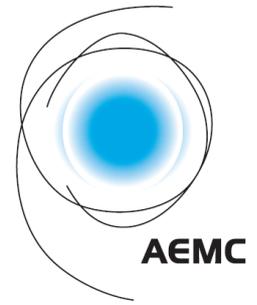


**Public**



**Minutes**

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**MINUTES OF A MEETING OF THE  
TECHNICAL WORKING GROUP FOR THE  
REVIEW OF THE SYSTEM BLACK EVENT IN SOUTH AUSTRALIA  
EPR0057**

**Meeting Number One**

Date: 11:00am to 3:00pm, 16/08/2019

Organisations with representatives present:

- Market bodies: AEMC, AER, AEMO
- South Australian Department of Energy and Mining
- South Australian Power Networks
- ElectraNet
- Energy Networks Australia representatives: Essential Energy, Tasnetworks.
- Clean Energy Council representatives: John Laing, DNVGL, UPC Renewables.
- Australian Energy Council representatives: CS Energy, Engie
- PIAC
- Energy Consumers Australia

## 1. Minutes

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11:00am

### **Welcome, introduction and workshop objectives**

Participants are welcomed, and thanked for their participation in the technical working group (TWG) and contributing insights to the review. AEMC staff noted:

- the review terms of reference from the COAG Energy Council require the AEMC, in undertaking its review, to draw on the events of 28 September 2016 and the various reports and assessments of the event that have occurred since then.
- however, the report is intended to be a forward looking piece of work. Its focus is exploring what changes may be needed to the regulatory frameworks to manage the changing risk profile of the power system in future
- this presentation provides an overview of staff thinking in terms of the directions and scope of the SA black system review
- the project team are seeking feedback from key stakeholders on the review's directions as draft policy positions are developed
- this session aims to facilitate discussion, questions will be posed for discussion and we encourage stakeholders to ask questions as we go
- this session reflects the content of the discussion paper published on 15 August 2019.

11:10am

### **Review background, scope and status**

AEMC staff introduced the review and its context, which was followed by an outline of the changing power system risk profile and a general approach for a new framework. Key introductory points included:

- the review is considering whether power system security frameworks are sufficiently flexible to manage the full set of risks faced by the power system as it evolves
- the SA Black system event highlighted that increasing penetration from VRE and other technological changes are creating new kinds of variability, and therefore new risks to be managed through the NER frameworks
- very high penetrations of distributed energy resources and control system characteristics may also make the system response less predictable and potentially increase the consequences associated with system security events
- the review will focus on risks arising generally from 'indistinct' events, including those arising from fast renewable variability, but also consider other sources of risk
- the project team considers existing frameworks may need to be extended to manage the risks from these non-traditional, more uncertain events.

11:30am

### **Managing credible indistinct risks**

AEMC staff introduced contingency events and indistinct events, the criteria for a secure state and issues arising in augmenting the criteria. Key introductory points included:

- definition of contingency should be clarified to clearly be applicable to risks being managed
- international experience is not to classify indistinct events as contingency events
- the preliminary staff view is not to classify indistinct events as contingency events

- the preliminary staff view is that the contingency event should reflect risks associated with failure or removal from service. This requires indistinct event risk to be managed through an additional 'term'. This would operate separately, but in addition to, the existing n-1 contingency event criteria. This would allow the system to be n - 1 secure state to the set of traditional contingency events, plus an additional provision for indistinct events. This leads to an n – 1 (plus) criteria for a secure state.
- Given indistinct events are more forecastable than contingency events, the (plus) element may be determined by a probabilistic assessment of qualifying variability analogous to the role of the forecast uncertainty measure (FUM) applied to assessing reserve levels for reliability purposes
- Renewable generation variability arising from indistinct weather events exists on a spectrum of speed and significance. To incorporate these events in system security frameworks, a view is required on the speed and size of the generation variability that qualifies as a risk to system security.
  - The project team noted that there are precedents to these thresholds for speed and significance in the Reliability Panel determination of the frequency operating standard.
  - Significance thresholds may be defined relative to a specific risk associated with a specific area
  - A minimum threshold would reflect impact materiality and level of noise in the system
  - A maximum threshold may define the difference between credible and non-credible and act as an upper bound on consequence for which the system needs to be kept secure.

