Noel Schubert

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Energy Transformation Taskforce
Energy Policy WA
Locked Bag 11, Cloisters Square
WA 6850

Submission re: Issues Paper - DER Roadmap: Distributed Energy Resources Orchestration Roles and Responsibilities

Thank you for the opportunity to comment on the proposals outlined in the above Issues Paper and the questions raised.

I understand the reasons for the approach outlined in the Issues Paper and agree it is likely to be required if other earlier, lower cost approaches do not solve the current "clear and present challenge".

However the Issues Paper approach will be costly to implement, taking into account the total cost to all participants. As indicated in Table 1 of the Issues Paper (DSO/DMO action items from the DER Roadmap), the approach will also take quite some time to implement effectively due to the many regulations, procedures, technology standards and other matters that will need to be developed and implemented, complied with by participants and monitored. Even the additional technology/hardware costs will be significant and may present a barrier to the take-up of DER.

I consider that there is a much lower cost and faster way to obtain customer and other participant responses earlier, to help overcome many of the challenges the DER Roadmap and orchestration are seeking to overcome – such as minimum, ramp-rate and peak system demand issues, network reverse power flow issues and network voltage management to name some of the more significant ones.

I fully support the following comment made by Mark Timson of Energy-Tec in the 'chat' dialogue of the online TDOWG meeting #22 on 28 August 2020 regarding DSO / DMO Roles and Responsibilities:

> From a Customer Perspective - There is a lot of focus on technology integration/control of existing & new DER by the DSO/DMO. What about new tariff (Synergy Gazetted & Western Power Network Tariffs) designs that can be offered on an "opt-in" basis for DER customers (&/or Aggregators) to achieve the same technical outcomes for the System, but driven by tariff price signals only?

Effective tariff price signals with good participant education programs and promotion would be a much lower cost approach to achieve initial demand changes to help overcome the immediate and impending challenges. Third party aggregators will promote good tariffs.

The Issues Paper states that customers have been passive participants to date. That is exactly what would be expected because tariff price signals for most customers have been passive (not even time-varying) for so many years to date. No wonder customers are causing the 'clear and present challenges' and not responding to help overcome them when customers receive no signals to do so. The flat, energy-based tariff applied to most residential customers still incentivises (subsidises) the

installation of rooftop PV significantly, aside from the renewable energy buyback rate which has recently been improved.

The recently announced time-varying buyback rates (3c/kWh and 10c/kWh) are a good example of sensible price signals to encourage a change in customer and supplier behaviour.

Sensible changes now need to be made to network and retail consumption and demand tariffs. I acknowledge that the DER Roadmap includes actions to improve price signals, however little public information is available on the tariff pilots and the design of the pilot tariffs so that it appears as if this work is being given lower priority than the approach outlined in this Issues Paper.

Sensible tariffs could be introduced sooner, rather than waiting for results from tariff pilots. There have been enough tariff pilots carried out in the SWIS and elsewhere to date to allow informed implementation of sensible tariff designs without delay. Tariff reform should be given the same or even higher priority than the approach outlined in the Issues Paper because it would be lower cost and can be implemented to achieve results much sooner.

I elaborate further on tariff reform in Appendix A and its references.

One additional suggestion follows.

Building up the minimum demand - offering FREE electricity for extra consumption

When WEM balancing prices are negative, selected customers could be offered free retail electricity for extra consumption - to increase demand at those times. AEMO could send out notices (via SMS, via Western Power to advanced meters, via the Internet, via retailers or via other means). The offer would need to be restricted to customers with advanced meters with bi-directional metering communications enabled.

Customer selection could also be based on the WEM balancing price. The more negative the price, the larger the group of selected customers. The selected customers could be residential only (via Synergy) or include all advanced meter customers selected on the basis of local network needs at the time (reverse power flow, high voltages, etc.), or on other criteria.

