

# Topics A & B feedback: themes and main points

This is a summary of the themes and main points from feedback on the FlexForum paper outlining its thinking on:

- the flexibility-related needs of DER owners, transmission and distribution networks, the system operator, and electricity retailers and generators
- technical characteristics for the operational response of transmission and distribution networks, the system operator, and electricity retailers and generators to network, system and market conditions.

Comments are not attributed.

Theme	Main point
<b>Goal and purpose</b>	I congratulate the FlexForum on your work thus far. Progressing the practical implementation that enables distributed energy resources to offer flexibility services is timely, if not urgent, to maximise the value to the electricity system of investment that is already being made, and assets that already exist. There are actions the industry can take that are independent of any work by, or interest of, regulators.
	A holistic approach is required. I recognise the forum has several different parties. However, the progress to date appears to be very network-focussed. This may be because network information is the most accessible available to the forum participants, and that other stakeholder perspectives will be incorporated in time. Still, when creating a framework for DER to participate in the NZ electricity system, all angles should be considered to ensure the optimum outcome is achieved. For example, the best outcome for “NZ Inc” may cause an issue for network owners, but overall it is still the best option. It was noted that a significant proportion of global (UK and Australian) case studies were also focused on networks. In contrast, there’s much larger DER participation in market-based programmes.
	Customers are the key. Customers/Consumers were identified as the most important stakeholder in the webinar, but there appears to be very little representation from them to date. Understanding why customers would participate, what considerations take place and how they facilitate responding to events is integral to creating the framework.
	I like the stated aims of the flex forum and its approach. It would be useful to understand how urgent it sees this space developing as for mind it is emerging and we are very much in a developing capability phase. This will take time but thankfully we have plenty of it.

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<b>Expected role of DER</b>	... commercial scale (for the purposes of generating and selling electricity), in addition to household or business owned, distributed generation should be added to the list of assets that can provide flexibility services on pages 4-5 of the report. Transpower include these assets in their definition of 'what is DER' in their report " <a href="#">Opportunities and challenges to the future security and resilience of the NZ power system</a> ", November 2021, page 32, for the joint EA and Transpower project on Future Security and Resilience.
	Page 5 – suggest adding refrigerated storage as a source of DER, and in the future, electrolysers.
	- the number of \$6.9b in benefit quoted in the webinar based on the Sapere work is almost certainly significantly overstated - sadly this is not hard to disprove very quickly. Going back to IPAG work in this space there has been a lack of rigour around estimation of benefits. In my view this area needs some priority and focus. It would be useful to determine a realistic value for the various areas of benefit as a next step. We are a resource constrained industry so we need to be very clear around where we are spending our time and effort around how we progress towards decarbonisation. Furthermore we (as an industry) are looking to solve our problems by having customers invest their capital rather than us make this investment. In that context it is vital we ensure a sense of realism around encouraging customers to invest. I want to avoid a future scenario where there has been investment from customers on a premise/promise that doesn't eventuate.
<b>Defining services and products</b>	[is it] better to start with what might be called a 'comprehensive' top-down framework (e.g. your 5 service categories) versus a more bottom-up approach that targets one or two of the flexibility use-cases where the barriers to progress appear greatest  [The] wholesale energy and ancillary services market framework is already reasonably mature... In contrast, there seem to be greater barriers to the emergence of common service specifications and markets for distribution network support services. Could we make quicker progress by just focusing on that subset of your 5 service categories?
	Specification of the five main services for DER and the technical requirements to deliver these (Table 1) appears to focus on the short term when operational information activation / deactivation speeds are in the seconds to hours. Also a number of the comments in the paper refer to managing "transient' mismatches between supply of and demand for network capacity. I query whether the definition of service and desired outcomes are too short term which makes it more complicated/difficult to contract DER to deliver the outcomes (eg. how much DER can react within seconds to a signal).
	I suggest DER also provides a service which is the "opportunity to avoid transmission, distribution and generation costs by using these resources to shape the daily load curve such as reducing daily peaks"

