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Review of the System Black Event in South Australia on 28 September 2016 EPR0057

The Australian Energy Council (the AEC) welcomes the opportunity to make a submission to the Discussion paper on Managing Power System Security risks in a Changing Power System.

The AEC is the industry body representing 21 electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. These businesses collectively generate the overwhelming majority of electricity in Australia and sell gas and electricity to over 10 million homes and businesses.

Introduction

The AEC appreciates the AEMC's management of the review into this complex area. In particular the AEC was pleased to appoint several expert member representatives to the Technical Working Group, and the AEMC's efforts to engage the AEC's views.

The AEC recognises the paramount importance of maintaining a secure grid, but also the challenges of defining exactly what is a secure technical envelope. Despite perceptions, there has never been a clear boundary to a secure system. Our inherited approaches arose from a trade-off between the value of gaining higher utilisation of assets against the probability times cost of a major disruption. The challenges presented by the changing power system should be seen as an extension of historical developments where:

1. Historically, a discrete event of a loss of a single large network or generator asset was considered to dwarf all other conceivable events in terms of probability and consequence such that the largest possible could be reasonably considered in isolation. This was termed a "credible contingency" and system operated as if the contingency was certain to happen whilst all other events were certain no to. Whilst this deterministic approach was clearly never a full description of reality, it was convenient, and historically proved a reasonably adequate trade off of security against utilisation.
2. Over time, it was observed that in certain abnormal conditions, such as, say, a bushfire near an easement containing two circuits, the probability of two such discrete events occurring in close succession increased to a point that it was no longer responsible to apply a 0% probability to its occurrence. Desirous of retaining a simple deterministic approach, a process of contingency reclassification was employed, that promoted such events from 0 to certain. However it was also recognised that each such abnormal promotion would impair market efficiency, so a systematic process of identifying conditions for promotion was implemented. Such a process could never anticipate every event, nor was it intended to, yet when an unanticipated event inevitably arose, a major review was instigated into the process, unreasonably implying it had failed. This occurred following the events of 16 January 2007 just as it did for 28 September 2016.
3. Refining further, it was recognised that certain non-credible events did not have sufficient probability that they should be considered as credible and impair dispatch efficiency, but still had sufficient probability that it is worthwhile investing in a control system to post-event shed customers or generators to avoid a system black. For this group the category of Protected Event was intended. A systematic process of transparently nominating and justifying such Protected Events was created.

4. The growth of wind and solar generation has created potential situations where a rapid widespread change in input energy (up or down) could have impacts on security. These changes don't individually meet the historical definition of an "event", but taken together, they imply a change in power system conditions with similar probability and severity to traditional events. So the system needs to take the potential impacts into account. Whilst this understanding is only in its early stages, in time well understood methodical and operationally feasible approaches to manage the risk can and should emerge.

The latter two groups are recent developments and the industry is yet to fully develop their application. Improving these, using scientific, methodical and transparent processes should be the focus of this review. Once this sophistication is formed, suggestions of a need to constrain the power system pre-emptively for "indistinct events" should recede.

Impacts upon the market of pre-emptive security constraints

Any unexpected constraint on market dispatch creates impairment upon the market. This arises through obvious sources:

- By constraining dispatch from the most efficient mix, hence using more costly inputs, e.g. burning additional natural gas whilst spilling renewable energy.
- By causing additional energy and ancillary services price separation – exporting regions' prices are suppressed and importing increased – leading to less allocative efficiency.
- By creating a risk to market participants, as unpredictable value transfers will occur that increase the overall risk of participating in the market.
- By under-utilising network assets that consumers are committed to paying for, and potentially justifying the expenditure of ever-more capital upon additional assets.
- By lowering the insurance value of settlement residue instruments.
- *In extremis* by leading to the pre-contingent interruption of customers in order to maintain security.

