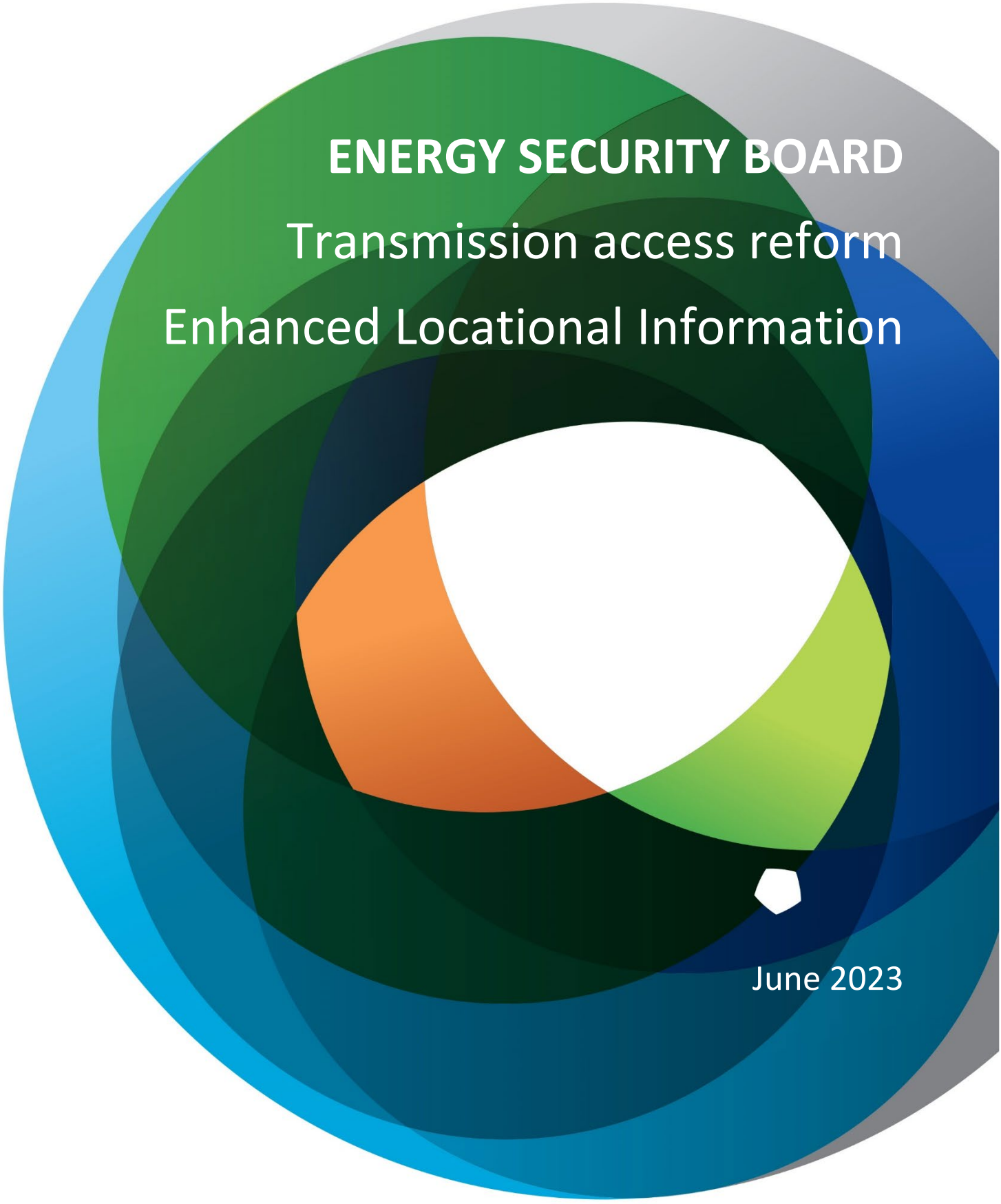
ENERGY SECURITY BOARD

Transmission access reform

Enhanced Locational Information



June 2023

Anna Collyer

Chair

Australian Energy Market Commission and Energy Security Board

Clare Savage

Chair

Australian Energy Regulator

Daniel Westerman

Chief Executive Officer

Australian Energy Market Operator

Executive Summary

In February 2023, Energy Ministers agreed to immediately implement 'enhanced information' reforms to provide east-coast market participants with better information on the optimal location for new generation and storage. This paper updates stakeholders on how these reforms will be implemented.