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	(Source: same Transpower report page 8 & 32). Predictive congestion management - network planning size of connection and network assets can be managed long term by commercial scale distributed generation where the activation/deactivation of seconds to minutes is irrelevant. Contracting for this service and compensation should be part of the FlexForum's mandate.
	[The Transpower Future Security and Resilience report] ...has a very clear explanation of the difference between reliability, resilience and security of supply from a power system perspective in Chapter 5. I suggest these events and the value of DER to deliver reliability, resilience and security of supply extends beyond the Service in Table 1 of 'Generation Capacity Adequacy'.
	There is already a form of flex available within electricity market systems, but it is not actively used by anyone currently (probably insufficient financial incentive) – dispatchable demand
	<p>Common layman's terms that customers understand can include:</p> <ul style="list-style-type: none"> <li>• Critical Price Response – responding to high wholesale spot prices</li> <li>• Network – responding to network/grid constraints</li> <li>• Reliability – responding to a shortage of generation (e.g. the 9 Aug 2021 event)</li> <li>• Grid Balancing – participating in frequency/voltage balancing</li> <li>• Intra-day price arbitrage – load shifting (or battery operation) based on intra-day pricing</li> <li>• Demand Charge Management – responding to price signalling from customers' network charge</li> </ul>
	<p>Portfolio optimisation</p> <ul style="list-style-type: none"> <li>• Managing spot prices to reduce energy costs should also include the risk aspect. Risk reduction products could be a huge part of what DER brings (i.e. batteries to cover periods of peak prices).</li> <li>• I wonder if whenever by trading period is mentioned they should address the fact that Real Time Pricing may mean responses could be as short as 5 minute periods?</li> <li>• Optimising network charges should really be minimising network costs for end users; the trigger is probably right (subject to charging basis), but I suggest they remove the current e.g. as I think that actually suggests it is something it is not (it's more about if the network charges a very high fixed fee, then how can that fixed fee be reduced, and the solution to a high fixed fee will be quite different to a charge that is based on c/kWh)</li> <li>• Managing fuel stocks is a weird one. ... not sure what this actually means</li> </ul>
	<p>Generation capacity adequacy</p> <ul style="list-style-type: none"> <li>• I would have thought network reliability and network resilience both may need KVAR support in some situations?</li> <li>• I assume network reliability and network resilience are also basically distribution level reserves? That would make sense, otherwise it doesn't really have a connection to generation capacity adequacy</li> </ul>

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	<p>Corrective congestion management and Predictive congestion management</p> <ul style="list-style-type: none"> <li>I think these sections should be called Transmission and distribution capacity adequacy – corrective and Transmission and distribution capacity adequacy – predictive respectively, to keep them using consistent language with Generation capacity adequacy</li> <li>Both may require KVAR as well I would have thought? It's not just thermal limits that cause congestion, this may be covered by the balancing section but see below for my comments on that</li> </ul>
	<p>Balancing</p> <ul style="list-style-type: none"> <li>I think a few elements have crept into this section that should be placed elsewhere. Balancing should only mean second by second flexibility to maintain certain parameters within predefined limits (and these limits should be well justified, rather than engineers just liking things to be stable all the time).</li> <li>Reserves and elements of voltage management should be included in the capacity adequacy space – they are designed to ensure we have sufficient BAU, pre- and post-contingent capacity. The easiest way to define what goes where is: do you pay for a specific volume (MW, VAR, etc) or do you pay for a service and the volume should be zero if averaged over a long period of time (e.g. when frequency keeping you should just be covering overs and unders and the total volume you supply should be close to zero as regular dispatch should resolve any volume needs)</li> <li>FK and elements of voltage management that relate to real time stability should be the only things that fall into the balancing bucket.</li> <li>Black start is a tricky one to place, but maybe there is an additional category that covers “response when the lights go out” or “response when capacity adequacy fails”</li> </ul>
<b>Planning and operational criteria</b>	Page 9 – suggest add capacity to the technical points
	<p>Technology definition. It's agreed that digitalisation provides fast and reliable DER participation. However, it also creates barriers to entry in terms of costs to enable customers, and reduces the addressable market size as some customers will never allow third parties to control their assets or processes. For example, data centres are reliable DER participants but almost always decline third party hardware accessing their assets and systems. This point is more relevant for the Commercial and Industrial sectors than the Residential sector where automation is mostly required to access the capability</p>
	The number of events (expected or maximum) is integral to some customers participating.
	Other planning information required is how the events will be dispatched (what communication/technology platforms will be used, if any) and what baselines will be used to determine the counterfactual.

