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Dear Mr Smart

Issues Paper – DER Orchestration Roles and Responsibilities, August 2020

Western Power welcomes the opportunity to provide feedback in response to the Energy Transformation Implementation Unit (ETIU) Issues Paper on Distributed Energy Resources (DER) Orchestration Roles and Responsibilities.

Western Power supports the development of DER Orchestration to enable the continued uptake of DER by customers, while ensuring the safe, reliable and efficient operation of the SWIS. DER Orchestration will play a key role in maximising utilisation of the existing network and ensuring any investment decisions are no-regret.

Western Power has been facilitating the safe connection of customers to the network for many decades, including substantial volumes of DER in more recent times, whilst ensuring the network continues to operate within prescribed technical limits. Western Power considers that the Distribution System Operator (DSO) role outlined in the issues paper as an extension of our existing responsibilities to more actively manage DER, enable DER provision of network services to the DSO, and enable network access to the Wholesale Energy Market (WEM) for DER.

It is noted that the issues paper focusses more on utilising DER orchestration to address problems posed in times of high rooftop solar PV generation (and associated low load) in the SWIS. Although this is the main present emerging issue in the SWIS, Western Power highlights that DER orchestration could also be a cost-effective solution to address network constraints during peak load times in the SWIS.

The most onerous low load and peak load times that pose network issues in the SWIS are expected to occur for a small proportion of time in any given year collectively (with recent experience on this being approximately 2% of the time). Utilising DER orchestration to alleviate constraints during these times, as opposed to upgrading network infrastructure, for a small proportion of the year is a compelling value proposition.

Aggregators will play a key role in unlocking the full value of customer DER by optimising the use of customers' own generation, storage and appliances; improving energy efficiency outcomes and passing on financial rewards to customers for supporting the network and system.

DER orchestration will enable higher uptake of all types of DER while maximising its value to customers and the SWIS. This will lead to increased renewable energy being generated within, stored and consumed by customers in the distribution network. Considering this and the long-term future, DER orchestration is a key enabler to progressing a low carbon emissions SWIS.



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Additionally, Western Power sees DER orchestration as the most cost-effective method in maximising utilisation of the network and enabling moderate to high uptake of Electric Vehicles (EVs) in the SWIS. Substantial network augmentation to support charging of EVs as everyone arrives home during the evening peak load period could prove to be costly whilst providing minimal additional benefits. Changes to time of use tariffs will help incentivise less onerous charging behaviours but Western Power does not expect that this alone will be enough to resolve issues year-round.

It is important to note that any future arrangements need to recognise Western Power's obligations, including safety, reliability and efficiency of solutions employed. Hence, Western Power as the DSO must be able to manage the network to remain within thermal and voltage limits in all scenarios (including normal operating states, planned work as well as emergency and fault scenarios). As a result, Western Power must be able to quickly and efficiently respond to these as the highest priority without being overly burdened by additional processes or interfaces.

The number of outages that facilitate the works program on the distribution network are orders of magnitude higher than on the transmission network and therefore requiring external approvals in a similar manner on the distribution network could impact restoration and would not be practical.

Western Power believe that there is no value to customers in establishing distribution level markets until there is sufficient volume of DER (capable of providing network support services), enabling infrastructure installed and network augmentation need until a point at which doing so creates value for all customers.

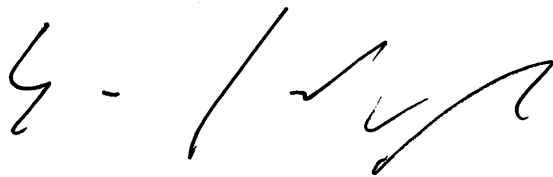
Installation of communications and operational platforms to manage DER are critical enablers to maximising utilisation of the network, now and into the future. Further, the security, availability and reliability of communications provided needs to be cognisant of the impact of the unavailability of the service that is provided over the link (including communications dependency on electrical supply). Western Power highlights the different nature of network support services and market services and the lack of other alternatives to address network constraints should a contracted network support service be unavailable.

