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Dear Mr Corrigan

AEMC Power of Choice review – Directions paper

The Australian Energy Regulator (AER) welcomes the opportunity to comment on the Australian Energy Market Commission's (AEMC) directions paper as part of its review into demand-side participation (DSP) in the national electricity market (NEM) - the "Power of Choice" review.
The AER acknowledges the importance of this review given the:

- recent evidence of the deteriorating rate of network load utilisation across the NEM
- significant increases in approved expenditures driven largely by a need to build networks to service demand during peak times, and
- the overall tightening in the energy demand and supply balance in the NEM and its implications for generation investment and the type of generation investment.

The AER notes that achieving an efficient energy demand and supply balance in the NEM, including an efficient level of DSP in achieving this balance, is likely to involve a complex interplay of factors along the energy supply chain. The AEMC's directions paper has covered a range of issues which can best be grouped in sequence, from the:

- provision of price signals to encourage efficient behaviour
- to enabling consumers to respond to these signals; and
- incentives facing participants along the supply chain individually and collectively to engage in and/or facilitate efficient DSP.

Accordingly, given the range of issues, any approach to achieve an efficient supply and demand energy balance will necessarily need to be multi-faceted and beyond any possible single solution.

While the AER acknowledges the relevance of a number of issues identified by the AEMC, the AER's submission focuses principally on issues raised in the directions paper that are more closely related to its regulatory role and experience. These issues include the following:

- methods of achieving greater coordination of the supply chain toward DSP
- information access as an enabler of consumer participation in DSP and competition in DSP services; and
- factors affecting the incentives upon regulated distribution businesses to engage in or facilitate DSP.

In relation to the incentives for a network business to engage in or facilitate efficient DSP, the AER in principle considers that a network business should be indifferent as to whether it undertakes network or non network options (including DSP) to meet expected peak demand. That is, where DSP represents the most efficient option (lowest cost option) to address a network constraint, the regulatory framework should in principle provide the sufficient incentives for a network business to adopt a DSP option. However, the AER also recognises that given a range of factors, including an inability of network businesses to capture all of the benefits of DSP and uncertainty regarding the cost recovery associated with DSP initiatives, that there may be an inefficient take up of DSP initiatives. The AER notes that the AEMC has identified a number of areas in its directions paper that it considers should be reviewed further. These areas include a review of the incentives under the network regulation framework. The AER considers that these issues should be considered in conjunction with the AER's rule change proposal related to the economic regulation of network businesses.

Overall, the AER considers that any arrangements which seek to encourage efficient DSP should not prevent the development of innovative business models for contestable services from emerging in the industry that may also address peak demand.

Coordinating DSP initiatives across the supply chain

The AER recognises that the nature of benefits and costs of DSP will vary for different parts of the supply chain given the wide range of possible types of DSP and the likely participants involved. Further, despite this range, any DSP initiative may have flow on effects throughout the electricity supply chain. For example, an initiative targeting reductions in network peak demand could also provide additional benefits to the wholesale market (in terms of deferral of generation capacity). The AER is aware that the inability of all of these benefits to be captured by a DSP proponent is often cited as a barrier to DSP. This barrier arises given that:

- different market participants will have differing commercial incentives to engage in DSP (referred to as split incentives); and
- there is a possibility of 'free-riding' by some participants on DSP initiatives (i.e. where participants are benefitting from DSP without contributing to their costs).

In view of these barriers, the AEMC has sought feedback on whether a "single agent" model should be adopted, where a participant coordinates DSP across the supply chain. The AER considers that adopting a model whereby a single market participant would be charged with procuring demand-side responses should be approached with a degree of caution on the basis that:

- consideration would also need to be given to any potential for a single agent model to stifle the development of innovative business models and competition in the market for DSP; and

- the possible practical difficulties of a single agent accurately understanding the range of inter-network and intra-network constraints across each NEM jurisdiction.

