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Review of Demand Side Participation in the National Electricity Market: Submission to Draft Report

This submission has been prepared by the Consumer Utilities Advocacy Centre Ltd (CUAC), an independent consumer advocacy organisation, established to ensure the interests of Victorian consumers, especially low-income, disadvantaged, rural, regional and Indigenous consumers are effectively represented in the policy and regulatory debate on electricity, gas and water.

CUAC welcomes progress made by the Australian Energy Market Commission (AEMC) as part of this review, in particular, it's recognition that the way network businesses earn revenue may affect their incentive to undertake efficient demand side participation.

However, based on our analysis of detail presented in the AEMC draft report, CUAC remains concerned that not all barriers to efficient demand side participation (DSP) have been identified and/or fully considered and that further analysis and consideration may be required by the AEMC. This submission addresses specific issues in detail and makes recommendations for further work. In summary, those specific issues and recommendations are as follows:

Issue: The AEMC characterises DSP as necessitating load curtailment. CUAC disagrees with this position. Recommendation: That the AEMC revisit the conclusion we believe to be erroneous - that price cap regulation encourages socially efficient DSP, because loss of DB revenue reflects loss of customer value due to load curtailment. It is likely that loss of revenue is a source of incentive asymmetry.

Issue: The AEMC has not fully accounted for the effect price cap regulation has on network incentives to undertake or facilitate efficient DSP.
Recommendation: That the AEMC undertake or commission evidence based research to determine the effect that price cap regulation has on network incentive to facilitate or block efficient DSP

Issue: We believe the AEMC has defined efficient consumption in a circular, restrictive way, and that this limits its ability to ensure the market delivers efficient energy services.
Recommendation: That the AEMC test the validity of its definition of efficient consumption through evidence and experiential based research, with a view to recommend to the MCE any non-price based policy interventions deemed necessary to ensure efficient energy consumption takes place.

Issue: We believe the AEMC has not adequately analysed the efficiency and adequacy of incentives network companies have to innovate.
Recommendation: That the AEMC consider measures undertaken by the AER to encourage innovation by distribution businesses in this review, and make recommendations to improve incentive for innovation where applicable.

The remainder of this submission sets out our analysis in full.

With regard to the incentive networks have to undertake or contract for DSP, the AEMC states that: *"The reduction in revenue experienced under a price cap serves an important function in making sure that the network business has full regard to the loss of value experienced by the DSP provider whose load is curtailed under a DSP contract."*

The assumption that a DSP provider experiences a loss of value, and conclusion resulting from it appears to be erroneous. We accept DSP comes at some cost to implement, but the AEMC appears to suggest DSP can only occur through load being curtailed. However, DSP can involve substituting local generation for centralised generation, with no load curtailment, or can involve the coordination of energy use by appliances in a way which does not affect the service delivered to the customer. In this way, load may not be curtailed, so much as shifted for no loss of value to the customer additional to the cost of implementing the DSP. By way of example:

- Off peak hot water storage is one of the oldest forms of Demand Management. Customers experience no loss of service value and no load is curtailed – load timing is merely shifted.

- Residential air conditioners can be cycled on and off to optimise network utilisation during peak times with no loss of home comfort[1].
- Air conditioning can also be shifted to off peak times, shifting demand timing for no loss of customer service value[2].
- A customer can choose embedded generation (EG) at some cost over mains grid supply, for no loss of service value.

We note that the extent to which peak demand can be reduced without loss of customer amenity is limited by a number of variables, but the important conclusion is that it can be done. The following excerpt is taken from ETSA Utilities web site:

> *"Air conditioners already switch off their compressors and "cycle" with their fans on when they reach a desired temperature. Using demand management simply increases the number of times the compressor switches off. Demand management done properly is so sophisticated, and so precise in what it can deliver without affecting a home's comfort, that a customer should not notice it is being implemented. During the February pilot trial, volunteer customers did not notice their air conditioners being managed."*

These examples are a limited set of many forms of DSP that can reduce peak demand without curtailing customer load, or affecting the value of service being supplied. In this way, it appears DSP can reduce network revenue and this loss of revenue ***may not be*** reflective of any loss of customer value due to load curtailment. Therefore if a network may lose revenue from undertaking DSP, and the customer does not necessarily lose value due to load curtailment from undertaking DSP, it follows that a network company may experience incentive asymmetry with regards to efficient DSP.

We recommend that the AEMC revisit the conclusion we believe to be erroneous - that price cap regulation encourages socially efficient DSP, because loss of DB revenue reflects loss of customer value due to load curtailment. It is likely that loss of revenue is a source of incentive asymmetry.

Of particular relevance to this point is that the AEMC has not fully considered the incentive faced by a network company where a customer seeks to supply energy to its own premise using EG.

