



Submission to the Electricity Authority

on

Enabling mass participation in the electricity market

11 July 2017

Introduction

1. We welcome the opportunity to submit on the Electricity Authority's *Enabling mass participation in the electricity market – how we can promote innovation and participation* (the consultation paper).
2. Our views, on the whole, are represented in submissions prepared by both PricewaterhouseCoopers (PwC) and the Electricity Networks association (ENA). We have taken this opportunity to provide views from an engineering perspective that the Authority and or other market participants may have over looked.
3. We support the proposal to promote innovation and competition by enabling mass participation in the electricity market. However, the technical and operation realities should not be overlooked by the Authority when setting of an effective and appropriate regulatory framework.
4. In its consultation paper the Authority has not demonstrated that it has a good working understanding of the operational realities of the technology that would enable mass participation in the electricity market. By highlighting two realities through our submission we hope that the Authority will take check of the depth of its operational and technical understanding.
5. No part of our submission is confidential.

Remember the technical realities when setting regulation

6. It is easy when debating the economic theory and setting the regulatory framework to forget the technical and operation realities of electricity networks. In this submission we bring to your attention two such realities those being that:
 - (i) mass participation will result in higher costs to serve
 - (ii) photovoltaic generation (PV) without batteries will do little to displace peaks.

Higher costs to serve

7. Mass participation will bring with it challenges around how to control overvoltage on congested feeders. We are of the view that the increase of distributed PV generation will force investment in equipment to control the voltage and extra resources to manage additional complexity on the network.
8. Accordingly, mass participation on network will drive expenditure to maintain system reliability/security up. Increased expenditure is not a bad thing and should not be an inhibitor however the Authority needs to recognise that mass participation will bring with it increased cost to serve.
9. The question then arises as to who is best placed to pay that cost. Should it be those that are participating in the electricity market through distributed PV generation as they are the exacerbator? Or is it all consumers as all consumers are ultimately the beneficiaries of the participation?
10. Neither of these are easily answered questions in practice. Economic theory would state that cost reflective pricing would signal to consumers that participation has both an economic cost and an economic benefit. However, experience tells us that placing a charge on consumers that have invested in distributed PV generation can be perceived as a 'solar tax' and be very difficult to make acceptable to participants. And having no charge can result in uneconomic investment in PV generation.

Batteries are a must to displace the peak

11. Perhaps unintentionally the Authority comes across as having the view that the installation of PV will in itself reduce network peaks. The operation reality is that PV without batteries will not displace the peaks as the peaks usually occur in the mornings and/or the evenings.
12. At the 2017 EEA conference, Peter Armstrong, Waipa Networks Limited presented the findings of the paper *Initial Lessons for St Kilda, Cambridge, a 100% Photovoltaic Subdivision* (the paper). The paper was about a subdivision in Cambridge that had 100% PV penetration and a monitoring programme for the purpose of analysing and deriving lessons for the future.

13. A conclusion of the paper was that PV does not by self-reduce network peaks.
14. The key points from the paper include that the:
 - (i) export of excess PV generation is a feature in the middle of the day, however the network demand per ICP was generally higher in the morning and evening
 - (ii) need to cater to the expected peak demand per ICP still exists and PV generation does not assist in mitigating the network demand in a residential setting
 - (iii) energy use of ICPs with PV generation in the daytime shoulder period is reduced, in spite of higher energy consumption, but still contribute to the network peak load by the same degree as ICPs without PV.
15. Accordingly, if PV is to be of network benefit it is important to promote the use of batteries with any solar installation.

Closing comments

16. We support the proposal to promote innovation and competition by enabling mass participation in the electricity market. However, the Authority must have regard for the technical and operation if it is to set a regulatory framework that is enduring.
17. We hope that our submission is helpful to the Authority. We are happy to discuss our opinions further with the Authority should it find it useful.
18. The main contact for this submission is:

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