



Government
of South Australia

Department of
State Development

In reply please quote #A912380

Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Emergency Frequency Control Schemes – Draft Rule Determination

Dear Mr Pierce

The Energy Markets and Programs Division of the Department of State Development, South Australia (Division) welcomes the Draft Rule Determination and Draft Rule (Draft Determination) on the Emergency Frequency Control Schemes (EFCS). The Division appreciates the work conducted by the AEMC in processing the two South Australian rule change requests for the design of new or modified Emergency Frequency Control Schemes,

However, the Division is concerned with the pace of progress in finalising this work and considers it a matter of urgency to provide the necessary regulatory and operational arrangements to manage the current system security challenges.

Please find attached a submission on the Draft Determination, where the Division provides feedback with the aim of finalising the new rules sooner and moving into the implementation phase straight afterwards. As stated in the submission, the Division is mainly recommending modifications to the proposed governance framework that will accelerate the delivery of solutions to provide the necessary security of supply following major system disturbances.

Should you wish to discuss any of the content of the submission, please feel free to call Ms Rebecca Knights, Director - Energy Markets and Programs Division, on (08) 8226 5500.

Yours sincerely

Vince Duffy
EXECUTIVE DIRECTOR

16 February 2017

Energy Markets and Programs

Level 8, 11 Waymouth Street Adelaide 5000 | GPO Box 320 Adelaide SA 5001

Tel (+61) 08 8226 3715 | Fax (+61) 08 8204 1880 | www.statedevelopment.sa.gov.au | ABN 83 524 915 929



National Electricity Amendment (Emergency frequency control schemes) Rule 2016

Submission to Draft Rule Determination

Energy Markets and Programs Division, Department of State Development

South Australia

February 2017

ERC0212 – EMERGENCY FREQUENCY CONTROL SCHEMES RULE CHANGE

The Energy Markets and Programs Division of the Department of State Development, South Australia (Division) acknowledges the work done so far by the Australian Energy Market Commission (AEMC) in relation to the emergency frequency control regulatory framework in the National Electricity Market (NEM).

While the Draft Rule Determination (Draft) is a positive step towards managing current system security challenges, the Division stresses the urgency of reaching a final solution sooner rather than later. While similar trends are emerging in other jurisdictions of the NEM and overseas, South Australia is already experiencing demanding power system conditions that urgently require the most secure supply of power to its customers following major system disturbances. Although major disturbances are rare and are classified as non-credible contingencies, the increasing plausibility of such events calls for immediate action to mitigate the risks of cascading failures and possible system blackouts.

Current Issues

The Division agrees with the comments made in the Draft regarding the main factors affecting the effectiveness of current emergency frequency control arrangements, as summarised as follows:

- The reduced ability of the current Under-frequency Load Shedding Scheme (UFLS) to arrest a frequency fall following a non-credible contingency by using frequency-sensitive relays to automatically shed cascaded blocks of load. The first reason that affects the ability of UFLS to operate effectively is the high expected levels of Rate-of-Change of Frequency (RoCoF) (due to decreasing levels of system inertia) under which the relays would not be able to respond fast enough to trip load. The second reason is the increasing penetration of solar embedded generation within the load blocks, also known as Distributed Energy Resources (DER), which when generating can be reducing the necessary amount of load required to control frequency.
- Lack of a coordinated mechanism for shedding excess generation in the case of an over-frequency event that, under a high RoCoF, could trigger generator protection systems to collectively disconnect too much generation causing the frequency to reverse to an extreme under-frequency event, thus repeating the concerns about the current UFLS.
- The plausibility of some non-credible events occurring with significant foreseeable consequences.

New Emergency Frequency Control Scheme (EFCS)

The Division supports the new EFCS, which include facilities to initiate automatic load or generation shedding in a coordinated process to prevent major system disturbances.

However, the Division is concerned that the governance framework proposed in the Draft as it is not consistent with the regulatory framework in the NEM and is likely to result in excessive delays in reaching the best solutions within a reasonable timeframe. As such, the Division wishes to propose a different framework.

The Division fully supports the AEMC's view that the design of the EFCS should comply with the EFCS standard determined by the Reliability Panel, as detailed in the Draft. This standard will be

[System Security Market Frameworks Review – DSD Submission to Interim Report](#)

referred to in the National Electricity Rules (NER) and is published and maintained by the Reliability Panel in accordance with necessary rules consultation procedures. The aim of this arrangement is to provide flexibility to adapt the scheme to changing system conditions and is in line with other standards (such as the Frequency Operating Standard) maintained by the Reliability Panel.