The ESB has developed an approach to improve the information provided to stakeholders to inform decisions about where to locate projects in the NEM. In addition to improving access to information for project developers, this initiative will provide other stakeholders with better access to information about the locational characteristics of the power system. This could be used to inform better regulatory, investment, and transmission augmentation decisions.

Initially, enhanced locational information (ELI) will draw from and consolidate existing sources of locational information in an annual report publication and accompanying data set. AEMO will be responsible for compiling and publishing the report. In parallel, AEMO will work with TNSPs through joint planning arrangements to ensure AEMO has access to the information it needs and that ELI and TAPRs create a consistent and useful picture of locational information on the NEM.

ELI will evolve over time to continue meeting stakeholder needs

To allow the report to evolve and continue meeting stakeholder needs, AEMO will consult on the scope of ELI on an ongoing basis. The first consultation would take place in 2024, with subsequent consultations occurring approximately every two years. This approach will ensure that AEMO resources are used efficiently, and that ELI is robust and adaptable over time. Following stakeholder consultation and further consideration being given to the most efficient approach, it was decided that ELI could be implemented immediately and that changes to the national electricity rules (NER) are not required.

Improvements to TAPRs are being investigated in parallel with TNSPS

To complement AEMO's ELI report, AEMO has established a working group with TNSPs to review the information published in TAPRs with a view to further aligning the inputs, assumptions and methodologies used when calculating information on congestion and network capacity information. The group will explore other ways TNSPs and AEMO could improve locational information provided to stakeholders, including exploring the benefits and risks of providing more detailed information – particularly revised constraint equations – sooner on new transmission and interconnector projects. This is expected to be an ongoing process, with a different timeframe to the ELI process.

AEMO will work with the Commonwealth, ESB and other key stakeholders such as the ENA and CEC to deliver a framework for providing enhanced locational information to market participants who wish to connect to the NEM.

This approach will be faster to implement and more flexible than hosting capacity

During the development of ELI, the ESB consulted with industry on implementing network hosting capacity forecasts through an AEMC rule change process. It was ultimately decided against this in favour of the approach outlined in this paper. This is because it will be faster and more efficient to implement initially, and more flexible and better able to meet stakeholder needs in the long term. This decision was informed by mixed stakeholder feedback on the proposal, with some considering a more streamlined approach would be more in line with their needs. This is because some stakeholders consider existing information to be sufficient, with further analysis being part of their due diligence, and AEMO undertaking that same analysis would be duplicative. Additionally, several stakeholders emphasized that the new information should be provided as close to immediately as possible.

Stakeholders have indicated a desire to see the first report as soon as possible. As such, the first ELI report is scheduled to be published in early 2024, followed by consultation on the usefulness of this

data and suggested improvements, prior to the second report publication in 2025. Subsequent reports will be published annually with consultations occurring approximately every two years. This will provide multiple opportunities for stakeholders to provide input on the usefulness of the ELI and provide feedback on what network data is needed.

Introduction

Stakeholders currently have access to an array of information that is relevant to considering levels of congestion in the NEM. AEMO and TNSPs are responsible for providing some of this material.

Some of the locational information relating to congestion information provided by AEMO includes:

- The ISP, which provides a NEM-wide description of Renewable Energy Zone (REZ) transmission limits, and broader opportunities for development out to 2050.
- Information on transmission augmentation and generation projects.
- Power system models for PSSE (Power System Simulation for Engineering) and PSCAD (Power Systems Computer Aided Design)
- Electricity market models for the Electricity Statement of Opportunities (ESOO)
- Marginal loss factors (MLFs)
- The Congestion Information Resource (CIR), which focuses on historical congestion
- The Connections Simulation Tool, which provides an optional fee-for-use service, enabling participants to develop higher-quality models, independent of the connections process.

Some of the locational information relating to congestion provided by TNSPs includes:

- Transmission Annual Planning Reports (TAPRs), which provide granular congestion and network capacity information
- System strength charges.

While there are currently a variety of locational investment signals available in the NEM, some of these can be inconsistent across jurisdictions, incomplete, and difficult for smaller and newer stakeholders to engage with. A complete set of information on locational factors is not currently available publicly from a single location. Without this information, stakeholders are limited in their ability to undertake meaningful analyses, which would be informative for regulatory, connection location, and transmission augmentation decisions.