The marginal wholesale cost of the energy is negative, and the marginal cost to Western Power of transporting the extra energy over the network towards extra load during these low load times is zero, apart from minor effects (positive and negative) on line losses.

The metering/determination of the extra consumption would need to be arranged and implemented - a bit more challenging - and would need the advanced meters. It will be necessary to prevent gaming by customers - withholding demand and then switching it on during these periods.

Free electricity would be an excellent marketing offering by Government and retailers - **Free electricity** for extra consumption whenever the wholesale price is negative, helping customers lower their bills if the extra consumption replaces consumption at other times of the day. It would require adjustment to:

- the billing of Western Power charges to retailers
- Synergy or other retailer customer bills

or could be handled by a separate credit settlement mechanism - normal tariff charges, and then:

- a rebate from Western Power to retailers and

- a rebate from retailers to participating customers

to offset the normal energy charges for the extra consumption.

A rebate would be more popular with customers.

The marginal generator or foregone generation is also likely to be from a renewable generator(s) (zero emissions for the extra consumption) during many of these instances. During the recent very negative balancing price events renewable generators decreased output to avoid the negative prices by bidding to be 'out-of-merit'.

Free electricity at these times would be a bonus of the rapid take-up of renewable energy.

It could result in sufficient extra demand to raise wholesale prices towards zero (negating the issue) and could avoid minimum-demand security-of-supply issues.

There's quite a bit of work to implement this, but there is also a mountain of work and cost to avoid minimum demand security risks using other methods such as are being worked on (e.g. DER orchestration via DSO/DMO proposed by the Issues Paper).

Responses to some questions raised in the Issues Paper

***Question D2**: Should different 'use of system' charges apply for DER customers? If so, how should the costs and benefits of DER be accounted for?*

Ideally retail tariffs and network tariffs should have a $/kVA variable charge for the customer's coincident demand from the network at the point of connection irrespective of whether the customer has DER or not.[1] It is this coincident demand that drives the amount of network capacity required to supply that customer.

A fixed charge covering truly fixed costs (those that do not vary with reasonable changes in the customer demand profile) is also required.

The $/kWh energy charge component should only be in the retail tariff to reflect the varying wholesale energy cost, and not in the network tariff. Energy transported by the network does not drive network costs. Coincident demand does.

If these tariffs were structured to correctly reflect these cost drivers, then no other charges would be needed for DER use of system.

***Question C1**: Should a customer with new or upgraded DER be required to participate in an aggregation scheme to mitigate the risk of a significant proportion of DER in the SWIS remaining 'passive'? If yes, what should be the trigger for such a requirement? If not, why not?*

Effective tariff price signals are needed to incentivise helpful customer behaviour. Perhaps the customer can be given the choice of at least one of: being on a tariff that is structured to properly reflect supply cost drivers, or participating in an aggregation scheme, or both.

***Question C3**: If the application of dynamic operating envelopes results in temporary limits on customer DER exports, what measures should be put in place to ensure that this does not*

[1] Coincident kVA demand - an individual customer's 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 capital cost of the network elements that must be built and maintained in order to supply that customer at that time.

unnecessarily limit DER output in preference to other alternatives such as load management or other generation sources?

That is, what criteria should apply to the network operator's assessment of when to undertake a network enhancement to remove constraints that prevent the export of DER energy and to maximise the ability of small DER owners to participate equally with other energy resources?

I suggest that proper economic evaluation of the alternatives should be used to choose the most appropriate one. There are five well-known tests for choosing between demand-side and supply-side alternatives, with each test depending on whose perspective the evaluation is done from. See the California Standard Practice Manual for DSM programs[2], and similar documents.

***Question G1**: Would aggregated DER providing services into the WEM require changes to metering and settlement arrangements?*

If so, how could this be implemented without multiple meters at a customer site and the associated costs?

A single advanced meter is fine for measuring half-hourly-interval import and export energy and demand. That is all that matters to the network and upstream generation from a proper cost allocation perspective. Metered data, and closer-to-real-time data from the meter, may need to be shared with parties who need it (aggregator, DSO, AEMO, others?). If any party wants more behind-the-meter (BTM) information they would need to arrange for it to be measured and/or obtained from BTM devices.

