be customer- and technology-neutral if possible. That is, DER and non-DER customers should be treated equally. This suggests that all new connections, upgrades and solar installations should trigger a shift to a demand tariff.

We are sceptical of opt-in CRNT tariffs, as those customers with high peak demand will resist, not only perpetuating but even increasing cross-subsidies. Same with opt-out; allowing it will only delay the transition to CRNT. Bite the bullet, transition to full cost reflectivity over time if necessary, and let retailers deal with any fallout. Our preference is therefore for assignment to a well-designed demand tariff to be mandatory for all new and upgraded connections.

Renters/vulnerable households

Modelling of impacts

In the current round of TSSs we have seen little evidence of modelling of bill impacts of different tariff design options on different consumer cohorts. At the very least, this modelling should be for the following cohorts:

- Low, medium and high total consumption
- Stay at homes versus working families (ie, flat versus peaky loads)
- Solar versus non-solar

Modelling should preferably also include the likely bill impacts of load-shifting away from peak periods.

Jurisdictional alignment

Residential consumers, business customers and energy retailers all benefit from avoiding the confusion of multiple tariff structures within the same jurisdiction. If the Victorian and Queensland networks can agree on common tariffs, we see no reason why the NSW networks cannot do likewise. Some substations may peak in winter and at different times of the day to those with summer peaks, but dynamic CRNT can vary by location as well as time of day.

Integration with regulatory proposals

Tariff reform is made easier where tariff design is well integrated with the demand management and capex requirements of network regulatory proposals. For instance, innovative tariffs such as solar sponges can be trialled as demand management programs.

Model demand tariffs

In TEC's view the ideal CRNT would have the following features:

1. *Cost-reflective*—ie, sends a price signal about the cost of meeting current and future peak demand, but also peak supply (the solar trough).
2. *Simple and attractive* to consumers:

- To be aware of (preferably in real time).
- To understand (and therefore for retailers to pass through).
- To respond to via behavioural change (if they choose) by offering incentives rather than penalties wherever possible.

3. *Equitable*—ie,

- Treats DER and non-DER households equally and fairly.
- Does not penalise low consumption households by increasing fixed charges.
- Does not hobble the effectiveness of CRNT by allowing customers to opt out.

Applying these features suggests the following model demand tariffs:

1. A seasonal or localised real time *peak time rebate* based on a flat, IBT or TOU tariff.
2. A seasonal or localised *capacity tariff* with rewards for whole of season under-consumption as well as penalties for exceeding the plan.

Either of these designs should be complemented by the following features:

- Peak periods are no wider than 4 hours to allow for easy load shifting.
- It does not attempt to recover a majority of sunk costs via fixed charges.
- It does not allow opting out.
- It is consistent with other demand tariffs in the same jurisdiction (allowing for minor variations such as application in morning or winter as well as evening and summer peak periods).

Notes

- Networks with high PV penetrations should also consider introducing a peak supply tariff (say 10am-2pm on sunny days) to cater for solar troughs, alongside but cheaper than existing overnight controlled load tariffs.
- Simplicity suggests 2- rather than 3-part tariffs. Where the energy charge is dropped, sunk costs should be recovered from the demand as well as the fixed charge.
- Both of the above model tariffs require smart meters to implement.

Examples of better tariffs

1. Peak time rebate

- Paid as rebate ($10-20 per event) off next bill up to 10 times pa for reducing current or historical peak demand by a given amount (say <1-2kW) in response to day-before or same-day signal.
- Offers a positive incentive for behavioural change.
- Paid for by a slightly year-round higher energy charge.
- Currently being implemented by Powershop in its Curb Your Power (AEMO/ARENA) DR program.
- Being considered by SAPN for its next TSS.

2. True capacity tariff

- Based on either (a) a customer's historic peak demand for the same month, or (b) the customer's choice of peak monthly capacity in kW.
- Customers can either be rewarded for staying well under their capacity or penalised with higher charges for exceeding it.
- Currently being piloted by Horizon via its MyPower trial, which combines a TOU with a capacity/demand tariff and peak time rebates in summer.

Assessment framework

TEC will assess the success of demand tariffs in networks' Draft TSSs according to the following criteria:

1. How cost reflective is it? In particular:
   A. Does it send an appropriate price signal about the LRMC of demand at the local (zone substation) or network-wide peak (or to increase demand in the solar trough)?
   B. Does it attempt to recover sunk (residual) costs via higher fixed charges, or from demand and energy charges as well?
2. How easy is it for small consumers to understand and respond to?
3. Is the customer assignment strategy likely to support its success?
4. How will it impact on the total bills of different consumer cohorts?
5. What opportunities does it afford consumers to monitor and change their behaviour?
6. What else is the network doing to reduce maximum demand at peaks and increase it in troughs?
7. Does it treat DER and non-DER consumers equitably?
8. Is the demand tariff likely to be complemented by other innovative tariffs (eg solar sponges)

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1 R Passey et al, Designing more cost reflective electricity network tariffs with demand charges, *Energy Policy* 109 (2017) 642-649.

2 DBT = declining block tariff; IBT = inclining block tariff; TOU = time of use; MMD = maximum monthly demand; PTR = peak time rebate; CPP = critical peak pricing.

3 See, eg, Mountain, B. R. 2018, Customers' rejection of electricity tariffs with demand charges: Lessons from Australia, in "Title of chapter", in *Consumers, prosumers, prosumagers: How innovation in energy services will lead to stratification of consumers and disrupt traditional utility business paradigm*. Sioshansi, F. Ed. Academic Press. Forthcoming.

4 CUAC (2015) Cost reflective pricing: Engaging with network tariff reform in Victoria, 2.

5 ACCC (2018), Retail Electricity Pricing Inquiry—Final Report, 181.