The process to date

At the Energy and Climate Change Ministerial Council (ECMC) Meeting in February 2023, Ministers agreed to "immediately implement 'enhanced information' reforms to provide east-coast market participants with better information on the optimal location for new generation and storage".[1]

Since the publication of the Transmission Access Reform (TAR) Directions Paper in November 2022,[2] the ESB has continued to work closely with market bodies, stakeholders, jurisdictions and the Commonwealth to develop solutions in relation to two of the issues identified in the Directions Paper:

1. reviewing information published through the Transmission Annual Planning Reports (TAPRs), and
2. the provision of centralised locational information, including on congestion.

---

[1] Energy and Climate Change Ministerial Council, Meeting Communique Friday 24 February 2023 https://www.energy.gov.au/sites/default/files/2023-02/ECMC%20Communique%20-%2024%20February%202023.docx

[2] ESB, Transmission Access Reform Directions Paper https://www.datocms-assets.com/32572/1667984730-tar-directions-paper-final-for-web.pdf

Together, these constitute 'enhanced information', whilst the remaining scope (known as the 'hybrid model' comprising congestion relief market and priority access) is being progressed separately by the ESB.

The ESB established a working group including members of the AEMC, AEMO and the AER to develop a proposal to address the issues identified in the TAR Directions Paper relating to 'enhanced locational information'. This working group conducted two stakeholder engagement sessions during 2023, which explored the gaps in existing locational information provision, and options for the proposed solution. This policy paper outlines the proposed solution, which the ESB has concluded best aligns with the Ministers' and the TAR broader strategic objectives.

As foreshadowed in the TAR Directions Paper, it is important to note that given the enhanced information will be for use to provide an initial screening for investors as they consider their project siting options, before they and their consultants undertake their own detailed assessments for their specific project. It is important to stress this objective to provide appropriate context for the conclusions reached in this paper.

Improvements to locational information provision

Overview of solution

The proposed solution is for AEMO to provide enhanced locational information through an annual report, and for AEMO to work with TNSPs to consider opportunities for alignment of inputs, assumptions and methodologies for congestion and network capacity information provided through Transmission Annual Planning Reports (TAPRs), in addition other potential improvements if appropriate.

With regards to the first part of this, the primary advantage would be that intending participants would be provided with a consolidated set of outputs to inform investment decisions. This information would also support jurisdictional schemes for renewable energy zones (REZs).

With regards to the second part of this, the ESB believes that further alignment regarding the methodologies used to publish information through TAPRs on locational information that relates to congestion and network capacity would improve accessibility for intending participants.

To combine the two elements, the annual publication would link to the most recent TAPR published for each NEM region.

This proposal aims to address the information asymmetry between AEMO, NSPs and stakeholders and support generation and storage project conceptualisation.

Publication of a report that collates existing locational signals

The proposed solution will lead to the regular publication of consistent, accessible and conceptual 'enhanced locational information' (ELI) in a report format. This would require the collation of several existing locational information sources that are published at different times. The annual ELI Report would leverage existing information from sources including, but not limited to TAPRs, system strength charges, Marginal Loss Factors (MLFs) and Renewable Energy Zone (REZ) scorecards from the Integrated System Plan (ISP). Initially, the report will focus on the transmission network, however, opportunities to improve information on the distribution network may be considered in the future in consultation with stakeholders. It is possible that new analysis could be undertaken in the future, however, this would be determined as the model evolves.

AEMO will lead the coordination and publication of these outputs. The information will be published annually on AEMO's website for stakeholders to access.

Stakeholder engagement

This proposal was developed with the consideration of stakeholder feedback, which was elicited through three online workshops, on 8 May 2023, 22 May 2023, and 29 June 2023. (in addition to written submissions provided through the Directions Paper published in November). Within the working groups, stakeholders broadly agreed with the problem statement and gap analysis, and had a variety of views on the specific implementation details. These are tabulated in the *Stakeholder feedback summary* section. At the June working group, stakeholders were consulted on their preferred implementation timeline for ELI and this has informed the timeline presented in this paper.