The AER supports the alternative approach described in the directions paper, which instead seeks to investigate where further improvements can be made to existing arrangements and processes in the NEM. In particular, the AER considers there is scope to further explore and improve on the following aspects of the regulatory framework:

- The potential for greater price signalling via cost reflective tariffs, and their role in communicating the costs of energy and encouraging efficient responses by both consumers and third parties acting on their behalf. The AER considers effective price signalling to be a necessary feature of any market that seeks to enable behavioural change by empowering participants to make efficient decisions. Further, by making visible the true value of the costs of energy, they provide a mechanism for participants to obtain benefits from facilitating peak demand reductions, and negotiate in an informed manner.[1]

- The scope for greater clarification and harmonisation of how benefits are valued under different network planning processes, including: the RIT-D, RIT-T and regulatory determinations.

- The potential for emerging business models such as energy aggregators to lower the transaction costs involved in different parts of the supply chain by coordinating their efforts and how these benefits are apportioned between participants.

Access to consumer information

The AEMC's paper highlights access to consumer information as an important aspect of its review. In this context the AER considers that pricing signals that transmit to a practical extent, the costs of energy supply are a necessary component of any market that seeks to achieve an efficient demand and supply balance. However, as the directions paper has correctly identified, price signals alone are insufficient to elicit efficient customer behaviour to achieve demand supply balance in the NEM. In particular, consumers need to be enabled to respond to price signals, through a combination of approaches, including:

- access to appropriate technology

[1] The AER notes there appears to have been some demand side response to extreme price events in the wholesale market (refer to attachment 1).

- access to information on how their consumption decisions impact on the market and on the price they pay

- access to information/education on the range of options available to facilitate changes in their consumption behaviour.

The AER agrees that access to information, particularly individual energy consumption data has a key role to play not only in informing the consumer, but enabling other market participants to act on their behalf.[2] Indeed, many forms of demand-side management depend on access to the pattern, timing, and intensity of energy usage by individual consumers or groups of consumers with similar characteristics. Given the importance of consumption information from the perspective of enabling consumers and competition in DSP service industries, how access to this information is governed is of importance.

The AER notes that the governance arrangements involving access to information centre around the involvement and interaction of various parties with the actual technology used to transfer consumer information (i.e. the meter, or more specifically, the advanced meter capable of real-time information relay).

These governance arrangements, such as they are, are currently set out in clause 7.7 of the National Electricity Rules (NER), and detail the range of participants that are entitled to receive or further relay electricity consumption information. These arrangements envisage a situation in which market participants, such as the financially responsible market participants (that is, a consumer's retailer) are the agents for consumers to gain access to their own information, and relay this to other parties – which might include other retailers or DSP services firms. However, these arrangements may have been outpaced by policy and market developments in some jurisdictions. In particular, it is not always the case that the key conduit for flow of this information, the meter, will be provided by a retailer. For example, in Victoria, the smart meter roll-out has been mandated upon the distribution businesses (and not the retailer). Accordingly, in some jurisdictions, the installing of smart meters has been undertaken under a framework where the DNSP has the infrastructure to facilitate consumer access to the detailed information from a smart meter. This is despite the fact that under the NER, it is the retailer that can provide the consumption information to the consumer. This situation could be further complicated by the introduction of the National Energy Customer Framework (NECF) that will introduce a triangular relationship, which provides a direct link between the consumer and the DNSP.

The AER is already aware that a number of participants, particularly DNSPs, have concerns as to whether they would be in non-compliance with the NER if they were to grant residential consumers access to consumption data directly, without seeking the consent of the consumer's retailer. It has also been brought to the AER's attention that the NER is unclear whether retailers are able to share such information with other companies – either network businesses or DSP services firms.

Given the importance of the issue of information access and the uncertainties that currently exist in the NER regarding access to consumption information, the AER supports clarification of the Rules in this regard and also more generally. The AER considers that this further

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2 The provision of DSP services to consumers by dedicated DSP firms is emerging as a competitive industry with considerable potential for creative business models to emerge.

consideration is not just to deal with the specific deficiency identified, but will need to consider how the market for demand-side services could evolve and how the rules may need to be changed to facilitate competition in future DSP services. Also relevant is to take account of future smart meter provision; how this market may be impacted by different frameworks for smart meter roll out – whether mandated or a commercial (third-party) roll out.

Further, consideration may also be required to the issue of the form in which the information is provided when access is sought, and the impact this might have on the ability of different participants to make use of that information for the benefit of DSP.

