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Dear Warwick

Demand management incentive scheme and innovation allowance mechanism

AEMO welcomes the opportunity to provide feedback on the AER's consultation paper on the demand management incentive scheme (DMIS) and innovation allowance mechanism.

Changing technology and consumer behaviour are leading to more diverse power flows on the distribution networks. Electricity is starting to flow upstream as well as downstream, requiring more active management. It is possible that in the future, the traditional model of supply following load will be superseded by a model where load follows supply.

AEMO supports a framework that encourages contestability and innovation, particularly at a time where there is a paradigm shift towards non-traditional technology and greater consumer involvement in managing their energy supply. AEMO believes schemes and processes within the regulatory framework must be harmonious so that there are no barriers to entry of demand management options. Network businesses should be able to consider these options through their revenue determination process on an equal playing field and deploy them effectively.

Our submission highlights that the DMIS will miss many opportunities to drive customer benefits if it has a narrow focus on using demand management to offset peak demand. We also make some suggestions about what information the AER might request if it decides to use the DMIS to address information asymmetry.

1. Demand management can do more than peak shaving

There are a broad range of potential roles that demand management can play in meeting localised and system-wide network needs. The DMIS should create incentives on DNSPs to provide a price signal that reflects the value of:

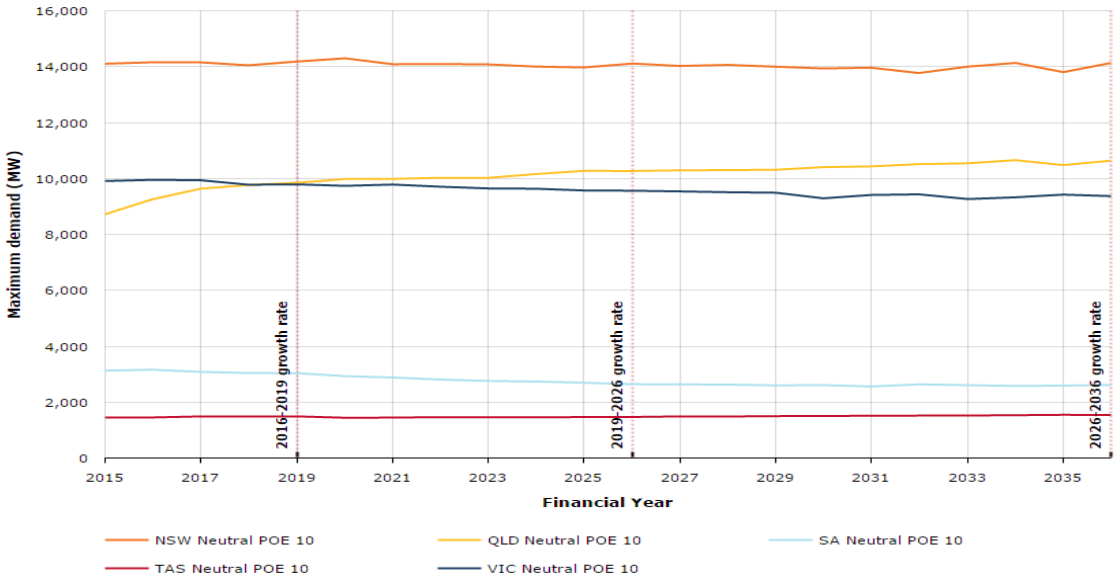
- Peak shaving in capacity constrained parts of the network;
- Downsizing or deferring replacement expenditure;
- Managing diverse power flows;
- Flexibility, given uncertain demand; and
- Grid support services to maintain system security.

1.1. Opportunities for peak shaving

Initiatives funded by the DMIS need to be carefully targeted if they are to drive savings for customers.

AEMO's demand forecasts show that peak demand is expected to remain near current levels or decline in most eastern states out to 2036 (see Figure 1).

Figure 1 – 2016 National Electricity Forecasting Report peak demand forecasts



However, pockets of growth exist within the distribution networks. To be effective in reducing costs associated with peak demand growth, the DMIS needs to target specific areas of growth and where network constraints exist. This would enable relief of localised constraints so that network augmentations can be deferred or potentially avoided.

1.2. Downsizing or deferring replacement expenditure

Demand management can defer replacement expenditure as the wear and tear on existing assets reduces. Altering power flows on the networks has the potential to reduce peak thermal loading on network assets and thereby extend the asset life or increase the rated capability of assets. For instance, Energex's 2014-15 Distribution Annual Planning Report noted that as a result of rooftop PV reducing the thermal loading on certain substation transformers and switchgear during the hottest part of the day, Energex was able to increase its ratings on some assets by 10%.[1]