The AEC fully accepts the primacy of system security and the need to limit the network prudently which implies the forms of impairment above. However behind every prudent action to improve security there is also a potentially imprudent impact upon the operation of the market with real costs. It must be acknowledged that there is no hard secure system envelope and that determining the technical envelope is, as it has always been, an economic trade-off of the market costs above against the cost of the consequences of an event multiplied by its probability of occurrence.

There are many difficulties in calculating this balance, and expert judgement is will be required. One of the many challenges in exercising this judgement is that the decision maker – the market operator – has a natural bias as it is held more responsible for system security than for market costs.

Analogously, in the early years of the NEM, network owners were observed to take outages at inopportune times in order to reduce their own costs, increasing congestion costs greatly. In response to that inefficiency the regulator created the Short-Term Performance Incentive Scheme (STPIS) to transfer some of these market costs to the network owner, which resulted in great improvements in outage timing.

Unfortunately a similar financial incentive is not available for a not-for-profit operator. This means the only way the market can gain confidence that an appropriate balance is being struck is through the governance processes ultimately underpinned by the rules obligations. This will at times be inconvenient and burdensome, but it is a necessity of operating a market.

The importance of procedure

Network constraints that vary with conditions are a necessity. However it is crucial that the processes are as mechanised, predictable and transparent as possible. This is for the following reasons:

- The cost of the risk upon participants of unexpected value transfer can be greatly diminished if the participants themselves are able to predict the market operator's actions to various circumstances.
- The mechanism, being developed ahead of time, has more opportunity to consider the inherent trade-offs of constraint costs against the benefit of security.
- The market operator's actions become systemised and not subject to personal judgement.
- The constraint is explainable, improving the credibility of the NEM.
- A discipline is placed on delivering good operating practice, in that all choices must be appropriately justified with a level of scrutiny and accountability.
- Judgement about the level of risk is likely to be more stable over the long-term. Arguably in the NEM's history there has been periods of lower and higher tolerance to risk affected by recency bias to system events.

Indistinct Events

The AEC does not accept that the market should be constrained for "indistinct" events. In all cases of applying a secure system envelope, it is an essential part of the market operator's role to explain the mode of failure of which it wishes to prevent, and make some reasonable attempt to assess its probability and impact.

The AEC considers that for the fourth group of risks – widespread rapid change renewable output – it should be readily possible to calculate this probability and impact through analysis of historical renewable output in different weather conditions and then to publish a formulaic calculation of how real-time weather will be taken into account.

For the third group – Protected Events – the AEC broadly supports the governance and checks and balances contained in the existing processes.

The AEC accepts that with the rapidly changing power system there may be occasions where there has been insufficient time for the market operator to satisfactorily describe and mechanise a system security action, or to go through the formal process of classifying a Protected Event. Yet the unexpected conditions that have arisen are so serious that the market operator feels it is essential to immediately constrain the market in order to avoid a potential disaster.

For such cases the market operator could be granted the power of ad-hoc action to constrain the market. However this should be done with caution. Ad-hoc powers, due to their ease of operation, can quickly devolve into a first rather than last resort action and the incentive to develop predictable, methodical approaches ahead of time is lost.

To avoid this, the power should be constructed to limit its use only for rare, unanticipated events. This is best dealt with by ex-post reporting obligations such as those apply to the power of intervention. Reporting must explain why the risk was not anticipated, and how the risk can be incorporated into future processes such that the ad-hoc power is never used twice for the same circumstance.

Any such ad-hoc action also requires real-time market advice, through market notices, specifically referring to the use of this extraordinary power.

Question 3

The existing Power System Risk Review process is a beneficial process and the AEC would support extending its scope to include other power system services in the manner described. It may also be possible to perform it more frequently.

Question 6

The AEC supports the proposal of better monitoring and reporting of interconnector flows. It notes however that for the Vic-NSW interconnector, the more appropriate location for this monitoring may be the potential points of separation of the transmission systems rather than the regional boundary.

Any questions about our submission should be addressed to me by email to ben.skinner1@energycouncil.com.au by telephone on (03) 9205 3116.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Ben Skinner', with a large, sweeping flourish at the end.

Ben Skinner
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