These matters are not necessarily unique to the energy sector and a comparison of other access regimes under the Competition and Consumer Act and other industry legislation could also be considered.

Incentives for network businesses to undertake DSP

Network businesses, and in particular, DNSPs as the parties responsible for investment in required network infrastructure to address peak demand have a key role in addressing the efficiency of the demand supply balance. It is therefore important to consider the inter-relationships between the regulatory arrangements in the NER and the decision by DNSPs to either invest in network or demand-side (non-network) alternatives. The AEMC has identified a range of factors that may affect a DNSP's decision to engage in DSP, including:

- how different types of expenditures (i.e. operating or capital) are treated under the regulatory framework and how a network business expects this expenditure to be assessed by the AER – including how benefits are valued in reset expenditure assessments, the RIT-D and the DMIS
- how this regulatory treatment affects a network business' ability to derive profit over the life-cycle of a DSP initiative
- how changes in energy volumes impact on a network business' revenue under different forms of price control
- the uncertainty associated with different types of expenditure programs (i.e. network versus non-network expenditure), including uncertainty regarding forecast costs and the impact on demand and service standard outcomes.

The AER's response to these issues is discussed below.

First, the AER agrees with the AEMC that the key factors impacting DSP investment decisions by DNSPs concern the incentives under the regulatory framework, and not the presence or design of the DMIS. In examining these issues, the AER also agrees that caution is required in making overarching statements about possible biases against DNSPs undertaking DSP. In particular, the AER considers that the factors that may affect DSP investment identified in the directions paper are not all biased for or against DSP investments, given the existence of possible mitigating circumstances, as set out below. That said the AER accepts that there are some specific issues that could provide disincentives for DSP investment and warrant further consideration. In particular, the AER suggests that the AEMC consider the following matters to address any disincentive for DSP investment by DNSPs:

- clarifying the range of benefits associated with DSP programs that can be considered as part of the AER's regulatory reset expenditure assessments

- provide the AER with the ability in the NER to develop capex incentive mechanisms to reduce the incentive for a DNSP to over-spend on capex allowances to better balance the power of the incentive between capex and opex – this is proposed as part of the AER's chapter 6/6A rule change proposal

- consider whether the network pricing principles could be improved to provide greater flexibility in how prices are structured, including to promote efficient DSP, particularly for DNSPs under price cap regulation.

- the possible need for temporary and specific exemptions from incentives involving reliability service standards.

AER network regulatory determination expenditure assessments

In examining possible barriers to the uptake of efficient DSP, a preliminary issue is whether there are shortcomings regarding the AER's expenditure assessment process under the NER. The directions paper identifies that there is currently some uncertainty for DNSPs as to how the AER will assess demand-side expenditure as part of the capex and opex assessments. In particular, there is some uncertainty as to the nature of benefits associated with DSP that will be considered by the AER.

To date the AER has approved expenditures for a wide variety of demand-side initiatives proposed by DNSPs, including:

- initiatives with a direct network benefit via their ability to alleviate peak network demand or local network constraints and therefore delay the need for network investments

- initiatives that have a more indirect impact on network utilisation, such as tariff based pilot programs that seek to improve price signals for the costs of energy delivery to encourage consumption at non-peak times or lower overall consumption.

The AER considered that initiatives involving tariff based pilot programs were expected to have broader market or system-wide benefits beyond network benefits. However, such benefits were proposed and assessed as additional to network benefits, or linked to an ultimate impact on network utilisation. The AER considers that the NEO provides for a broad consideration of potential benefits to be identified as the basis upon which to approve expenditure allowances for DSP as part of regulatory determinations. In particular, where there are network benefits such as improving network utilisation, reducing network losses or the deferral of network investment but there are also benefits in other parts of the supply chain, these additional benefits can be taken into account by the AER in assessing efficient DSP allowances.

That said, the AER considers that the AEMC should consider whether the NER, and more particularly the expenditure criteria against which proposals are assessed, could be clearer about the potential scope of market benefits that can be considered in assessing expenditure allowances arising from DSP. The AER considers that clarity on this issue is likely to promote consistency as to which benefits are valued and available across the supply chain such that

DNSPs may seek regulatory approval for DSP options that also have broader market benefits. The AER also considers that further review should be undertaken to consider how to achieve greater clarity in how benefits are to be valued, noting that network businesses have responded in quite different ways to the opex and capex assessment criteria of the NER as part of their expenditure proposals.

