

Noel Schubert

4 May 2021

Ms Elizabeth Walters
Economic Regulation Authority
4th Floor Albert Facey House
469 Wellington Street
Perth 6000

Submission re: Issues paper on the Framework and Approach for Western Power's fifth access arrangement review

Dear Elizabeth,

Thank you for the opportunity to comment on the Issues Paper the ERA has prepared for consultation on the development of the Framework and Approach.

I support the recent amendments to the Access Code, although in June 2020 I recommended additional Access Code amendments to the Energy Transformation Taskforce and still do.¹

Further to the points made in my recent submission² to the ERA on its Framework and Approach Scoping Paper, I comment in this submission on the following aspects discussed in the Issues Paper:

- The new Access Code objective, and how to determine consistency with it – section 2.1
- Reference services, in particular “Exit and bi-directional services” – section 4.2, “Time of use periods” – section 4.3 and “Smart technology” – section 4.7
- Demand management innovation allowance mechanism – section 10.

Determining consistency with the new Access Code objective

From the discussion in the Issues Paper this appears to be complex and challenging. I am not able to suggest an overall approach to determine consistency.

However I do suggest that it could help to evaluate consistency by considering the costs and benefits of the matters under consideration from multiple perspectives as described in my recent out-of-session submission to the ERA and Energy Policy WA, included as appendix A.

Energy options could be evaluated from the different perspectives, and then be determined taking into consideration the benefit/cost ratios from multiple perspectives.

The issues paper seeks comment on the following (among others – page 10):

The ERA is seeking stakeholder feedback on the ERA's proposed approach to determining consistency with the Access Code objective, including but not limited to:

- What information or data might be available to assist the ERA in considering each of the limbs, particularly the environmental consideration, in determining consistency

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

² Submission to the ERA's scoping paper: <https://www.erawa.com.au/cproot/21632/2/Noel-Schubert.pdf>

with the Access Code objective? For example, information on greenhouse gas emissions.

Without wishing to add to the workload of EPWA and AEMO, it would not be difficult for AEMO to develop systems that calculate and provide estimated greenhouse gas emissions of market generators - as dispatched and over their range of operational output – to use for modelling emissions.

More comprehensive modelling of emissions across the whole supply chain and customer base will require significant effort if it is to consider changes in emissions due to changes in technologies that customers may take up, and the interrelation with electricity network evolution and expenditure – for example electric vehicles, batteries and rooftop solar systems and their effect on overall WA emissions.

In my opinion there will need to be much greater focus on these aspects in future.

Exit and bi-directional services

In section 4.2 the Issues Paper states the following (**bold additions** are my comments/queries):

Most of the residential and commercial reference services include an exit and bi-directional version. Combining the exit and bi-directional service would reduce the number of services. However, the service provided to a customer who imports energy from the network and exports to the network is quite different (**yes, but is it materially different, from a network cost perspective?**) from a customer who only imports energy from the network. Exporting energy to the network places different demands on the network compared with importing energy from the network (**how material are they?**). In addition, the load profile for a customer that can supply some of its own energy will differ from a customer who draws all of its energy from the network (**yes, but how does this materially affect the cost of service provision when a customer's remaining coincident demand is the main driver of network costs?**)³. Reference services should be tailored to the (**predominant**) service that is provided.

Care also needs to be taken before expanding the existing bi-directional services to include connections with new technologies, in particular batteries and electric vehicles. The service requirements for a battery connected to the network or an electric vehicle charging point will differ (**how materially, apart from differences in coincident demand?**) from those of a household with a photovoltaic system, battery and electric vehicle behind the meter. Specifying appropriate reference services is an important component of providing incentives to users that enables efficient operation and use of the network.

I consider that it is important to simplify the reference services and corresponding reference tariffs and maintain simplicity by basing them on the predominant services and the material network cost drivers.

It is possible to simplify reference services a lot by focussing on the aspects of the service that materially affect network costs and not trying to differentiate between services on the basis of immaterial differences.

³ 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.

It would help to combine exit and bi-directional services into say an 'import-export' reference service under which the common 'exit-only' service (i.e. a normal customer that does not export) is merely the import-export service with zero export occurring.

