

Please find below Submission from

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Q1

Do you agree with the description of decentralisation?

Broadly, I strongly agree. I worked in this space until retirement and I am delighted to see official recognition of the potential for strengthened network supply that dispersed generation and batteries offer.

However, improved resilience will only be achieved with dispersed resources if this is a mandated (ie regulated) design objective. In my view, the supply industry will not pursue the development of microgrids on its own for several reasons: eg specific technology options are required, with somewhat higher costs; the lines cos and retailers have no market incentive to improve resilience; and it is just not in their DNA to hand any level of autonomy to the customer.

Q2

Do you agree with the articulation of the potential outcomes and benefits for consumers?

I agree generally but I think the benefits may be overstated without appropriate regulatory changes to use the dispersed resources in the interactive manner envisaged. In my view, the control technology required is unlikely to develop organically under existing market structures. In this respect, it is good to see that the discussion document recognises that significant changes in the present market structure will be required.

Some technologies, for example energy management systems have been around for decades and have not become disruptive. Many of the other technologies mentioned are only supportive, so don't overhype their importance. The focus should be on getting the environment right for accelerating the uptake of the key disruptive technologies, ie PV and batteries.

Uptake will have to be driven by strong, technologically literate governance, or the benefits will not be realised.

Therefore, I think a key "success factor" not mentioned in the discussion document is the provision of strong regulatory leadership to define the market and physical environments for deployment of dispersed resources. The existing market participants will not make the necessary changes on their own, largely because there is no skin in the game for them, and they are not technologically literate in this space.

Q3

Do you agree with the articulation of the possible challenges to unlocking the benefits of decentralisation?

I agree.

An issue to sort out immediately is the ownership and control of these resources, so as to give clear direction for investors and to avoid the uncertainty and chaos currently being experienced in the Australian PV market. The right of consumers to use their DG for their own purposes at all times must be protected (irrespective of whether they are network connected or not). It also needs to be decided whether (as lowest cost delivered renewable generation), dispersed resources should have priority to export all of their surplus at market-appropriate rates, other than in situations where network stability is threatened, in which case the distribution supply operator should have the means to curtail generation.

It is my view that the main technologies relevant to residential use are rooftop solar PV and V2G EV batteries. Both are already well proven and while still getting better, are more than adequate for immediate uptake as mass market decentralised assets. Control and management technologies for interacting with the distribution system now need to be urgently commercialised. EA needs to focus on removing institutional barriers to mass market residential uptake of these specific technologies.

Q4

Do you agree with the articulated opportunity statement for a more decentralised electricity system?

I strongly agree that development of the network/grid backbone based electricity system is the best way forward to capture the benefits of dispersed generation assets (as opposed to stand-alone distributed generation), from both economic and resilience perspectives. A key change required to the existing market structure is the development of a corresponding local energy markets.

Q5

What other feedback would you like to input, eg

- a) what a more decentralised electricity system might look like?
- b) how this might benefit consumers, and
- c) what might be needed to unlock these benefits

a) Load diversity:

It is important to recognise the effects of load diversity in developing an environment for dispersed generation to operate within, and how diversity effectively shapes network economics. Decentralised residential systems should be developed to work (ie share generation and demand) in clusters of at least several hundred installations to retain the benefit of the reduced peak capacity resulting from aggregated demand. Numbers less than this will not make best use of the shared (network and generation) resources.

b) Seasonal output:

It is important to recognise that the only widely applicable generation technology (solar PV) is highly seasonal, with winter production around one third that of summer in some parts of the country. This substantially reduces the overall benefit of these dispersed resources as the winter reduction in local electricity production must be covered by central generation capacity. Battery assets do not generally suffer from this disadvantage, although there is a noticeable winter reduction in capacity for existing lithium ion technology.

c) Local markets:

At present I have no conception of how a "decentralised retail market" metering and reconciliation process might work, but I am sure it would be possible with modern data

and communication systems. Substantial changes would be necessary to capture the reduced costs for residential customers. If the status quo DG market arrangements are not changed, (ie gentailers currently treat local DG as GXP wholesale energy, which it is not) I cannot see how much benefit will accrue to the residential prosumer. It might be that gentailers need to be split up, with grid scale generators competing to sell to a single wholesale buyer, with the separated retailers purchasing from this entity and competing for customers in the local retail markets.

Resilience:

For improved resilience to grid disruptions, a distribution cluster or community would form a natural boundary for microgrid operation. Should the grid supply be disrupted the microgrid would disconnect and operate autonomously until either its internal aggregate demand exceeded generation plus storage, or the grid supply was reinstated. Depending on technology specified, different levels of resilience are possible.

For example, EVs even now can store typically 3 days of house demand, so assuming future EVs in V2G mode provide say 5 days capacity, plus say 50% PV local generation is available, a microgrid could function autonomously for up to 10 days in an emergency (if all EVs are precharged and available for V2G use) before demand would have to be curtailed. One can even envisage EVs being driven elsewhere to where supply is still available for charging and wheeling the energy back to the grid isolated site.

Most General Customers:

The majority of residential electricity consumers are not DG enthusiasts, and just want a reliable electricity service. They see their network supply as being too complex to understand, and simply hope that the government is looking after this service at the lowest possible cost. These households will be reasonably keen to uptake dispersed generation if it keeps costs down, but will not be interested in strong engagement in the technical maintenance and management issues. Any significant level of dispersed generation uptake will need to provide options that work for these households, eg plug and play PV charging of an EV, with seamless V2G generation occurring when the export price is attractive.

END

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