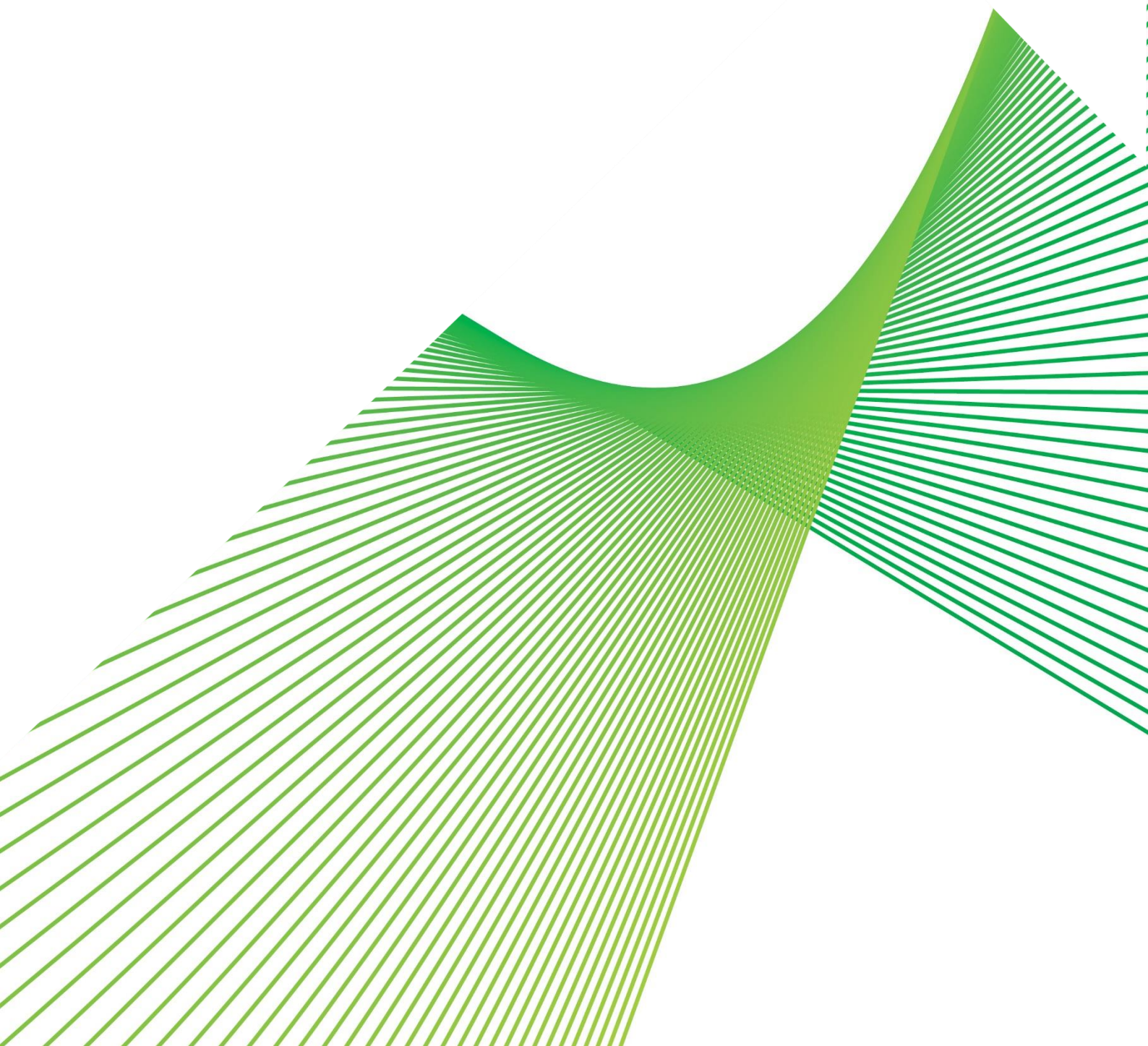


Summary: Managing increased fault levels in southern New South Wales

RIT-T Project Specification Consultation Report

Region: Southern New South Wales

Date of issue: 12 July 2024



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Summary

We are applying the Regulatory Investment Test for Transmission (RIT-T) to options for ensuring increased fault levels in southern New South Wales (NSW) are managed appropriately and in the most efficient manner. This Project Specification Consultation Report (PSCR) represents the first step in the application of the RIT-T.

The expected commissioning of three actionable ISP projects in southern NSW in coming years (Project EnergyConnect, HumeLink and VNI West), as well as full commercial operation of Snowy 2.0 in December 2028,¹ is expected to result in fault levels that exceed the existing fault level ratings of existing transmission assets at four of our substations in southern NSW if action is not taken. Without action, (i.e., under the base case), this would cause equipment failure and likely significant unserved energy to end consumers in the NEM.

The four affected substations are:

- Lower Tumut 330 kV substation;
- Upper Tumut 330 kV substation;
- Murray 330 kV substation; and
- Wagga 330 kV substation.

We have therefore commenced this RIT-T to assess the options available for managing the expected increased fault levels to avoid these consequences and continue to maintain compliance with the relevant standards.

We note that ‘managing increased fault levels in southern NSW’ is a contingent project in the AER’s determination for our current regulatory control period.² The AER accepting that we have completed a RIT-T to address this identified need is one of the four triggers for this contingent project. A further trigger is that Transgrid has a connection agreement in place with Snowy 2.0. We note that we will not formally commence the investment identified in this RIT-T unless it is approved by the AER and will not proceed until the connection agreement is in place. We intend to undertake early works and development activities on the project before submission of the Contingent Project Application (CPA).