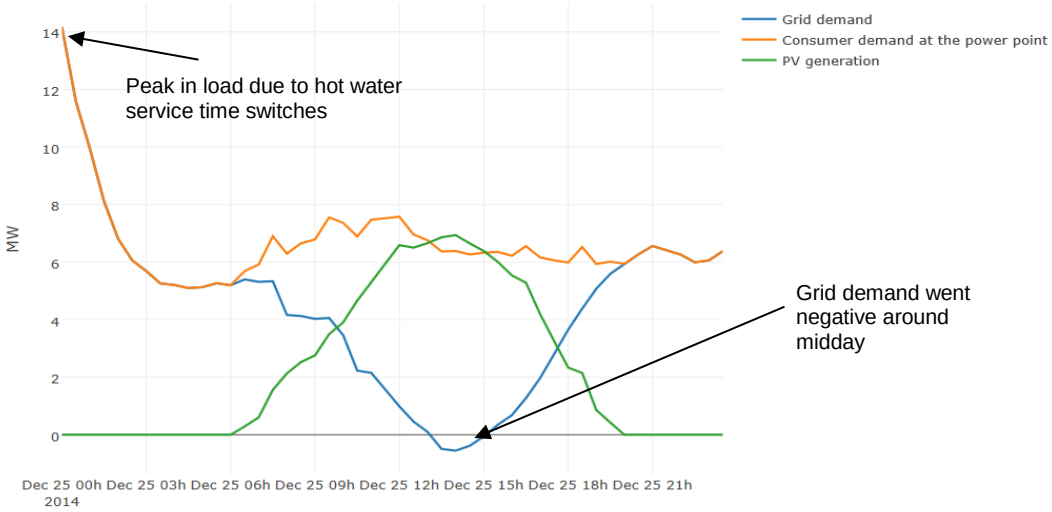
1.3. Managing diverse power flows

Demand management options are not only beneficial for peak demand conditions but also for minimum demand conditions (e.g. in South Australia) where there is a high level of penetration of distributed generation, namely rooftop PV. Figure 2 (next page) shows the Kadina East transmission connection point demand briefly going below 0 MW on Christmas Day in 2014, traditionally a low demand day. When minimum demand gets below a certain level, it creates system security issues (such as voltage fluctuations) which can drive a range

[1] Energex, Distribution Annual Planning Report 2014-15 to 2018-19, Volume 1, pg 150.

of costs. Increasing levels of distributed generation can also trigger a need for new network investment where the network is not designed to support bidirectional flows.

Figure 2 Kadina East transmission connection point, Christmas Day 2014



These costs can be mitigated by demand management schemes that shift energy consumption to times that offset peak solar output. For instance, hot water systems can be set to heat up in the middle of the day instead of the middle of the night. Energex is already undertaking these types of initiatives.

1.4. Option value of demand management

The decision to invest in network infrastructure is relatively straightforward if demand for electricity network services consistently grows. Historically, network planners have been confident that network infrastructure will ultimately be used, even if their demand forecasts are not quite right. Over the decade, this assumption has ceased to hold true.

There is now more scope to consider alternatives to expensive, lumpy network upgrades. Demand management options have the potential to be more cost effective and flexible in circumstances where it is unclear whether an identified constraint is likely to persist. Having a scheme that appropriately incentivises businesses to invest in projects that are more flexible to declining (or uncertain) demand conditions will mean there is a less likelihood of future stranded assets.

1.5. System security grid support services

As the NEM-wide system operator, AEMO takes an holistic view and approach to maintaining security and reliability. In the future, we expect that system operators and network service providers will increasingly rely on distributed energy resources (DER, which includes demand management) to maintain system security. Table 1 provides examples of how DER could be used to support the grid.

Table 1 – Examples of DER grid support services

Network impact	DER based solution
Peak demand management	• DER can be used to reduce network investment requirements by offsetting demand during peak periods. • For instance, customers could receive a payment for temporarily switching off their air-conditioners when the system is under stress, or batteries can store excess rooftop PV output for use during the evening peak.
Thermal loading	• DER can be used to prevent thermal overloads. • For instance, if excess PV generation is leading to upstream power flows, hot water systems can be set to come on during the middle of the day in order to act as a "solar soak". Alternatively, solar PV could simply be curtailed.
Voltage stability	• DER can help with voltage stability if the inverter has reactive power capability and/or low voltage ride through capability. • There is scope to use storage to manage DER output variations.
Frequency stability	• DER, especially storage, can help to maintain frequency stability. • For instance, Reposit Power's GridCredits technology is designed to enable residential batteries to provide frequency control ancillary services (FCAS).
Reactive power capability	• New inverters have the capability (as per AS 4777) to provide reactive power by being set to either voltage control mode or power factor mode – improving grid power factor and therefore minimising transmission losses.

2. Using the DMIS to address information asymmetry.

For the benefits of demand management to flow through to customers, the revenue determination process should not provide funding for network assets where there is a more efficient non-network alternative. In order to help demand management service providers to form a view on the scope for alternatives to network investment, the DMIS could require DNSPs to make available the following information:

- A forecast demand trace - or summary statistics such as a duration curve - that sets out the expected frequency and duration of systems limitations. For proponents of non-network options such as a demand management service provider, this information is key to assessing the likely costs of meeting the system limitation.
- The composition of load within the part of the network affected by the constraint. This information is likely to have major implications for the potential solutions available. For instance, an embedded generation solution might be more feasible in a predominantly commercial feeder where peak demand tends to occur in the middle of the day.
- Required response times. Network businesses may have flexibility within their reliability obligations to meet a standard within a specified timeframe. For instance, South Australian transmission reliability standards are defined on an "N equivalent" basis – the TNSP might be obliged to ensure that the reliability standard at a given connection point meets N-1 standard within an hour.[2] The non-network option needs to be capable of meeting the required standard, taking into account any other relevant aspects of the network's capability.

The information listed above will help demand management proponents to propose their solutions within the investment decision-making process timeframe.

[2] ESCOSA, Electricity Transmission Code Review - Final decision, September 2016.

We hope that these comments have been helpful. We would welcome the opportunity to work with the AER to make sure the scheme effectively promotes the deployment of efficient demand management options. If you would like to discuss any of the content, please contact Jess Hunt on 08 8201 7315.

Yours sincerely,

David Swift
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