Taking the AEMC example in Box 2.2, the incremental cost of supplying energy at peak times can either be supplied by spending $100,000 pa on a network build option, or could be supplied through some embedded generation (EG) option. If we assume, as the example does, that all costs and benefits of any form of DSP are internalised into network

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[1] See http://www.etsautilities.com.au/centric/news_information/electricity_information/demand_management/demand_management_faqs.jsp and http://www.cleanenergy.qld.gov.au/zone_files/energy_conservation/energex_network_demand_management__mar_09.pdf for some basic examples and explanations of this

[2] See http://www.offpeakcooling.ca/OPC%20TES%20Primer.pdf for details of one such technology

costs and network savings, the socially desirable outcome would be for embedded generation to be chosen where the annualised cost of supply at peak times using EG is less than $100,000 pa where all other performance characteristics of EG are comparable with mains grid.

For example, assume the network charge for the cost of building new network is cost reflective – that is $1,000 MW. The customer will seek to implement EG where the annualised cost is less than $1,000 MWh to install and operate EG at peak times. Assume it decides to implement the full 100 MW of EG at $1,000 MW, and so saves $100,000 in reduced energy charges for peak consumption, while the network saves $100,000 in avoided financing costs, equal to the lost revenue at peak times. If the EG only operates to supply at peak times, the network will be indifferent to the EG. This scenario is most likely to occur when a generator exists on site as a back up supply unit. The generator would not be used in situations other than an emergency because the site demand profile may not allow for efficient EG at any other time.

However, the EG may be able to achieve an annualised cost of $1,000 MWh by operating outside of peak times. This is more consistent with combined heat and power systems, or even tri-generation systems, that recover costs efficiently through maximising their utilisation all day, not just at peak times. This will occur when a favorable demand profile exists such as a steady demand for heat and/or cooling. Where the EG supplies the customer directly outside of peak times, the annualised cost of EG to the network business is not just revenue lost from not supplying the incremental increase in peak demand, the network loses revenue it expected to gain from sunk assets because there is a reduction in demand over and above the demand reduction at peak times. A network may seek to recover these costs through charges to the EG at the time of connection and/or tariffs may be adjusted in future periods to allow for cost recovery.

At this point, it is important to distinguish here between a theoretical world where networks will only seek to recover efficient costs, and the real world where networks have an incentive to maximise profit. Networks can seek to maximise profit by under-forecasting demand to maximise prices, and over estimating the costs of meeting that demand, so revenue recovered from any asset building will be maximised. Where actual load growth threatens to be less than forecast, network businesses will perceive some opportunity cost. So where EG results in a reduction in demand greater than any forecast increase (in the case above, where EG supplies more than the incremental increase in peak demand), networks experience an opportunity cost and so will not seek to recover efficient costs, they will seek to maximise the recovery of any perceived loss. This is likely to result in setting inefficiently high charges for EG for either connecting or operating.

On this issue, we draw attention to the submission made by SPAusnet to the Australian Energy Regulator (AER) on the development of a demand management incentive scheme for Victorian Distribution Businesses. The AER notes that:

> *SP AusNet submitted that allowing DNSPs to roll demand management capex into the RAB and retain the capex savings from network replacement/augmentation deferral would be necessary to encourage DNSPs to undertake demand management.* ***SP AusNet considered that this is particularly the case given that the regulatory framework operates to reward DNSPs more from spending capex than opex. That is, the balance of incentives already works to deter demand management****. (our emphasis in bold)*

The SPAusnet suggestion that demand management spending be rolled into the RAB, and that capex savings be retained goes to the heart of barriers to efficient DSP, and suggests the AEMC analysis on this issue may be incomplete. Network businesses expect to earn revenue, and grow their asset base, under any spending scenario, as though energy services were supplied by building network assets, implicitly, ***even where spending on network assets would have been inefficient***.

The logic of this is perhaps more simply conveyed through the following example. If all customers could supply themselves energy through EG more reliably, efficiently, securely and cost effectively than the mains grid, all customers would disconnect from the grid and choose EG. If this occurred, a network business would have no value and would need to have exited its investments profitably, prior to losing all value, in order to preserve its capital. This would be an extremely difficult scenario for a network business to manage, and so it will naturally seek to block EG, even where it is efficient, until it knows it can exit its business profitably to the extent EG is more efficient than mains supply.

If rules and regulation fail to address this perverse outcome, customers are unlikely to see savings from DSP where it has the potential to reduce supply costs. In such a scenario, consumers and networks will be indifferent to DSP unless they can capture some value of DSP external to network costs.

If we reject the assumption that all costs and benefits associated with EG are internalised into network costs and benefits, and CUAC believe it is reasonable to reject this assumption, the incentive for a network business to block socially efficient DSP is made worse. Socially inefficient blocking of EG may occur when internalised DSP costs are greater than internalised network costs, but when external (and implicitly, un-captured) benefits of DSP are greater than the internalised cost difference between a network and DSP option. Such benefits may include: reduced greenhouse gas emission intensity of supply; reduced risk exposure to high wholesale prices; improved reliability of supply; fuel switching to more secure, sustainable fuels (such as local bioenergy); and improved efficiency of fuel use and thereby a degree of fuel security.