More detail on proposed ELI Report and TAPR Standardisation

A change to the NER will not be required

The ESB has concluded that at this stage, ELI should be provided quickly and comprehensively in order to best meet the Ministers agreement to implement reforms 'immediately'. The ESB considered a rule change which would include a new regulatory obligation on AEMO to develop a methodology for calculating hosting capacity and other metrics. Whilst methodologies may be explored in future consultation by AEMO (see 2.2 below), the proposed recommendation is a new ELI Report and joint planning to achieve further improvements to the approach taken in TAPRs by TNSPs to provide information on congestion and network availability, rather than a change to the NER. There are several reasons for this:

i) Given the urgency of stakeholders' need for enhanced information, it is preferred that AEMO produce a report based on existing outputs, as this can be commenced upon approval of this policy paper, rather than via a slower rule change process.
ii) Joint planning provides for a more efficient (faster and less resource-intensive) process to consider potential alignment and amendments to the scope within TAPRs
iii) An AEMO initiative provides for a more durable approach where ongoing consultation over the medium to long term led by AEMO will facilitate the evolution of scope over time based on stakeholder feedback. This flexibility may not be possible through a rule change. It may also minimise market body and industry resourcing needs whilst still meeting the objectives of enhanced information.
iv) A rule change process may not be an appropriate use of resources given the proposal can be achieved without any changes to the rules.

High level and conceptual information to be provided

Initially, the ESB consulted with some stakeholders on the level of desired granularity to be provided as part of the ELI. Many stakeholders provided feedback relating to hosting capacity and other metrics. However, ultimately the ESB has concluded that the ELI Report will be high-level and conceptual at this stage to balance the cost to consumers and the need for enhanced information.

It should be noted that the hybrid model for transmission access reform of priority access and congestion relief model is still being considered. The ESB will report back to Ministers on the progress of this model at the upcoming July Energy Minsters meeting. The enhanced information reforms are designed to provide market participants with better information on the optimal location for new generation and storage in today's markets. When Ministers agree to the implementation of the hybrid

model on transmission access reform, consideration will be given as to whether these proposals for enhanced information need to be built on to better provide information to support the priority access reforms.

Governance

Given the central position of AEMO in the NEM, the ESB considers that AEMO would be best placed to publish locational information in an annual document available on the AEMO website. In a similar way, AEMO currently publishes the annual ESOO, which presents opportunities for investors in relation to reliability. The proposed publication would include drivers that investors and developers may be interested in – not only congestion information, but potentially including (but not limited to) marginal loss factors and system strength charges. Subject to the requirements of investors/developers and the NER, the publication could be an investor-driven document that encourages investment and reduces risk. It is important to note that this would constitute an expansion of AEMO's national transmission planner function.

AEMO will consider presenting information on jurisdictional schemes in ELI where appropriate, and will liaise with jurisdictional governments in doing so.

Future evolution of the ELI Report

As part of this proposed approach, AEMO would periodically consult on the ELI publication, with a view to amending over time based on how stakeholders view the benefits of the publication. AEMO would initially publish the first report in early 2024, followed by consultation, prior to the second report publication in 2025. The consultation would seek feedback on the first report and help inform the scope and design of the second ELI Report.

Subsequent reports would be published annually and AEMO would consult with stakeholders approximately every two years to ensure the ELI Report remains fit for purpose and meets the enhanced information objectives. It is envisioned the Report would evolve over time depending on stakeholder feedback through these consultations, and that AEMO may amend the scope of the publication.

Therefore, this proposal aims to introduce a flexible approach to the development of enhanced information on locational factors, which allows for amendments to the scope over time, based on a number of factors including stakeholder feedback through consultation.

Form of ELI Report

It is proposed that AEMO provide enhanced information as an annual report or webpage. It could be a downloadable PDF supported by data files. Alternatively, it could be an addendum to the ESOO or an expansion of the Congestion Information Resource (CIR).

Exclusions

i) Power system data and modelling

Participants and intending participants can already access technical data and models via AEMO's data request process. As such, there is limited value in publishing technical information for the purpose of participants building power system models. Network infrastructure owners and equipment manufacturers would need to be consulted before publishing infrastructure-related information to manage risks relating to confidential data. Government departments would also need to be consulted on risks relating to national security.

Further, AEMO will investigate options to improve stakeholder access to power system data. One option that has been proposed is a streamlining process for stakeholders to access pre-tuned network snapshots through a subscription model.

ii) Distribution network information

Some stakeholders have expressed interest in distribution network information, ideally through an integrated transmission-distribution network model. Limited distribution network information is available in the public domain, mostly through Distribution Annual Planning Reports (DAPRs) and an integrated transmission-distribution model does not currently exist and would be resource intensive to develop.