The AER is aware that these two issues arise not only in the context of regulatory determinations, but also in broader network planning processes, including the RIT-D that the AEMC is currently considering in its network planning and expansion rule change proposal. In light of the RIT-D considerations, resolving these issues will depend on which classes of market benefits are to be identified and specified under the NER, and which party will have discretion to determine any other market benefits that are to be considered relevant. The AER's submission to that rule change expressed the view that in order to achieve consistency across network businesses, such discretion should reside with the AER. It follows that this approach would also apply the AER's consideration of expenditure proposals in a reset.

Regulatory treatment of capex vs opex

An important issue highlighted by the AEMC then turns to whether the regulatory framework introduces an undue bias in favour of capex relative to opex and what effect this may have on incentives for DNSPs to pursue efficient DSP. The AER has had regard to the following biases identified by the AEMC, including:

- the superior profit generation potential of capex relative to opex, where a DSP option involves opex – i.e. the ability to achieve higher returns relative to opex from both under-spending capex against the approved allowance (assuming most capex reductions are one-off rather than permanent, and opex savings are permanent) and overspending capex

- the relatively more 'mechanised' approach to setting capex allowances at subsequent regulatory determinations compared to opex

- the shorter asset lives of DSP related capex compared to network capex means that DNSPs can suffer increased losses from overspending on their allowances.

In general, the AER agrees that there does appear to be a bias in favour of capex in circumstances identified above relative to opex. As acknowledged by the AEMC, the AER is seeking to strengthen the capex incentive framework as part of its network regulation rule change proposal. In particular, the AER's proposal in response to the AEMC's directions paper on this rule change proposal is to seek discretion to develop arrangements which could be tailored to a DSNP's circumstances to improve incentives for efficient capex, and discourage capex overspends.[3]

Nonetheless, the AER is also aware there may not always be a bias against DSP, for example:

- A network business may prefer to obtain all of the necessary funding for a DSP option via the opex allowance in the regulatory control period rather than over the life of the DSP asset as would be the case with capex.

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[3] This incentive is exacerbated where the DNSPs true cost of capital is below the regulatory cost of capital and depends on the asset life and timing of any expenditure within the regulatory control period.

- There are situations where the assumption that all opex savings are permanent does not hold.

- While past capex is automatically rolled into the RAB, the AER has given significant weight to past opex in forming opex allowances. Businesses have tended to forecast opex using the 'base year' roll forward method and the AER has typically adopted this method in approving efficient forecasts of opex. Under this method, the AER has assumed, where incentives are seen to be strong, that the revealed costs of the businesses are efficient given the incentive based framework such that these costs are reflected in the forecast allowance over the next regulatory control period

- Whether any bias towards capex provides a disincentive for a DNSP to seek DSP funds as an alternative to direct network capex will depend on the nature of the DSP project. While most DSP has tended to be in the form of opex, an increasing number of DSP projects are capital intensive, as noted in the directions paper

- While shorter asset lives could disadvantage DSP capex over longer lived network capex given the greater impact of overspending on short lived assets, this impact is symmetrical. That is businesses would also receive a significant proportion of the gains from under-spending these allowances if they are able to deliver the DSP option at a lower cost than forecast. However, whether short lived assets is a predominant characteristic of DSP projects and whether this is considered to be a significant risk by DNSPs will largely depend on the certainty with which they can forecast the costs involved.

Funding DSP during the regulatory control period

The AEMC has noted that DSP initiatives can be funded within the regulatory control period where a DNSP under-spends on its total capex allowance. The AEMC also notes that the capital cost of an asset is recovered over the total life of the asset (usually 40 to 60 years for electricity network assets). The AEMC concludes that given the long lived nature of these assets, the annual allowance for the recovery of these costs may, in certain circumstances be insufficient to fund DSP initiatives.

The AER is unaware of the extent to which this is an issue and it is important to recognise that the AER approves a total amount of capex in a determination, rather than project specific capex. Further, the AER notes that it will not always be the case that such a situation will eventuate, for example:

- DSP project costs need not always be front loaded

- where the capex savings are significant, these could still be sufficient to fund DSP, as noted in the directions paper.