***Question G5**: Should the DSO (Western Power) or the System Operator (AEMO) be able to issue instructions directly to end-user DER in the presence of a network reliability risk or system security risk, or should all instructions come via an aggregator?*

The instructions should all come via an aggregator – the customer's representative – to keep costs down and allow communications innovation to provide low cost communications methods. Based on past experience I suggest that Western Power would likely require expensive communication solutions if Western Power has the right to instruct customers directly.

Thank you for the opportunity to comment. I would be pleased to be able to elaborate in a 1-on-1 meeting on any aspects of this submission, to provide additional explanation to support my comments.

Yours sincerely,

Noel Schubert

[2] https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/CPUC_STANDARD_PRACTICE_MANUAL.pdf

Appendix A – Improvements to Network and Retail Tariffs. Extract from my June 2020 submission to ETIU on the recently proposed changes to the Network Access Code

Chapter 7 – Pricing methods and tariff structure statements

The ETIU and the Energy Transformation Taskforce have recognised the need to improve price signals to users and end-users of electricity to incentivise more efficient responses from them. The DER roadmap has "tariffs and investment signals" as one of its four themes. The roadmap states:

> Current electricity tariffs are contributing to inefficient and inequitable outcomes for customers, and the power system.

The roadmap goes to some length to outline the problems with current retail tariffs and has actions to address tariff deficiencies.

For many customers, particularly residential and small business customers, the network tariffs currently charged to retailers (for those customers) still have the same old tariff structures as the retail tariffs had when the network tariffs were first introduced. Around 98% of residential customers are still on flat, kWh energy-based retail and network tariffs (with non-time-varying prices) because that is all that the older electro-mechanical meters could support.

Flat energy-based tariffs, and even some time-of-use energy-based tariffs, are a key contributor to significant inefficiencies in retailer and customer investment decisions and consumption profiles. They cause significant cross subsidies from those who don't have rooftop PV systems or air conditioners to those who do. This results in inefficient outcomes and higher costs of supply for other customers. These tariffs have also caused Western Power and Synergy to lose more revenue than the cost reductions resulting from wide-spread customer adoption of rooftop PV.

For economically efficient outcomes, network tariff structures should ideally be based on the main cost drivers of network costs so that retailers and customers see these cost signals and can respond efficiently. The absence of good price signals has caused inefficient outcomes - that the Energy Transformation Strategy recognises and is now having to manage.

Coincident kVA demand - an individual customer's 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 capital cost of the network elements that must be built and maintained in order to supply that customer at that time.

Energy consumption (kWh transported by the network) has little direct relationship to the costs of network services provision and so ideally should be phased out as a component of network tariffs. There is no sound basis for including energy charges in network tariffs other than for customers with electro-mechanical meters that can only measure cumulative energy consumption (kWh) rather than half-hourly kWh consumption from which half-hourly demand (kVA) can be derived. Yet many network tariffs are still based on cumulative energy consumption for customers with electronic meters that are capable of measuring and recording half-hourly consumption. Around 500,000 (half of) residential customers already have electronic meters that are recording their half-hourly consumption, but this is not downloaded and used for network and retail tariffs that could be based on it.

On the other hand, it is good that network tariffs for large commercial and industrial customers are already demand-based – based on their kVA anytime maximum demand or contract maximum demand.

These tariffs would be even more efficient if their demand charges were time-based (based on peak demand times - that matter to the network), rather than charging for anytime demand. I recommend that time-based demand charges be introduced for these tariffs. Making them time-based would encourage customers to shift their maximum demand away from network peak demand times that drive network expenditure, to other times when there is spare network capacity. This would defer network expenditure and improve network utilisation. Please refer to pages 5 - 7 of my December 2017 submission to the ERA [3] for more detail on this.

