Noel Schubert

5 December 2020

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Economic Regulation Authority
4th Floor Albert Facey House
469 Wellington Street
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Submission re: Scoping paper - matters for inclusion in the issues paper on the framework and approach and new guidelines for Western Power's fifth access arrangement review

Dear Elizabeth,

Thank you for the opportunity to comment on matters for inclusion in the issues paper the ERA plans to prepare for consultation on the development of the framework and approach and new guidelines.

I note the matters covered in the ERA's scoping paper. I support the recent amendments to the Access Code, although in June this year I recommended additional amendments and still do.[1]

I comment in this submission on the first part (underlined) of one of the outcomes quoted in the scoping paper, that the amendments gazetted so far seek to achieve:

> **Maximising network utilisation** through changes to the Access Code objective, ensuring end-use customers receive appropriate price signals, enabling cost recovery for Advanced Metering Infrastructure (AMI), improving access to the Western Power network and enabling cost recovery for constraint-related functions.

I recommend that the ERA discusses this matter in the issues paper so that it leads to Western Power working appropriately to maximise average network utilisation, to lower costs, including through price signals that incentivise network users and end-use customers to help achieve this.

Maximising network utilisation

At present the annual average network utilisation of most transmission and distribution network circuit assets is very low.[2] There are a number of reasons for this, some of which Western Power can influence.

Western Power can encourage network users and end-use customers to manage electricity demand to maximise network utilisation and lower costs by:

- Focussing effort on increasing average network utilisation, rather than its main focus being on peak network utilisation as it has been[3]
- Applying network tariff price signals that incentivise customers to:

[1] Recommended Access Code changes submission: https://www.wa.gov.au/sites/default/files/2020-07/Noel%20Schubert%20submission%20-%20redacted.pdf

[2] Average network utilisation of a circuit/feeder it's 'average load' divided by its 'rated capacity'. Many Western Power transmission circuits have an annual average utilisation around 20%, and even lower. Industries seeking to get more, useful output from their assets focus on increasing average utilisation rather than acquiring additional assets to meet peak demands.

[3] Peak network utilization is 'peak load' divided by circuit or feeder 'rated capacity'.

- have lower demand at network peak demand times – i.e. lower 'coincident demand' – to defer network augmentation[4]
- shift demand to times when there is spare (unutilised) network capacity, like the middle of the day or overnight.

Community batteries and grid-scale batteries can help to achieve improvements in network asset utilisation upstream of the batteries (relative to the direction of energy flow), but not downstream where the load on the network assets is dependent on downstream demand irrespective of whether the upstream battery is supplying it or not.

Behind-the-meter batteries and other forms of energy storage (e.g. thermal energy storage – storage hot water systems, heat banks, chilled-water storage) can assist with levelling load on network and generation assets all the way upstream from the customers with the storage.

I recognise that batteries can also provide other very useful services and in some case are better located upstream. I support the use of batteries for these various roles, but they are also a network 'augmentation' when used for that, with a capital cost that could be avoided or deferred if customer demand was managed sufficiently through effective price signals, customer education and then customer response in the short and long term.

Customer flexibility

Western Power recognises that customers can provide flexibility to help manage electricity demand. It's 100MW Challenge and Flexibility Services Pilot is seeking to make use of such flexibility, and I support this.[5]

The DER Roadmap aims to make use of customer flexibility in future.[6]

Western Power is assisting large customers in the Eastern Goldfields to lower energy costs by making available and 'signalling' spare network capacity when it is available.[7]

Network tariff price signals

The present network reference tariffs are not structured well to help maximise network utilisation.[8] The main deficiencies in the reference tariffs from this perspective are described in more detail in the appendix to this submission.

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[4] Coincident kVA demand - an individual customer's kVA demand at the time of the annual peak demand of the network elements supplying that customer - is the main long-term driver of network costs. It determines the capacity required and so the cost of the network elements that must be built, operated and maintained in order to supply that customer at that time.