Technology agnostic reference services

Technology agnostic reference services are one approach to simplify reference service. Reference services that only focus on the important components of customers' load and export profiles at the point of connection, irrespective of the appliances and technologies behind the meter that are causing the profiles, greatly simplifies the specification of the services.

For the vast majority of customers, the network and its costs are affected materially by only a few components of customers' load and export profiles, such as:

Load profiles:

- A customer's 'coincident demand' – in kVA or kW
- Some fixed costs of the customer's network connection and service provision that don't vary with changes in the customer's load profile – e.g. meter, service lead, dome, back office systems, and operating and maintenance of the network, although they are a result of the amount of network required to be built to service customers' coincident demands.

The customer's load profile throughout the rest of the year - away from peak network element load times – does not materially affect network costs or service provision. In other words, the customer's energy (kWh) consumption profile for most of the year is immaterial to the network and should not be the basis for network service differentiation or network charges.

Export profiles:

- A customer's kVA export quantity at times of low load on affected network elements in areas where reverse power causes material issues. Even then, this may not materially affect network costs. What percentage of total network expenditure is likely to be incurred due to reverse power and voltage management issues? I suspect it will be insignificant.

In my opinion there is no need to differentiate reference services based on whether customers have different technologies like a battery connected to the network or an electric vehicle charging point, or are a household with a photovoltaic system, battery and electric vehicle behind the meter. There are many appliances and other equipment that can cause similar customer load profiles.

It gets very complex and administratively burdensome and costly to manage different reference services based on different technologies over time.

It is much simpler to be technology agnostic and focus on the components measured at the customer's meter that materially affect network costs as discussed above. There is then no need to try and keep track of which customers have which appliances and technologies, and to have many different reference services to reflect the combinations of these appliances and technologies.

The network does not know or need to know whether a particular customer load profile is being caused by a rooftop PV system, an air-conditioner, a large storage hot water system or an electric vehicle charging. It only matters to the network what the resultant coincident demand of the customer is, not what is causing it.

For these reasons I strongly recommend that the ERA and Western Power move towards technology agnostic reference services and reference tariff structures.

I also recommend that 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. Requiring the network tariffs applied to retailers to match the structure of the retail tariff hold back progress towards more cost-reflectively structured tariff adoption.

Meter technology

To date it has been the meter type installed at a customer's premises that has determined what reference tariff structure could be supported. Old electro-mechanical meters have limited tariff structures to those based on cumulative energy (kWh) consumption rather than coincident demand for example.

Advanced meters will allow better structured network and retail tariffs to be rolled out and so facilitate better reference services. Reference services and tariffs for legacy meters can then be phased out and only be available for customers with legacy meters that need the legacy services and tariffs.

Time of use periods – section 4.3

I agree it is important that time of use periods are reviewed as demand patterns across the day change like they have done.

I raise other questions here that I recommend be taken into account in reviewing time of use periods, reference services and tariff structures.

1. Given the serious operational effects on market demand, wholesale prices and the network, due to the magnitude and variability of all of the renewable generators including rooftop PV (~2700MW in total), how can we ensure that large customers with flexible demand receive signals to carry out their flexible processes when market demand is lowest (like the middle of the day now instead of overnight), and ideally not when market demand peaks occur?
2. How many large customers with flexibility are receiving signals to move demand to times when WEM prices are low/negative, or when the network is experiencing issues due to low demand or reverse power flow? I suspect very few - due to the historical structures of generator/retailer bilateral contracts and network pricing to retailers and customers, that are probably still mostly based on low overnight demand. Daytime demand is now the new 'off-peak' and yet we are not reflecting that in signals other than wholesale market (WEM) prices.
3. How many retailers are exposed to the appropriate price signals to reflect low middle-of-the-day demand and wholesale prices? Bilateral contracts could be masking those low WEM price signals so that they are not in-effect passed through to the retailer.

There are quite a few commercial customers who could change their operating practices to increase daytime demand if they received the signals via tariffs or in real time. Some examples are:

- Universities and hospitals that already have chilled-water storage systems for shifting air-conditioning load
- Large cold stores that in the past have over-cooled their stores on off-peak (overnight) tariffs to avoid most of their cooling during past daytime peak periods (e.g. 8am to 10pm).
- Water Corporation with quite a few flexible pumping loads, as well as Shire/Council water agencies

- Ice makers

These are some examples of existing facilities that could do a lot to help the minimum market demand issues being experienced by AEMO, WEM generators and Western Power's network.