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	I wonder if an additional column along the lines of “Regularity of need/Does it suit market-based solution or ad hoc contracting?” in the sense it would be good to have a feel for where we might look at market platforms (managing spot prices or congestion management) vs ad hoc contracts (coverage for outages). Or could be framed from the point of view of payments: retainer type model (paid for always being available) vs. event payments only
	in my travels around the industry it is really clear that people talk load management in very general terms treating it almost as the same thing when it's not. Some of this arises due to new participants thinking they understand this area but from a distance. Therefore the work being done to determine requirements for potential services and having common definitions is a very good step. Beware the trap of falling into designing services based around the perceived capability of things like solar PV systems. In my view a critical need will be for balancing to manage the intermittency of solar and wind - probably more than anything else. This will likely need rapid response. Sadly because we are still a very centralised industry we are struggling with this shift to decentralisation. The way to achieve fast response is at source control in response to actual conditions. Thinking this can be achieved via IoT and reliance on public networks will not deliver at the scale required. It is best to test and accept this early on or we will build out something that will not work. We must also not forget that if this can be achieved (and it can) that there is as much a challenge for turning load back on - knowing what the timeframe for provision of a service is good but don't neglect how load will be restored or we will just create downstream problems
<b>Flexibility resource participation</b>	We had discussed previously about how to record DER and prevent double dipping as these will most likely be some form of bilateral contract. In its Links. In its August 21 consultation paper “Updating Regulatory Settings for Distribution Networks” I had inserted a section about development of a DER exchange/registry, I am uncertain if this is progressing but it would be informative to chat to members about how an exchange could operate.
	Commercial & Industrial are equally as important as Residential. The progress done to date appears to be focused on the residential sector (also noting the reference to step-change demand growth from process heat electrification). DER from the residential sector will be important in the long-term when batteries and EV charging are common in most homes. Still, the commercial and industrial sectors are where DER will come from in the short-mid term. In creating a framework for DER, participation from all sectors should be considered.
	DER framework should have open and equal access. There is very little reference to aggregators in the research done to date. Although customers can participate directly with DER buyers, aggregators are the parties that make the complex simple for customers and are incentivised to make programmes successful for all parties (buyers and customers). Aggregators also seek ways to value-stack the customers’ DER capacity,

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	ensuring that it's utilised optimally. To be successful, any DER framework should allow open and equal access to all parties.
	- the paper doesn't feel very customer focused and ultimately it will be customers who determine the success of this space. Case in point people talking about battery storage systems as if they are things customers invest in. Other than large scale industrial batteries they are purchased as part of solar PV systems. That's a far better way to look at this. Understanding the motivations of customers shouldn't be overstated. Currently we don't have this. The one provider I am aware of is a flexibility trader who own the kit and the right to use it (which is good) but to what benefit to customers? How will you get customer input into this process?
<b>Terms of trade</b>	I suggest priority should now be given to creating a standard contract to transact these flexibility services with different purchases (ie 29 distribution companies, the System Operator, retailers etc). If, initially, a contract for one particular DER service is developed and agreed, this contract can be a benchmark for future DER services agreements. There may be existing arrangements that can form the basis of an agreement that is used industry-wide
<b>Valuing and rewarding flexibility</b>	As well as a standard agreement, I suggest industry agreed values for different DER services is essential as you are aware flexibility aggregators are likely to operate across multiple distribution company boundaries. This could start with all distribution companies valuing 'reliability' the same when considering non-network solutions or DER services. Trustpower clearly describes the improvements needed in this regard in its recent submission to the Commerce Commission on their targeted review of Information Disclosure rules.
<b>Coordination – Tx, Dx and markets</b>	DER is multi-tier as it spans different stakeholders. Coordination between stakeholders is going to be key. Has the group considered how DER could be coordinated to achieve maximum benefit, recognising that the operation of DER for one purpose could cause an issue elsewhere?
<b>Investment information</b>	DER for capital deferral works, but at some time a network may need to invest and the value of DER will fall away. Had the group considered how distributors asset management plans be standardised or at least made readable so the load aggregators could understand any risk in investing in DER?

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<b>Connection requirements</b>	Page 11 3rd para from the bottom – distributors do get a choice on connecting new customers, but do not get a choice on what customers do within their premises up to the capacity of the point of supply. This is the problem with EV chargers as networks have not been sized for that particular load type. Networks are refusing connections for renewable distributed generation where they have insufficient capacity unless the generator agrees to paying the incremental cost of connection – set out in Part 6 of the Code
<b>Terminology</b>	terms like ‘network charge arbitrage’ might cause discomfort for some stakeholders, and could therefore be counter-productive
	Terminology should be kept simple. Agreeing on common terminology is commendable. However, the language used in the document is engineering-heavy and would be difficult to understand for those stakeholders outside the energy industry. Simple language should be employed so all stakeholders can easily understand the concepts, particularly when education is required.
<b>Related considerations</b>	The development of 5-minute pricing will introduce new dynamics into market facing flex.