[5] Flexibility Services Pilot: https://www.westernpower.com.au/our-energy-evolution/projects-and-trials/flexibility-services-pilot/
100MW Challenge technical briefing presentation: https://www.westernpower.com.au/media/4322/100mw-challenge_technical-briefing-deck_20-july-2020.pdf

[6] DER Roadmap and supporting documents: https://www.wa.gov.au/government/distributed-energy-resources-roadmap

[7] Goldfields network capacity offered: https://www.westernpower.com.au/community/news-opinion/big-data-strikes-gold-for-miners/

[8] See the 2020/21 Price List: https://www.westernpower.com.au/media/4302/network-access-prices-2020-21-price-list-20200702.pdf
and 2020/21 Price List Information: https://www.westernpower.com.au/media/4299/network-access-prices-2020-21-price-list-information-20200702.pdf

Summarising the main reference tariff deficiencies:

1. Most of the reference tariffs, applied to most customers, do not have effective structures to signal and encourage customers to shift demand from the network peak demand times to other times of the day when there is spare, unutilised network capacity, particularly to the middle of the day. This is when the large amount of rooftop solar PV is causing the lowest demand (more unutilised/spare network capacity), reverse power flow, and high voltages on the network. More demand at this time would help to remedy those issues.
2. Some reference tariffs have no, or no longer appropriate, time-of-use time periods and their signals given the new network kVA demand profiles that are now common due to the large amount of rooftop solar PV installed.
3. Many of the reference tariffs are based on kWh energy consumption rather than customer coincident kW or kVA demand. Aside from some truly fixed costs which should be recovered by a tariff fixed charge, customer kVA coincident demand is the primary driver of network costs, not kWh energy consumed. The amount of network capacity required to be built, operated and maintained is primarily determined by the annual peak kVA demand on each element of the network and hence the costs of doing so.
4. The most commonly used reference tariffs that do have kVA demand charges, charge for 'anytime' maximum demand rather than customer coincident demand that cumulatively determines the annual peak demand on each network element.

Many customers make investment decisions for things such as their buildings, appliances and equipment, business operating patterns, and solar PV systems. More recently some are making choices to invest in newer technologies such as batteries and electric vehicles. The viability of these choices, which can have long term implications for both the customer and the network, is determined by the electricity tariffs among other factors. The demand profiles we currently see in the network are the result of customer decisions based on less-than-optimal retail and network tariffs over many years.

It is important that electricity tariffs provide signals that are in the long-term interest of consumers as the new Access Code objective requires.

To achieve the best and most economically efficient outcomes from electricity tariffs, the tariffs need to be structurally cost-reflective of the network cost drivers. Also, retailers and a significant number of customers need to have these more structurally cost-reflective tariff signals applied to them so that they see the cost signals and can respond over time.

If retailers and most customers do not experience more cost-reflectively structured, time-varying price signals, the outcomes will continue to be less economically efficient because of less efficient responses from retailers and customers, resulting in higher costs of supply. It will also result in continued unfair and inequitable cross-subsidies between customers, distorting efficient price signals.

I would be pleased to discuss any of these matters to explain my reasoning in more detail.

Yours sincerely,

Noel Schubert

Appendix – Network Reference Tariff deficiencies

Some of the more significant deficiencies in the current reference tariffs are described below.