Western Power supports DER participation in the WEM, though highlights the design and characteristics of the distribution network is inherently different to the transmission network (including redundancy and ultimately reliability) which needs to be accounted for when evaluating the amount of resource and investment required to meet system needs.

Western Power applauds the issues paper and fully supports ETIU in development of DER orchestration roles and responsibilities under all related DER Roadmap actions. Further to this, Western Power provides responses to the consultation questions posed in the issues paper.

If ETIU would like to discuss any aspect of our response, please contact Nathan Kirby at nathan.kirby@westernpower.com.au.

Yours sincerely



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Western Power responses to the Issues Paper – DER Orchestration Roles and Responsibilities

D1. What processes or arrangements should be used or created to register an aggregator that provides network support services to the DSO (Western Power)?

Western Power supports bi-lateral contracts for provision of network support services between aggregators and the DSO. The contract would include details of the scope of network support services to be provided (including network locations and issues it addresses), technical requirements for availability and service provision and payments for availability and provision of services. Network support services would be in place of (or to defer) network augmentation to provide additional network capacity or reliability services.

D2. Should different ‘use of system’ charges apply for DER customers? If so, how should the costs and benefits of DER be accounted for?

To address the issue of equity and potential for cross-subsidisation between customers with DER and customers without DER, it would be prudent to consider different ‘use of system’ charges in the future. Fair consideration should be given to the cost for provision of network access to each category of customer and the benefits and challenges each category of customer presents to the network when determining such charges in future. To ensure DER provides benefits to the network overall and to put downward pressure on all charges, participation in DER orchestration as ‘active’ DER should be incentivised over access as ‘passive’ DER in the future.

It should be noted that changes have been made to the Access Code to update the pricing principles and objectives that Western Power’s network tariffs must adhere to. As part of developing our submission for the fifth Access Arrangement period, Western Power will be investigating whether changes are required to the range of tariffs and services offered in light of these Access Code changes. In particular, the new pricing objective puts a greater emphasis on network tariffs reflecting costs, which will include any cost differences DER customers may impose on the network.

M1. Taking into consideration how the future registration of aggregated DER is outlined in the *Registration and Participation Framework in the Wholesale Electricity Market* paper, are additional changes required to incorporate aggregated DER in the WEM?

A few market constructs need to be revisited to consider the following issues:

- Registration requirements for aggregated DER would not be the same as large-scale generators
- DER and the associated distribution network generally does not provide the same reliability as large-scale generators
- Standards are required for aggregated DER (including substantially enhanced level and accuracy of network visibility and control)
- Communications and interoperability requirements will differ between aggregated DER and large-scale generators; a different method of dispatch may need to be considered.

M2. Should energy exported from DER be more explicitly integrated into the WEM?

Western Power’s believes that one of the key roles of the DSO is to facilitate aggregator access to markets to the fullest extent possible, as long as performance standards of the network are not infringed and the cost of DSO installing appropriate enabling infrastructure is justified and recoverable.

M3. Monitoring and compliance for participation in energy, capacity and ESS markets need to be considered for aggregated DER. How should aggregated DER be monitored and measured for compliance?

The monitoring required for participation in markets will be a function of the service being provided. Energy and capacity contributions could be measured at the customer connection point by Advanced Metering Infrastructure (AMI), with aggregated DER facilities being summated to the associated Transmission Network Identifier (TNI) for monitoring and compliance checking by AEMO. Western Power has extensive monitoring equipment at zone substation level, so would be able to provide this in a cost-effective manner.

Some categories of ESS require fast response beyond the resolution of AMI meter, though aggregated response could be monitored and assessed for compliance at the TNI. Installation of additional monitoring equipment could be considered, but the scale of DER and the distribution network could make the cost of doing this at large scale disproportionately large relative to the benefits associated with doing so.

M4. What performance standards should apply to aggregated DER facilities?

Over-arching performance standards are required in the Technical Rules, connection guidelines and WEM rules to ensure consistency and certainty of performance.