The Division agrees that the Australian Energy Market Operator (AEMO), in consultation with relevant Network Service Providers (NSPs) and the Jurisdictional System Security Coordinator (JSSC), is best placed to design a suitable EFCS because of its first-hand knowledge of power system conditions as well as its role in maintaining power system security. Within the scope of the design, useful parts of existing UFLS arrangements, whether as is or recalibrated, should be incorporated in the design of the EFCS. It is envisaged that AEMO will adhere to the initial set of parameters stated in the rules in the design process.

According to the COAG Energy Council's Australian Energy Market Agreement between the Commonwealth of Australia and all the States and Territories¹, the responsibility of service reliability standards (to ensure network security and reliability) rests with the respective State or Territory. Hence, the JSSC should have a key role in approving the final design of the scheme. Therefore, it is expected that AEMO will coordinate with the JSSC in the selection process, which will include estimated costs for each design proposed.

The implementation procedure and design specifications developed by AEMO, as stated in the Draft, would still be applicable and NSPs would have the responsibility of implementing the under and over frequency components of the EFCS (after consultation with affected parties). As per existing arrangements for network assets, costs incurred by the NSP will be recovered through standard regulatory determination processes overseen by the Australian Energy Regulator (AER).

The Division agrees with the proposed framework in the Draft with regards to components of the monitoring and reporting functions by both NSPs and AEMO.

Given the involvement of AEMO, NSPs, the JSSC and the AER in the design and approval process of the EFCS, it appears that the Reliability Panel will be duplicating other bodies and potentially significantly delaying the implementation of an improved EFCS.

With regards to delineation of responsibilities, the draft rules referred to in the Draft do not seem to address the issue raised in the rule change request by the Government of South Australia with regards to the role of Market Customers in providing load that is able to be automatically interrupted. According to current clause in the NER (clause 4.3.5) the obligation on market customers should be clarified and amended if necessary to reflect the adopted practice for emergency under frequency load shedding.

Within the component of Over-frequency Generation Shedding (OFGS), it is also unclear in the Draft what action NSPs will take in the case of generators electing to not comply with their obligations under the EFCS design. The Division proposes that the NER should state obligations on generators to

¹The COAG Energy Council's Australian Energy Market Agreement can be found at <http://www.coagenergycouncil.gov.au/publications/australian-energy-market-agreement-amended-december-2013>.

comply with the EFCS, similar to the current obligations placed on customers to shed load in the case of UFLS.

Protected Events

The Division supports the proposal for defining plausible, high consequence non-credible events as protected events and putting in place mitigation measures for limiting the consequences of such events with ex-ante solutions and some ex-post load shedding.

Although the Draft presented one example of protected events being the interconnector tripping when carrying high power transfer between two regions, operationally there could be other events that would meet the criteria mentioned in the Draft (page 44) to be classified protected events.

In the case of an interconnector trip between South Australia and Victoria coupled with operational periods of high power transfer between the two regions and low inertia in South Australia, it is most likely that RoCoF will be quite high. A high RoCoF will thus be almost always a result of non-credible contingent events, some of which will be protected events. It is therefore important to recognise the vital role of a RoCoF standard (requested in the rule change submitted by the South Australian Government to limit the initial RoCoF) can play in determining the capacity of the system to return to a secure operating state, whether via procurement of additional security services or relying on an EFCS (as stated in the System Security Market Frameworks Review Interim Report by AEMC).

The Division supports the governance framework for protected events in that it allocates the responsibility of identifying protected events to AEMO.² However, due to the current urgency for developing mechanisms to manage protected events, the Division proposes that the determination of the post-contingency operating state (should any protected event occur) is coordinated between the Reliability Panel and AEMO at the same time. Following this approach, an envelope for the post-contingency operating states of protected events (or selected categories of protected events) is incorporated in the final rule.

Once the final post contingency operating states are defined in AEMO's operating procedures, AEMO can immediately start the implementation of the measures to operate the system so that the consequences of any protected event falls within the definition of the post-contingency operating state assigned to each event (or specific category of events).

The Division believes that the proposed accelerated approach would be in line with the process for dealing with *credible* contingency events in terms of returning the power system to the normal operating state, as defined in the NER.

² Given that a RoCoF standard may take some time to materialise, AEMO will need to review protected events at a later date once a RoCoF standard is developed or power system conditions change in general.