The AEMC has also raised whether any barriers to efficient DSP arise from the need by a DNSP to resubmit capex programs that were previously funded, but unspent due to successful DSP initiatives. Accordingly, it is contended that there may be a risk that the AER would not approve this capex in subsequent regulatory control periods. The AER agrees with the AEMC that capex is generally deferred rather than being avoided. However, the AER considers that this concern may be overstated given that in circumstances where this capex has been efficiently deferred to DSP initiatives, the AER would approve any resubmitted capex

programs on the basis that these capex programs reflect efficient expenditure. Further, under the NER, the AER does not approve individual project expenditures but rather a total sum of allowed expenditure. The network business is provided the discretion as to how to prioritise its expenditure requirements, and may re-prioritise where necessary, either due to DSP or other circumstances that may arise during the regulatory control period.

Funding DSP via the Demand Management Incentive Scheme

The Directions paper has referred to the AER's DMIS as an additional avenue for some limited DSP funding. However, two potential concerns with the operation of the scheme have been identified in the Directions paper, as follows:

- unlike capex which is automatically rolled into the RAB, DMIS expenditures are subject to an ex-post assessment
- the consideration of system-wide benefits is not permitted under the DMIS

The AER considers that the first concern is overstated. In some jurisdictions, DNSPs have the option of seeking upfront pre-approval for DSP projects to alleviate any concerns over whether such projects would be approved under the Part A – Demand Management Innovation Allowance (DMIA) component of the DMIS. In any case, unlike the capex and opex assessment criteria in the NER, the DMIA criteria are relatively broad. The AER considers that there are limited circumstances where a DMIA project would not be approved by the AER. These circumstances include where expenditure was previously funded elsewhere in a determination or jurisdictional scheme, or where the expenditure did not relate to any form of demand management.

In setting out the various types of demand management activities that can be pursued by a DNSP, the DMIS explicitly states that projects can be either designed to manage peak network constraints, or broad-based demand on the network. These activities can also be tariff or non-tariff based. As such, the AER does not agree that the DMIS presents any apparent disincentive to innovation or research into broader forms of DSP that involve broader market benefits. As well, it should be noted the existing scheme is not an incentive scheme as such, as permitted by the rules, but a form of research and development (R&D) allowance. The AER will consider the need for development of an incentive scheme in due course once the outcome of this inquiry and the policy response is clear.

Impact of DSP on the form of control

The AER is aware of the possible revenue impacts for DNSPs under a price cap form of control mechanism arising from demand-side alternatives that successfully reduce energy volumes. To address this issue the AER introduced the Part B – Forgone Revenue component of the DMIS for networks that are subject to a price cap. However, the AER's approach to this issue has been conservative, not least due to the AEMC's findings in its stage 2 review of DSP that such impacts were an appropriate consideration for businesses to factor into their decision on whether to undertake DSP. In addition, the financial benefits of avoiding network options could still outweigh any reductions in revenue due to reductions in volumes.

The AER agrees that there could be a disincentive for DNSPs to undertake demand-side alternatives, where a business' profit is dependent upon actual volumes. This issue is being assessed as part of the AER's consideration on the form of control to apply to the NSW and

ACT DNSPs as part of their next regulatory determinations.[4] The AER has set out an initial preference to apply a revenue cap control mechanism for the upcoming determinations. The AER has considered the impact upon incentives to undertake demand-side management initiatives as a relevant factor on whether to apply a price or revenue based control mechanism (or some hybrid).

However, addressing the impact on DNSPs expected returns from undertaking demand-side management initiatives may not be dependant on the choice of the form of control. As acknowledged in the AER's discussion paper, even under a revenue cap, the incentive to undertake demand-side management initiatives could be diminished over the long term. This situation holds where there is an incentive to increase the RAB and where the DNSPs true cost of capital is below the regulatory cost of capital. Further, as acknowledged in the AEMC's Directions paper, even under a price cap form of control, the impact on a business' profit from undertaking demand-side alternatives that reduce volume will depend on additional factors, including:

- the impact of additional volumes on a business' costs – additional volumes could decrease or increase profit depending on the relationship between volumes and costs.