The performance standards would need to be set for each type of service they are providing they wish to participate in (noting that facilities may not participate in all of these):

- Network support services
- Energy
- Capacity
- ESS

The key requirement is that the aggregator must be able to pass on the signal to each individual DER within its portfolio to achieve the response required for the specific service within the operating envelope provided by the DSO at the connection point. There will need to be key consideration of validation and metering requirements and reliability and data quality requirements.

M5. Are any additional arrangements needed to incorporate aggregated DER facilities into the new scheduling and dispatch process (SCED)?

Yes, some of the additional arrangements should include:

- New orchestration platforms and systems.
- SCADA, communications and/or IEEE2030.5 methods
- Control room protocols (including treatment of planned and unplanned outages)
- Development of procedures for commissioning and testing
- SCED uses constraint equations to optimise the performance of the transmission system. Western Power suggests that the DSO platform interface with the SCED engine to manage distribution connected resources at an aggregated (TNI) level.

M6. Other than for device level communications, what other communication is required to manage aggregated DER? For example, communications between the aggregator and the DSO (Western Power) or AEMO.

Western Power is of the opinion that network services should be directly engaged by the DSO with the aggregator(s). Given that the implications of non-delivery of these systems has significant impacts to the ability of the network to meet its safety obligations, Western Power is strongly of the view that any communications that involve engagement of network services or definition of operating envelopes (which implicitly ensure that the technical limits of the network are preserved at any point in time for DER operation) is directly from the DSO to the aggregator(s).

A1. What aggregation options or models could deliver the most efficient outcome for the system and consumers?

It is envisaged that aggregators could provide the following range of services to customers, including:

- Optimisation of DER for self-consumption
- Improving energy efficiency
- Facilitating energy trading/sharing
- Compensation for provision of network support services
- Compensation for provision of services via WEM energy, capacity and ESS markets

It is envisaged that aggregators could provide network support services to the DSO, and participate in the WEM energy, capacity and ESS markets with AEMO.

Collaboration between customers, aggregators, DSO and AEMO through DER orchestration will enable better visibility and forecasting of power flows through the SWIS that will enable more efficient SWIS planning and operational responses going into the future.

A2. Are there any current barriers to DER aggregation? If so, what are they and how could they be overcome?

Additional systems and protocols are required to ensure that the engagement of DER does not overload distribution networks and ensures that voltages are within limits. To do this in a dynamic manner would require communications from the DSO to aggregator to indicate the timing and extent of network needs (in accordance with established bilateral contracts) as well as the publication of allowable operating envelopes (for provision of market services) to each participating connection point.

One barrier that is seen is the lack of operational experience by aggregators. It is envisaged many aggregators may wish to enter the market but may not have the sufficient operational experience or the required level of ICT infrastructure to participate in DER orchestration. This could potentially limit the number of aggregators that could possibly participate in DER orchestration.

To help overcome this barrier, guidelines and training for participation in DER orchestration for aggregators should be provided to promote understanding and enable potential aggregators to make more informed investment decisions on their participation. Western Power sees that the DER Orchestration project outlined in the DER Roadmap as a key project to provide foundational works.

Western Power envisages providing an indication of available downstream DER available for market purposes to AEMO for each TNI (given the operating envelopes published by the DSO to each connection point), noting that this would need to be updated in near real-time as power flows change. AEMO would then be able to send dispatch commands to aggregators for each TNI, though compliance assessment against dispatch commands requires further consideration (as articulated earlier) particularly given the nature of visibility of the distribution network.

A3. What should be the key elements of a regulatory framework for aggregation?

Key elements for consideration:

- Responsibility for reliability of DER
- Technical standards
- Management of compliance and disputes
- Customer protection mechanisms
- Contractual relationships
- Communication requirements

A4. Should aggregators be able to participate in all WEM market segments in order to stack the value of available DER services?

Aggregators should be able to participate in all WEM market segments that aggregated DER is technically able to provide if, and only if, the technical limits of the network are not infringed in doing so.