Economic theory would suggest that given competitive markets for capital, the weighted average cost of capital (WACC) provides some discipline for network companies to only pursue efficient network building. However this theory requires an assumption that information symmetry, substitutability of capital at no/low cost and homogenous risk preference exist. In practice, we believe it is highly unlikely these assumptions would hold against any evidence based analysis.

Consequently, we believe it is likely the incentive to maximise and preserve RAB under price cap regulation provides a bias towards inefficient network building, and an incentive to block efficient DSP.

We recommend that the AEMC undertake or commission evidence based research to determine the effect that price cap regulation has on network incentive to facilitate or block efficient DSP

DSP must be viewed by the AEMC, and ultimately the AER, as a way of delivering efficient energy services, and reducing customer costs. Compensating distributors for 'loss of revenue', or any other loss in perceived value would allow for all efficiency gains to be appropriated by network companies and undermine any social value of undertaking DSP.

DSP cannot be seen as a burden on network companies, it must be seen as part of a suite of options available to network companies for meeting their regulatory obligation to supply energy services efficiently. Only when this occurs will customers benefit from efficient DSP.

The AEMC analysis does deal with the effect DSP has on revenue earned by a network in a limited way, recognising this forms part of whether a network has an incentive to undertake efficient DSP. The AEMC addresses two potential issues: whether risk associated with opex or capex spending are a source of incentive asymmetry; and whether opex or capex spending to produce the same outcome affects network profitability differently. AEMC analysis suggests opex spending is at greater risk, and that the efficiency carry over mechanism is a source of bias towards capex. We welcome this finding.

Throughout its draft report, the AEMC places a heavy emphasis on the need for network companies to price efficiently in order to achieve efficient DSP. This emphasis is driven by the AEMC's circular definition of efficient consumption, where it is assumed consumption at any time and price must be efficient, because if consuming at that time and price was inefficient, consumption would not occur. In this theoretical world, efficient consumption must follow from efficient price.

This definition of efficient consumption, and the emphasis that follows from it, ignores fundamental complexity around how energy consuming decisions are made. For example:

- Even if consumers see an efficient price signal, they still need the capacity to make an efficient decision about consuming. This requires them to: most probably be at the location where energy is being consumed; in control of all energy consuming appliances; understand how much energy each appliance uses and the value of that energy to them; understand how other consumers on the network

will respond to prices; how the response of other customers will affect the prices they receive over time; make all these decisions in real time; and balance the time/cost spent on making these decisions against any other activities they could be undertaking.
- The ability of consumers to make efficient consumption decisions is a factor of both operating an appliance, and the purchasing of an energy consuming appliance. It is ambitious to assume that an efficient operating price will result in efficient decisions about what appliance to buy.
- Energy consumption is often passive, and so decisions about when to consume or not consume are not consciously made. For example, air conditioners and refrigerators are set to operate at a certain temperature and cycle their compressors on and off to maintain an approximation of the setting. Across a network zone, this compressor cycling is effectively random and any individual customer choice is binary – leave the appliance on, or turn it off. However, compression cycles can be controlled and optimised across a network, reducing network demand by reducing the probability that all compressors will be on simultaneously, but not affecting the service being provided by any one appliance. In this way, an appliance can be left on, and service unaffected, but consumption across the network may be more efficient. No consumer can make this optimisation choice on their own, the service must be offered by a third party, and so the price for consuming energy is unlikely to be a relevant signal.
- Consumption decisions, or decisions to sign on to DSP products, are unlikely to be strictly rational based on energy prices. For example, prospect theory highlights the potential for decision-making bias. Decision-making bias can occur when an outcome is framed in terms of gains or losses (Kahneman and Tversky, 81). In essence, people will prefer making a certain gain or loss, over an uncertain gain or loss of equal probable value.
    - In the case of energy consumption decisions, specifically air conditioning, it may be that a consumer has more certainty over the utility comfort they gain from consuming, than any avoided costs from not consuming, and so will preference consumption. In this way, their engagement in DSP may be driven more by the certainty associated with losses and gains, as opposed to the quantum of losses and gains themselves. As described above, prices alone are unlikely to give sufficient certainty in order to correct for any decision making bias.

It also ignores the potential that even if a network is pricing efficiently, this price will not necessarily be passed on by a retailer. A retailer may not pass on the full time specific network costs for fear of losing customers, preferring to alter the tariff shape to recover peak network costs at shoulder and off peak.

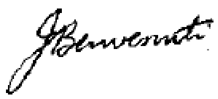
We recommend that the AEMC test the validity of its definition of efficient consumption through evidence and experiential based research, with a view to recommend to the MCE any non-price based policy interventions deemed necessary to ensure efficient energy consumption takes place.

On incentive for innovation, the draft report appears to find that building blocks regulation does not encourage efficient innovation and endorses the incentive model used in South Australia. However, the AEMC provide no comment on incentive mechanisms designed and adopted to date by the AER.

We recommend the AEMC consider measures undertaken by the AER to encourage innovation by distribution businesses in this review, and make recommendations to improve incentive for innovation where applicable.

Please contact Tosh Szatow on 03 9639 7600 should you have any questions about this submission.

Yours sincerely



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