- the structure of a business' tariffs – that is, how they recover the fixed sunk costs of past investment.

In regard to the second point, price caps do afford flexibility to rebalance tariff components to alleviate some of the concern over the impact of demand management initiatives. For example, a business may be able to increase the fixed charges, or increase prices on tariffs where demand is not expected to fall and reduce charges on tariffs where demand management can be expected to negatively impact on volumes. The degree of flexibility afforded to DNSPs is determined by the pricing principles in the NER. The AER considers there is merit in exploring whether these pricing principles afford sufficient flexibility in terms of promoting efficient DSP.

DSP and reliability service standard incentives

The AER recognises that DNSPs and other market participants may be reluctant to deploy new DSP projects because of the risk of a financial penalty under the AER's Service Target Performance Incentive Scheme (STPIS). In particular, if the ongoing impact on network reliability of a DSP project is uncertain, a network solution with proven reliability may be favoured over the DSP project. This may be despite the fact that the DSP project may ultimately provide a similar level of network reliability.

In general, the AER considers that an unqualified exemption from the STPIS, which is intended to maintain or improve service performance, would be inappropriate as customers should not be worse off in terms of the level of service performance they receive due to the implementation of DSP projects. These risks should be borne by those best placed to meet them rather than customers who are not as well placed. That said, the AER considers that an exemption from the application of the STPIS which is limited to pilots and trials of DSP projects may in some circumstances be appropriate. A limited exemption would provide parties wishing to deploy DSP projects with the opportunity to assess any reliability issues and to test

[4] AER, *Discussion Paper: Matters relevant to the framework and approach ACT and NSW DNSPs 2014-2019 – Control mechanisms for standard control electricity distribution services in the ACT and NSW,* April 2012.

the suitability of DSP projects on the network. The limited nature of any exemption would minimise the exposure of customers to potential reliability issues.

The AER also considers that these pilots and trials should be limited in size and duration to avoid placing an undue level of reliability risk on customers. The AER also considers that in considering an exemption, the potential reliability impact of pilots and trails would need to be identifiable to allow any reliability impacts to be removed from the STPIS.

Other specific issues

Distributed generation

The directions paper has noted uncertainties raised by market participants as to whether DNSPs can own distributed generation and further, use that generation to sell energy back to the market. Currently, these two related issues are treated under differing jurisdiction specific regulation. The ring fencing guidelines in each jurisdiction set out the nature of services that DNSPs are permitted to undertake, and specify the required level of legal or accounting separation for particular activities.

In some jurisdictions (Queensland, Australian Capital Territory) DNSPs are explicitly prohibited from engaging in any sort of generation activity. In other jurisdictions (South Australia, New South Wales, Tasmania and Victoria), certain conditions are placed on DNSPs in relation to what generation activities can be undertaken. For example, in South Australia DNSPs are only permitted to own generation for the purpose of providing network support. Therefore, a South Australian DNSP is prohibited from obtaining revenue from selling energy. It is also unable to hold a retail or generation licence as part of the same legal entity. Therefore, regardless of whether it sought to either obtain a retail/generation licence or an exemption under the National Energy Retail Law, it would still be prohibited from obtaining revenue from generation given ring fencing requirements.

The AER is currently reviewing the need for a national ring-fencing guideline to consolidate and standardise separation requirements across the NEM. The differing treatment of matters concerning a DNSPs' ability to own and sell energy from generation has been identified as part of the initial discussion paper.[5] The AER has not yet formed a view on whether DNSPs should be permitted to own distributed generation, and if so, on what terms, such as safeguards to ensure that such investments are only undertaken on an efficient basis, and that other parties are not disadvantaged in their ability to connect to a network (and where relevant, provide network support services). Stakeholder submissions on ring fencing are currently being considered, and the AER will look to publish a draft guideline for consultation in June/July 2012.