A5. Have stakeholders experienced difficulties in accessing consumer meter data for the purpose of providing DER services? If so, what were those difficulties and how did they limit opportunities to unlock the value of DER?

The main issue that Western Power has experienced is that too much manual intervention is required to deliver data consistently or at scale. As this area has not been in demand to date, it has not been a focus for Western Power. If Western Power were required to do more in this space to service increasing demand for data, additional ICT works are required to make systems fit for purpose. Western Power would welcome conversations with stakeholders around access to additional AMI data.

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?

No, Western Power supports customer choice for participation in DER orchestration (refer to response to C2 for more information).

C2. What provisions need to be made for customers who make the choice not to participate in aggregation services, for example to limit their energy export while enabling them to use their DER for their own purposes?

Western Power believes that customers who choose not to participate in aggregator services will require a static and minimal export limit.

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 unnecessarily limit DER output in preference to other alternatives?

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 customers to participate equally?

The trigger for a network augmentation consideration would be when export of DER is limited by a given threshold percentage energy over an annual period in an identified area of the network. The given threshold percentage could be determined via a cost-benefit based calculation on the value of curtailed energy vs the cost of network augmentation required to eliminate/alleviate the curtailment.

Drawing a parallel with the transmission network, this is consistent with Western Power's expectations of its role when fully constrained access commences.

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?

To reduce the cost of implementing DER orchestration and ensure it maximises benefits to customers and the SWIS, it would be best to not change metering and settlement arrangements (e.g. not introducing multiple meters at customer sites).

Installation of additional meters or ensuring that sensors are SCADA / metering-grade is likely to be a costly exercise. A more economic option would involve specifications of minimum requirements for sensors/SCADA for aggregated DER services, accompanied by an appropriate regulatory relaxation for this purpose.

A possible approach that does not require increased number of meters is to use the connection point meter data and DER inverter data for settlement arrangements.

G2. How can we ensure equity of access of DER to markets? That is, how can the greatest number of customers be allowed to install DER and provide services, if they choose? How could this be implemented?

Some suggestions:

- Public education about the SWIS and the issues. Let users know upfront that DSO requirements from them will change as more DER is connected and this is so everyone can access some benefits from DER.
- For customers with new or upgraded DER post DSO go live, give customers a choice to participate in DER orchestration or have a static and minimal export limit (if they don't want to participate).
- Aggregator operational guidelines for equitable DER dispatch.

G3. As tariffs (import and export) and other incentive mechanisms evolve to consider active DER, is it reasonable to require that, where practicable, non-contestable customers can access services provided by aggregators? If so, how could this be achieved?

Western Power responses to the Issues Paper – DER Orchestration Roles and Responsibilities

The DSO, in the connection application process, could provide all customers who choose to participate in DER orchestration with a full list of aggregators operating in their area to facilitate customer sign up to an aggregator of their choice.

It is reasonable for non-contestable customers who choose to participate in DER orchestration to be able to be assigned a 'default aggregator' if they could not find an aggregator to sign up to.

G4. Should there be guidelines or rules around how DER within aggregator schemes, other factors being equal, are dispatched?

Yes, aggregator operational guidelines for equitable DER engagement are required.

The guidelines need to reflect that nature of the service(s) being provided, including availability and likely timing of execution.

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?

Western Power sees one of its roles as DSO as enabling aggregators to provide network services and participate in energy markets. Communications and infrastructure installed for AMI and publishing of operating envelopes will play a critical role in providing this functionality. Western Power notes that active management of DER may be required for periods of time where the system is in an emergency state to ensure the system can continue to support a high penetration DER future, however these signals may not be required to go through an aggregator.

G6. Who should be responsible for the dispatch of DER owned by Western Power to address network support needs?

DSO owned DER (installed for the primary purpose of network support) should be deployed by the DSO for the purposes of network support. The DSO owned DER may also be leased to a third party for participation in energy, capacity, ESS markets and/or peer to peer energy trading/sharing for use at times when it is not required for network support – during such times it would be dispatched by the aggregator.