Smart technology - section 4.7

This section of the Issues Paper discusses the functionality of advanced meters.

My only recommendation regarding this is that Horizon Power be consulted on functionality that it would recommend be made available in advanced meters. Horizon Power has done quite a lot of work on the use of advanced meters and other technologies to enable customers and the network to manage demand more effectively.

Demand management innovation allowance mechanism – section 10

I recommend that the ERA base decisions on this mechanism, such as the level of the innovation allowance, on what is used in the National Electricity Market (NEM).

The demand management innovation allowance in the NEM has gone through a number of iterations with industry consultation over the years, and so is a reasonable basis on which to commence the mechanism in the Western Power network and our market unless there are good reasons for not doing so.

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

Appendix A – Submission to the ERA and EPWA on energy options evaluation methods, and improvements to future Whole of System Plans

Noel Schubert

6 January 2021

Ms Kate Ryan
Energy Policy WA
Locked Bag 11, Cloisters Square
WA 6850

and

Ms Elizabeth Walters
Economic Regulation Authority
4th Floor Albert Facey House
469 Wellington Street
Perth 6000

Dear Kate and Elizabeth,

Submission re:

- **Energy options evaluation methods**
- **Improvements to future Whole of System Plans**

This submission recommends that Energy Policy WA (EPWA), the Energy Transformation Implementation Unit (ETIU) and the Economic Regulation Authority (ERA) consider the methods for evaluating energy options described in the California Standard Practice Manual for Economic Analysis of Demand-side Programs and Projects⁴ (Standard Practice Manual) for application, as appropriate, to:

- EPWA's preparation of future Whole of System Plans (WoSPs) with input from Western Power
- The ERA's preparation of the following guidelines under the Electricity Network Access Code (Access Code):
 - Acceptable methods for valuing net benefits
 - Factors the ERA proposes to consider when determining whether expenditure meets the requirements of the new facilities investment test.

I consider that there may be useful information and approaches in the Standard Practice Manual to assist EPWA in preparing future WoSPs and the ERA in developing the above guidelines. It prescribes how to evaluate demand-side options against network and generation alternatives from different perspectives.

There may also be other equally relevant 'manuals' used in other jurisdictions to guide such energy options evaluation, but I am not aware of them being as comprehensive or considering evaluation from these different perspectives.

⁴ California Standard Practice Manual for Economic Analysis of Demand-side programs and projects, California Public Utilities Commission, October 2001,
[https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy -
Electricity and Natural Gas/CPUC STANDARD PRACTICE MANUAL.pdf](https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/CPUC_STANDARD_PRACTICE_MANUAL.pdf)

The Standard Practice Manual

The following is a quote from the California Public Utilities Commission website on Cost-effectiveness.⁵

The foundation of cost-effectiveness analysis for all demand-side resources is based in the [Standard Practice Manual](#). The Standard Practice Manual contains the Commission's method of evaluating energy saving investments using various cost-effectiveness tests. The four tests described in the Standard Practice Manual (i.e., the Total Resource Cost (TRC), Program Administrator Cost (PAC), Ratepayer Impact Measure (RIM), and Participant Cost Test (PCT)) assess the costs and benefits of demand-side resource programs from different stakeholder perspectives, including participants and non-participants. The specific tests and the applications of those tests varies among the resources.

The principles and thinking behind the application of each of these tests could be used by EPWA, the ERA, Western Power, Synergy and even AEMO when evaluating different energy supply and demand options/alternatives.

The terminology used is different in some cases to Australian terminology. For example, 'ratepayer' is essentially a 'tariff-payer' or end-use customer (consumer) that is not a 'participant' in the program being evaluated.

The 'Societal Test' in earlier versions of the standard practice manual is now a variant of the 'Total Resource Cost Test', and would be the test used from the perspective of a government acting in the interest of society as a whole.