5 AER, *Discussion paper – Electricity distribution ring-fencing guidelines review,* December 2011

If you would like to discuss these matters further, please contact Mr Blair Burkitt on Blair.Burkitt@aer.gov.au or by telephone on 03 9290 1442

Yours sincerely

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ÁTTACHMENT 1: POTENTIAL DEMAND SIDE RESPONSES IN THE NEM

Date	Region	Description
15 January 2009	NSW	High temperatures, drove new summer record demand. A significant amount of generation capacity was unavailable, and network outages led to reduced import capability. The resulting tight supply-demand balance coupled with rebidding saw the spot price reach $5210/MWh. Up to 350 MW of load reduction occurred following the five-minute dispatch price spiking to $8800/MWh. This appeared to be a price responsive demand reduction. The load reduction continued for around one hour. Following further high prices, there was a second load reduction of around 400 MW for around one hour.
20 November 2009	NSW	High temperature drove high demand (much greater than forecast 4 hours ahead). Planned network outages in NSW led to reduced import capability from Victoria. The impact of the outages was not forecast. Low reserves led to led to AEMO directing a NSW generator to be available for dispatch and instructing TransGrid to return network equipment to service. The spot price exceeded $5000/MWh for 10 trading intervals in total in NSW and Q'l'd, reaching a maximum of $9284/MWh and $8388/MWh respectively. Rebidding in NSW and QLD also contributed to the high prices. Following four hours of high prices, there appeared to be a demand side response in NSW with demand reducing by around 500 MW over 45 minutes, leading to lower prices for 3 trading intervals.
10 June 2009	TAS	On 12 occasions between 10 and 19 June, the spot price in Tasmania exceeded $5000/MWh. None of these high prices were forecast. Eleven of the events occurred when sudden and repeated reductions in the output from non-scheduled generation owned by Hydro Tasmania resulted in the dispatch of other high-priced Hydro Tasmania generation. Coincident with this, there was a step change in the amount of generation capacity offered at prices above $5000/MWh by Hydro Tasmania. The cumulative price threshold was breached for the first time in Tasmania. On 10 June there was an apparent reduction in industrial customer demand of 45 MW over 5 minutes in response to high prices.
4 February 2010	NSW	The spot price reached $5541/MWh for the 12 pm trading interval. The high price was largely due to network problems and the effects of the operation of a system normal constraint. In response to high 5-minute prices there were two apparent demand side responses of around 540 MW and 360 MW.
22 April 2010	VIC	The spot price in Victoria exceeded $5000/MWh over seven trading intervals from 12.30 pm to 4 pm inclusive, reaching close to the price cap. Imports into Victoria were restricted. Day ahead bidding saw significant capacity priced at close to the price cap. Some plant committed in response to high forecast prices, and forecast price fell. In response, capacity was rebid into high prices, and forecast prices rose close to the cap. During the high-price period, there was no capacity priced between $500/MWh and $9000/MWh. Further rebids shifted capacity into negative prices. Planned network outages saw flows flowed into the lower priced NSW and SA regions, and led to negative prices in SA. Constraints invoked to manage negative settlements residues, reduced output from a key generator.

		In response to these extreme prices, an industrial load turned off and demand reduced by around 255 MW.
7 and 8 August 2010	TAS	On 7 and 8 August, Tasmania exceeded $5000/MWh for a total of five trading intervals. During the high priced period, imports into Tasmania across Basslink were at the import limit of around 480 MW. High demand and a step decrease in the availability of low-priced capacity at these times resulted in high-priced generation being dispatched to cater for demand. The step decreases in the availability of low-priced capacity were offered in day-ahead bidding by Hydro Tasmania at a number of its generating units. At 8.35 am, Tasmania saw a demand side response to the high priced generation as demand fell by 70 MW. However, a subsequent demand side response to the high priced capacity offered for the 10 am trading interval saw demand fall from 1483 MW at 9.35 am, when the dispatch price reached $4500/MWh, down to 1424 MW at the next dispatch interval. At 9.45 am, a demand side response saw the level of local generation fall to 1372 MW from 1445 MW during the previous dispatch interval. This 80 MW The next instance of demand reduction in response to a step change in the price of available capacity was observed at 5.40 pm, as demand fell by 45 MW from 1507 MW at 5.35 pm.
10 August 2010	NSW	The spot price reached $6267/MWh at 8.30 am and $5739/MWh at 9 am. These prices were largely as a result of unforecast network congestion. In response to these high prices there appeared to be a demand side response leading to a 300 MW reduction in New South Wales demand.