Recommended addition to the proposed Pricing Objective

I support changes to chapter 7 of the Access Code to improve network tariffs, but I still question whether the proposed Access Code requirements are sufficient. Will they ensure that the network tariffs are structured in future to be properly cost-reflective, to achieve effective, economically-efficient responses from users and end-users?

Quoting from the proposed pricing objective - section 7.3, do the proposed changes to the Access Code require "that the reference tariffs that a service provider charges in respect of its provision of reference services should reflect the service provider's efficient costs of providing those reference services" to individual customers?

In the National Electricity Market (NEM), in November 2014, the AEMC made a new rule to require distribution network businesses to set prices that reflect the efficient cost of providing network services to individual consumers. Further information on the reasons for this and the process that led to this rule change are given on their web page [4]. I recommend that ETIU consider this NEM rule change and the need for it apply to WA networks to ensure network tariffs are more efficient.

For network tariffs to properly reflect the efficient cost of providing network services to individual customers, the tariffs would at least need to be time-based, and should also be based on the individual customer's coincident demand because that is the predominant driver of each customer's individual contribution to network costs, as discussed above.

Consultation re tariffs

Section 5.2(b) has been amended in the proposed draft Access Code to refer to 'customers' (i.e. end-use customers and users) rather than just users, so that types of reference services are based on services likely to be sought by (or the benefit of which is likely to be sought by) a significant number of end-use customers.

Retailers and customers may not necessarily seek network tariff structures that are economically efficient - based on network cost drivers. A requirement for the tariffs to be structured to be economically efficient, and in a way that customers are able to respond to, should take precedence over structures that retailers or end-use customers may favour or seek, if the latter are not economically efficient.

Tariff structures should not be designed and offered based on a "popularity" basis. For example, retailers and customers may favour flat energy-based (kWh) tariffs and seek such tariffs to continue

[3] https://www.erawa.com.au/cproot/18520/2/Mr%20Noel,%20Schubert.pdf
[4] https://www.aemc.gov.au/rule-changes/distribution-network-pricing-arrangements

for customers with meters capable of supporting more cost-reflective tariffs. Flat energy-based tariffs are not economically efficient and so should be phased, out as meter installations allow, for more economically-efficient tariff structures even if time-varying tariffs are less popular. Time-varying tariffs will result in lower supply costs over time from better retailer and customer responses and decisions, and so are more economically efficient. They will benefit end-use customers more than continuing on flat energy-based tariffs, consistent with the proposed Code Objective.

Ideally network and retail tariff structures for each individual customer should be as economically efficient in structure as the customer's meters are capable of supporting.

Network tariffs are charged to retailers for each customer, and so could be structured as efficiently as possible to apply to the retailer based on the customer's meter capability, even if the retailer does not adopt that retail tariff structure and pass these signals on to the customer. Of course, it is most efficient if the retail tariffs also include the efficient price structure and signals.

Charging the most cost-reflective tariff structure to retailers would incentivise them to act efficiently, or at least take on the risk of not doing so, rather than the network service provider bearing the risk of inefficient retailer and/or customer response.

Recommendations

I recommend that:

1. Network tariffs (charged to retailers) be as cost-reflectively structured as each customer's meter can support irrespective of the retail tariff charged to the customer.
2. The words "to individual customers" be added to the end of the pricing objective in section 7.3 of the Access Code, to match what is required by the NEM distribution pricing rule discussed above.
3. The relevant sections of the current draft of the proposed Access Code be checked again to see whether any of the requirements are still a barrier to implementing the most cost-reflectively-structured network tariffs.
4. Transmission tariffs also be required to be included in the proposed Tariff Structure Statement (TSS) so that this helps to incentivise improvements to these tariffs. The extra scrutiny through the TSS process should incentivise a move towards transmission network tariff demand charges being made time-based, to reflect times that matter to the network rather than the charges applying anytime (including times when there is ample spare network capacity available and the network is underutilised).