## **Discussion**

The technical working group were invited to discuss the project team's proposal. Key discussion points included:

### Contingency classification

- TWG members questioned whether the proposed framework over complicates the current contingency framework.
- Members noted possible crossovers between what can be labelled distinct and indistinct, and explore the appropriateness of labelling such events as simply 'risks'.
- Members noted the importance of frameworks being simple enough to be implementable in real time by control room operators.
- Some members of the TWG pointed to the existing power system security guidelines, and approaches to managing indistinct events already present in those guidelines. Questions were raised as to whether these frameworks may already provide adequate scope to manage indistinct events.
- Some members noted the risk of prescribing specific scenarios into the rules, and considered there to be a need to clarify what the market operator can and can't do during

abnormal conditions. This should ensure the operator is able to evaluate the risk, and pursue the best course of action, when the risk arises.

- Members explored a number of practical examples affecting the operator during periods of heightened risks to the network. These included:
  - that types of risks to the system are increasing (new technologies introduced, predictability of run back schemes, amorphous cyber risks, changes in output from generators in response to wholesale market prices)
  - the importance of planning frameworks considering a full range of risks, and not just weather-related events
  - that high levels of prescription in a new framework may not capture all risks and therefore not provide AEMO with the flexibility it needs to keep the system secure when heightened risks exist.
  - one member considered that AEMO should have the power, following declaration of abnormal conditions to be able to "batten down the system" when there is a heightened risk of regional separation and loss of synchronism. Some members noted that there currently is no rule framework that allows the operator to take these actions when a risk is heightened, but indistinct, and therefore it is too difficult to reclassify as credible under existing frameworks.
- AEMC staff described the need for a rules framework that provides the operator with the flexibility to respond to heightened risks, but is also transparent and economic.
- AEMC staff noted that the AEMC is required to respond to the circumstances of 28 September 2016. This means that wind farm feathering must be considered. However, the review will not however be limited to considering wind farm feathering and will also consider other risks and how they may be managed.
- Some members commented on the importance of validating any new frameworks. Any new frameworks should be tested against different types of events to validate their effectiveness.
- Members considered frameworks should allow 'best practice' management of the full range of risks faced in a transitioning power system.
- There was some discussion amongst members as to whether the proposed frameworks would have changed outcomes on 28 September 2016. The project team re-emphasised that the review is forward looking and will not be making any comment as to whether new frameworks would or would not have changed outcomes on 28 September 2016.

#### International comparisons

- The project team noted that a consultant had been engaged to provide some international comparison as to how uncertainty and variability is managed in other jurisdictions.
- TWG members queried the choice of international jurisdictions chosen for consideration by the AEMC, given the use of international experience as justifying a parallel framework for the management of indistinct risks. Members asked whether these comparisons were made with power systems that are comparable to the situation in the NEM.
  - AEMC staff explained that comparative studies were made with Scotland,

ERCOT and the South-West Power Pool, which all experience high wind penetration, transmission challenges and limited interconnectedness. These jurisdictions and systems were chosen on the basis of their similarity of their situation with the NEM.

- TWG members discussed the extent to which uncertain and/or indistinct contingency events such as lightning, fires and storms, are managed by jurisdictions around the world on the basis of operator discretion rather than through formalised frameworks.

#### 'N – 1 plus' secure state proposal

- In exploring the 'N – 1 plus' secure state proposal, the TWG discussed the relationship between the single largest credible contingency and the variability of generation that is considered reasonably possible in a certain dispatch interval.
- Members commented on a range of issues including appropriate triggers for expected levels of variability, levels of forecastability, the application of a probabilistic framework such as AEMO's existing Forecast Uncertainty Measure (FUM), as well as ramifications for Automatic Governor Control, FCAS procurement and line constraints.
- Some members noted the importance of operator judgement, and how this can be supported with transparent guidelines and processes. Members considered more information is needed concerning what it is used for and how it may be calculated.
- Members particularly noted increasing DER penetration and concerns over negative demand, DER visibility and controllability, the potential effects of AI bidding patterns, the changing relationship between non-scheduled units and system security and distinctions between large scale and behind the meter storage technology.
- AEMO noted that improvements in forecasting capabilities, as well as the approach taken to constraint formulation, should be considered when assessing the need for the N-1(plus) mechanism

12:45pm

#### **Lunch**

The TWG adjourned briefly for lunch.