1. Flat, kWh energy-based tariffs, such as the RT1, RT2, RT13 and RT14 tariffs, provide no time-of-use (TOU) signal or no kW or kVA demand signal. Aside from some truly fixed costs that should be recovered by a tariff fixed charge, customer kVA coincident demand is the primary driver of network costs, not kWh energy consumed. The amount of network capacity required to be built, operated and maintained is primarily determined by the annual peak kVA demand on each element of the network, and hence the costs of doing so.
2. Tariffs with a time-of-use signal, such as the TOU kWh energy-based tariffs RT3, RT15, and RT4, RT16 have peak periods from 7am - 9pm or 8am - 10pm on weekdays respectively, and so do not encourage extra demand in the middle of the day or focus customers to reduce demand during the much narrower late-afternoon/early-evening peaks, say 3pm – 9pm. Therefore customers receive no signal to shift demand from the evening peak to the middle of the day.
3. The RT5 and RT6 kVA anytime maximum demand tariffs do have a peak period from 3pm to 9pm on weekdays which is good. However, it is only used for a blunt signal (a discount) to customers to encourage them to increase their proportion of off-peak energy (kWh) consumption relative to their total energy consumption. Customers have no effective signal to reduce their coincident demand (during peak periods) and encourage higher demand at off-peak times (when there is spare network capacity) because the kVA demand charge applies to their highest half-hourly demand any time of the month on-peak or off-peak.

   I acknowledge that Western Power has to provide sufficient network capacity to supply a customer's anytime-maximum-demand – the rationale for charging for this. However, only a small part of the network nearest to the customer has its required network capacity determined by the customer's anytime-maximum-demand, which incidentally happens to be equal to its coincident demand on those network elements anyway. Upstream of those elements, where the network capacity is shared with other customers, the network's required capacity is determined by the aggregated coincident demands of all customers supplied by each network element. It is only a single customer's coincident demand for each network element supplying the customer that drives its share of required capacity of each element, and so what should be charged to that customer.

   In summary, the anytime maximum demand charge of the RT5 and RT6 tariffs, which is not time-based to apply during network peak times, with lower rates during off-peak times, does not provide an appropriate signal to maximise network utilisation.

4. The RT7 and RT8 contract maximum kVA demand (CMD) tariffs also apply the demand charge for that CMD at all times (anytime). There is no time-based signal to incentivise moving demand from network peak demand times to times when the network has spare (unutilised) capacity. An excess network usage charge also applies for customer peak half-hourly demand in excess of the CMD, even if/when the network has spare capacity the customer could use and which would increase utilisation of the network.

   Certain customers are limited to their CMD due to network constraints that apply at all times, and so the current conditions of these two tariffs are appropriate for them. Even then though, the tariffs provide no signal or incentive for the customer to reduce their demand at peak network demand times, or to increase demand up to their CMD during the middle of the day or at other times when the network has spare capacity, to improve its utilisation.

5. The RT17 and RT18, three-part kWh energy-based TOU tariffs are better structured than the tariffs discussed in items 1 and 2 above, although they are still kWh energy-based rather than coincident kVA demand-based.

   However, I am not aware of a sound basis for the noon changeover time between off-peak and shoulder periods. Noon is now in the middle of the network's lowest demand period due to the large amount of rooftop solar PV.

   The distinct morning demand peak should perhaps be the shoulder period, from say 7am to 10am, with off-peak being from say 10am to 3pm as well as the other times already designated as off-peak in the tariffs.

6. The RT19 and RT20, three-part, on-peak kW demand and TOU kWh energy tariffs are the most cost-reflectively structured tariffs of those charging on a kWh energy basis. This is because they include a kW demand charge that is applied in the on-peak period only (3pm – 9pm weekdays), which is good. This more closely reflects the customer's coincident kVA demand, which is more cost-reflective. The noon changeover time for off-peak to shoulder is questionable as described in item 5 above.
7. The RT21 and RT22, multi-part kWh energy-based TOU tariffs have more granular and demand-reflective time periods than the tariffs discussed in items 1, 2, 5 and 6 above, although RT21 and RT22 are still kWh energy-based rather than coincident kVA demand-based.

   In these tariffs, the distinct morning demand peak should perhaps be the shoulder period on weekdays, from say 7am to 10am, rather than 7am to 3pm, with off-peak being from say 10am to 3pm, as well as the other times already designated as off-peak.

8. The TRT1 transmission contract-maximum-demand tariff has the same deficiencies with respect to maximising network utilisation, as the RT7 and RT8 CMD tariffs discussed in item 4 above.