The initial implementation of the ELI Report will not include distribution network information, as this information is not currently readily available in a consistent format. However, however, opportunities to improve information on the distribution network may be taken in the future in consultation with stakeholders.

Improvements to TAPR consistency

The ESB considers there would be some benefit to reviewing information published through the TAPRs with a view to further aligning the inputs, assumptions and methodologies used when calculating information on congestion and network capacity information, as well as potentially expanding the scope of information provided. Through a working group, AEMO and TNSPs are in discussions on how the scope and method for providing information on congestion and network capacity through the TAPRs could be amended, and whether there is further opportunity for alignment. This is expected to be an ongoing process, with a different timeframe to the Enhanced Information process. AEMO will work with the Commonwealth, ESB and other key stakeholders such as the ENA and CEC to deliver a framework for providing enhanced locational information to market participants who wish to connect to the NEM.

Stakeholder feedback summary

Subject	Comments
Overall objectives of ELI	• Information asymmetry should be reduced between AEMO/NSPs and stakeholders.
Interactions with project developer due diligence	• Enhanced information should supplement but not replace detailed analysis – it should not substitute for the detailed studies and robust due diligence that are required as part of a generation project investment • The information could allow stakeholders to undertake early-stage analyses more efficiently.
Problem with the status quo	• It is difficult to evaluate opportunities for non-correlated resources like batteries. • There are differing views on whether locational information being spread across several sources represented a 'gap'. • There is currently insufficient information on the impacts of interconnector and transmission upgrades – with many stakeholders considering that technical information and constraints are provided too late.
Information that should be included in ELI	• There needs to be information on the effects of variability of congestion.

	• There is general agreement that if hosting capacity were to be included in enhanced locational information, it would need to be defined, and may need to be linked to an 'acceptable' curtailment level. • Some stakeholders supported time-sequential economic market modelling. • Most stakeholders support a 3-5 year time horizon, as opposed to 10 years, with many noting uncertainty limits the usefulness of a 10 year forecast • There was support for building in sensitivity analysis to allow stakeholders to see the impact of variability. These would be used to test factors like anticipated projects, coal closures, and other large changes that are not yet confirmed. • There was some stakeholder desire to include the distribution network in enhanced locational information, with a majority of stakeholders flagging it as a 'nice to have' • Some stakeholders wish to see the effect of generators that do not yet meet 'committed' criteria in enhanced locational information, and also identified risks around choosing the project winners beyond 'committed' projects. • REZ schemes could be considered differently – as there are capacity commitments by governments. • Some stakeholders suggested the inclusion of expected coal closures instead of announced coal closure information. • Some stakeholders suggested ELI could be extracted and consolidated from existing information.
Defining hosting capacity	• Stakeholders have a variety of views on how surplus hosting capacity should be defined. Many stakeholders consider that it should be defined in a way that assumes minimal thermal generator dispatch, to align with net-zero targets. • Many stakeholders consider hosting capacity should be reported separately for different technologies, due to differing diurnal and seasonal generation profiles • Stakeholders unanimously supported the publication of information on the existing hosting capacity, with many noting it would improve their analysis of future hosting capacity.
Variability and sensitivity analysis	• Stakeholders would like to see the impact of various different scenarios on locational network characteristics. Particularly regarding network project delays, and renewable and battery generator distribution.
Form and frequency of ELI publication	• Most stakeholders supported at least yearly publication, with many flagging that more frequently would be better. • There was a general preference for mapping tools, as they would be helpful in early-stage assessment. • There was a desire for the underlying data to be published in excel or csv files.
Governance	• There was general agreement that AEMO would be best placed to oversee the provision of information, given AEMO's independence. This would also provide consistency across jurisdictions. This would need to be done jointly with TNSPs who hold much of the necessary information

Interaction with TAPRs	• Many stakeholders flagged that there is likely to be some overlap between ELI and TNSP TAPRs, noting that AEMO and TNSPs should coordinate to minimise or avoid these.

Contact details Energy Security Board
Level 15, 60 Castlereagh St
Sydney NSW 2000
Email info@esb.org.au
Website http://www.energyministers.gov.au/market-bodies/energy-security-board