1:15pm

#### **Resilience framework, evolved protected events framework for enhanced resilience, interconnector flow monitoring and standard**

AEMC staff introduced their preliminary position on how to improve resilience to non-credible indistinct risks, outlining how to apply a framework for characterising power system resilience, an enhanced protected events framework, and methods for monitoring interconnector flows. The TWG were scheduled to discuss a generalised power system risk review, but this was postponed for further discussion at a later date due to time constraints. AEMC staff provided the following introductory points:

- The response of a power system to High Impact Low probability (HILP) events may be characterised by the power system's ability to avoid, survive, recover and learn from disturbances. The resilience of the power system may be enhanced through measures to make it stronger, more interconnected and smarter.
- Staff provided an initial mapping of NER arrangements against the above framework for

characterising power system resilience.

- Staff noted opportunities to enhance power system resilience by improving the protected events framework, including new classifications of non-traditional indistinct events and expanding and generalising the framework to efficiently enhance resilience through operational measures. Staff noted that the purpose of the protected operation framework is to prevent a cascading failure, rather than maintaining the system in a state of secure operation.
- Staff explained that the review will consider how frameworks could be applied to managing any emerging risks arising from high DER penetration
- Staff explained that interconnector flows provide a measure of the health of the power system. In particular, monitoring and reporting on Interconnector flows which exceed technical limits may provide insight into emerging risks.
- Staff proposed the development of a standard for monitoring and reporting on interconnector flow to be conducted through the Reliability Panel.

## **Discussion**

The technical working group were invited to discuss the project team's proposal. Key discussion points included:

1:45pm

### *Evolved protected events framework for enhanced resilience*

- The TWG explored the general concept of resilience, with some members pointing to the importance of other elements to enhancing system resilience. In particular, attention was drawn to the role of new services, such as or primary frequency control or provision of fault current, as being central and critical to maintaining the resilience of the system
- The project team acknowledged the importance of these other elements of the resilience framework, but noted that these other elements of resilience are being progressed through other processes. The project team noted focusing on operational measures represents a set of possible policy solutions that are complementary to other measures, incremental in nature, relatively low in cost and which are considered likely to deliver material resilience benefits.
- TWG members discussed challenges of dealing with DER and increased control system and protection scheme management issues. The importance of maintaining and monitoring the integrity of protection and control schemes was noted as an issue as the NEM transitions. Control schemes and protection schemes will need to be validated as being fit for purpose, ensuring appropriate control scheme interactions with protection schemes.
- Members noted a need to clarify the role of DNSPs in managing these types of risks, and perhaps rethink traditional responsibilities assigned between TNSPs and DNSPs as the level of embedded generation rises. Members also discussed the potential for improved joint planning between DNSPs and TNSPs, between TNSP's, and between TNSP's and AEMO.
- The relationship between the NER, standards for DER components, risk and cost allocation of faults that have effects across regions and the suggestion that resilience is

driven by people and talent were all discussed.

- Members discussed at length the economic trade-offs that are made between proposed protected event types, and the importance of preserving system security given prevailing conditions at the least costs to consumers and the market.
- The TWG explored the changes how protection from heightened risks was managed historically, and how best to manage non-credible contingencies that operators are unable to reclassify. The TWG considered the difference between an operator not knowing an event will happen, versus knowing something could *possibly* happen.

2:45pm

### Interconnector flow monitoring and standard

- There was also some discussion in regards to the proposed idea of interconnector monitoring. Generally, this discussion centred around the potential rationale for monitoring.
- The project team noted that understanding interconnector flow represented a health check of the power system, similar to monitoring frequency. However, it was acknowledged that further work was needed to be done in terms of defining the use of the monitoring, and what limits it might be measured against.
- TWG members discussed the relationship between technical limits and protected event criteria, such as shielding angles, footing distance of towers and dynamic line ratings, while expressing concerns over the clarity of the proposed framework.
- The group considered the notion that it is difficult to design power system frameworks that work for everything, but it is possible to know what frameworks do need to work for.

3:00pm

## **2. Other business**

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The technical working group were reminded of timelines for submissions – points of notice included:

- The review is seeking submission until 6 September (3 weeks) which will feed into the Commission's policy decisions positions, which will be set out in the draft report, to be published end of September
- Stakeholders are also welcome to arrange ad-hoc meetings with AEMC staff, however AEMC staff encouraged written submissions
- Where practicable, submissions should be prepared in accordance with the Commission's guidelines for making written submissions. All submissions are published on the AEMC website, subject to any claims of confidentiality
- All enquiries on this project should be addressed to [graham.mills@aemc.gov.au](mailto:graham.mills@aemc.gov.au) on (02) 8296 7800

3:10pm

## **3. Next meeting**

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The project team noted that it is the intent of Commission staff to hold the next technical working group meeting following the publication of the draft report on 4 October 2019 and before the publication of the final review