The 'Program Administrator Test' was formerly called the 'Utility Cost Test', the test applied by a utility like Western Power or Synergy from its perspective offering the program being evaluated. For example, it could be applied to the evaluation of offers to Western Power's current 50MW "Distribution Storage Plan" invitation, against the alternative network augmentations the storage and other offers could potentially avoid or defer.⁶

Future Whole of System Plans

The preparation of the inaugural WoSP is a major, and very positive, achievement. I commend ETIU for doing this important work, and the detailed processes used in its development, given the complete absence of such a process and plan in the past.

In the interest of incremental improvement, I comment here on some aspects where I consider the evaluation for future WoSPs should be expanded.

1. The inaugural WoSP modelled constraints and estimated the future costs of transmission augmentation between transmission zones (inter-zone) for each scenario, but did not model constraints and costs within transmission zones (intra-zone) of transmission system or distribution

⁵California Public Utilities Commission web-page on Cost-effectiveness

<https://www.cpuc.ca.gov/general.aspx?id=5267>

⁶ Distribution Storage Plan, Western Power. Opportunities Information Paper 2020:

<https://www.westernpower.com.au/media/4659/distribution-storage-plan-wp201211.pdf>

Web page: <https://www.westernpower.com.au/community/news-opinion/50mw-of-extra-battery-storage-planned-for-the-swis/>

Industry Forum presentation slides: <https://cdn->

[au.mailsnd.com/26738/V0Oc5rU2MGze1t6JFzByKfj6NVIA2O0tNgLeS_oUY5c/3374040.pdf](https://cdn-au.mailsnd.com/26738/V0Oc5rU2MGze1t6JFzByKfj6NVIA2O0tNgLeS_oUY5c/3374040.pdf)

system augmentation and replacement.⁷ By ignoring these future intra-zone costs the WoSP may have ignored components that could have had a material effect on the total costs of alternative approaches, and so the choice of the least-cost approach, for each scenario.

The amount to be spent on the intra-zone transmission and distribution systems in future is likely to be affected materially by the programs offered and how customers choose to respond in terms of DER take-up, demand management and energy efficiency in response to price and other signals, as technology and opportunities evolve over the 20-year time-frame.

For example, Western Power's recently announced 50MW Distribution Storage Plan invitation discussed above could avoid a material amount of distribution and transmission expenditure. Not only could it reduce the total demand of zones and so the need for transmission augmentation between zones – which was modelled for the different WoSP scenarios – but could also affect the choice of the overall least-cost approach. A future more-extensive distribution storage program may turn out to be the least-cost option for some scenarios if all costs were included in the WoSP analysis.

The WoSP has modelled different zone demand assumptions in the scenarios, but not total costs (intra-zone and inter-zone) to choose the overall least-cost approach.

If the intra-zone transmission and distribution system costs were included in future WoSPs, there may be a different least-cost outcome for each scenario - perhaps more focused on proactively implementing measures to avoid transmission and distribution expenditure because it could be least-cost to do so. Proactive demand management and other DER programs could achieve similar results to an extensive distribution storage program.

For these reasons I recommend that intra-zone transmission and distribution system costs be included in the modelling for future WoSPs. I understand that this will mean a significant amount of extra work, but the risk of not doing so is that the identified least-cost approach is not actually the least cost approach, and the identified priority projects may not be the best options.

2. The WoSP assumption that customer-owned DER has no market cost is one (market) perspective. An equally valid societal perspective or total resource cost perspective would include these costs with an aim to minimise the total cost to society of electricity supply to meet consumers' needs.

I recommend that future WoSP evaluations include intra-zone costs, and societal and total resource cost perspective evaluations so that customer-owned DER costs and other costs are included, to identify the least-cost approach from these broader perspectives. The ERA and WA Government should be interested in these broader perspectives because it is in the long-term interest of consumers to adopt approaches that may be less expensive overall than approaches other narrower tests may identify. Approaches identified by a market-perspective evaluation (as for the inaugural WoSP) may be more expensive overall from a societal or total resource cost perspective.

I would be pleased to be able to elaborate on any aspects of this submission.

Yours sincerely,

Noel Schubert

⁷ Whole of System Plan page 39: https://www.wa.gov.au/sites/default/files/2020-11/Whole%20of%20System%20Plan_Report.pdf