Identified need: ensuring fault levels at four substations comply with regulatory requirements

The system standards set out in Schedule 5.1a of the National Electricity Rules (NER) stipulate fault clearance times that we have to meet. Specifically, Schedule 5.1a.8(a)(3) requires that faults anywhere within the power system should be cleared sufficiently rapidly such that consequential equipment damage is minimised.

¹ Snowy Hydro, *Securing the Future of Critical Energy Transformation Projects*, 31 August 2023, available at: <https://www.snowyhydro.com.au/news/securing-the-future-of-critical-energy-transformation-resets/>. We note that this timing is consistent with the latest (February 2024) AEMO generator information as at the time of finalising this PSCR (see: <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information>), as well that assumed in the draft 2024 ISP (see: <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios>).

² AER, *Final decision Transgrid transmission determination 1 July 2023 to 30 June 2028, Attachment 5 – Capital expenditure*, April 2023, p 39.

If action is not taken (i.e., under a 'do nothing' base case), the connection of Project EnergyConnect, HumeLink and VNI West, as well as full commercial operation of Snowy 2.0, will lead to increased fault levels at the above mentioned four substations in southern NSW and consequent equipment failure that would breach our requirements under Schedule 5.1a.8(a)(3) of the NER, as well likely significant unserved energy to end consumers in the NEM.

While, in reality, we would not 'do nothing' and would instead constrain generation in the region (including Snowy 2.0) to avoid these consequences, this is not considered a sustainable long-term solution and would be out-of-step with industry standards. Specifically, section 8.4.4.2 of the Australian Standard 'AS2067-2016' – covering substations and high voltage installations exceeding 1 kV AC – states that the design of equipment should take into consideration expected fault levels in the future. We consider a situation in which generation is consistently constrained (likely significantly) to be unrealistic and inconsistent with this standard. We note also that all four substations in question were commissioned in the 1970s and were not designed to accommodate the increase in fault levels expected from the significant projects soon to be commissioned in the region.

The identified need is considered a 'reliability corrective action' under the RIT-T. A reliability corrective action differs from a 'market benefits'-driven RIT-T in that the preferred option is permitted to have negative net economic benefits on account of it being required to meet an externally imposed obligation on the network business.

One credible option is proposed to be considered in this RIT-T, although the potential to stage the option will be investigated further

We consider that there is only one network option from a technical, commercial, and project delivery perspective that can be implemented in sufficient time to meet the identified need for this RIT-T. Two other options have been considered but are not being progressed for reasons outlined in this PSCR (see section 3.3)

Option 1 involves upgrading certain existing substation switchgear and earth grid at the four affected substations to meet the increased fault levels in the network. The upgraded equipment will ensure that equipment failure does not occur and there is no breach of the requirements under Schedule 5.1a.8(a)(3) of the NER (or need to significantly constrain generation in the region).

The equipment to be upgraded at each site will comprise all equipment that is rated below the expected fault levels at that site. The equipment will also be upgraded to fault level ratings greater than or equal to the ultimate fault levels expected at each site.

The scope of works is expected to be carried out between 2023/24 and 2027/28 with commissioning in 2027/28 (when both Project EnergyConnect and HumeLink are expected to have been commissioned and ahead of full commercial operation of Snowy 2.0 in December 2028). All works would be completed in accordance with the relevant standards with minimal modification to the wider transmission assets.

The estimated capital expenditure associated with this option is \$50.2 million.

While Option 1 addresses the fault level issues at all four substations as part of one continuous program, we are also currently investigating a variant of Option 1 that stages the work at each substation according to when fault level issues are expected to arise at each. At this stage, we expect this variant to be significantly more expensive than Option 1 due to the multiple activation and mobilisation costs involved

(i.e., compared to doing the work as part of one program). However, we intend to report more conclusively on, and potentially model, this option as part of the PADR.

Non-network options are not expected to be able to assist with this RIT-T

We do not consider that non-network options are likely to be commercially and technically feasible to assist with meeting the identified need for this RIT-T.

Non-network options would need to replace the functionality of the substations affected by increasing fault level capacity or increasing the fault level ratings of the affected transmission assets. Neither of these is considered technically feasible for this RIT-T.

Submissions and next steps

We welcome written submissions on materials contained in this PSCR. Submissions are due on 10 October 2024.³

Submissions should be emailed to our Regulation team via regulatory.consultation@transgrid.com.au.⁴ In the subject field, please reference 'Managing southern NSW fault levels PSCR'.

At the conclusion of the consultation process, all submissions received will be published on our website. If you do not wish for your submission to be made public, please clearly specify this at the time of lodgement.

We intend to produce a Project Assessment Draft Report (PADR) that addresses all submissions received and presents our draft analysis and conclusion on the preferred option for this RIT-T. Subject to submissions to this PSCR, we anticipate publication of a PADR in December 2024.

³ Consultation period is for 12 weeks. Additional days have been added to cover public holidays.

⁴ We are bound by the *Privacy Act 1988 (Cth)*. In making submissions in response to this consultation process, we will collect and hold your personal information such as your name, email address, employer and phone number for the purpose of receiving and following up on your submissions. If you do not wish for your submission to be made public, please clearly specify this at the time of lodgement. See Privacy Notice within the Disclaimer for more details.