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Submitted to: NEMReform@aemo.com.au

RE: Consultation on automation of negative residue management for the implementation of transmission loops

Shell Energy welcomes the opportunity to comment on the automation of negative residue management for the implementation of transmission loops.

About Shell Energy in Australia

Shell Energy is Shell's renewables and energy solutions business in Australia, helping its customers to decarbonise and reduce their environmental footprint. Shell Energy delivers business energy solutions and innovation across a portfolio of electricity, gas, environmental products and energy productivity for commercial and industrial customers, while our residential energy retailing business Powershop, acquired in 2022, serves households and small business customers in Australia.

As the second largest electricity provider to commercial and industrial businesses in Australia[1], Shell Energy offers integrated solutions and market-leading[2] customer satisfaction, built on industry expertise and personalised relationships. The company's generation assets include 662 megawatts of gas-fired peaking power stations in Western Australia and Queensland, supporting the transition to renewables, and the 120 megawatt Gangarri solar energy development in Queensland. Shell Energy also operates the 60MW Riverina Storage System 1 in NSW. Shell Energy Australia Pty Ltd and its subsidiaries trade as Shell Energy, while Powershop Australia Pty Ltd trades as Powershop. Further information about Shell Energy and our operations can be found on our website here.

Transmission Loops in the NEM

Shell acknowledges the problems that implementation of transmission network loops in the NEMDE will cause with the NEM's dispatch and settlement process. The loop approach to the connections between the Victorian, New South Wales, and South Australian regions removes the ability to effectively manage negative interregional settlement residues (IRSR) on the individual bi-directional interconnector legs. Given this, we are supportive of AEMO's proposal to only manage negative IRSR when the sum of the IRSR on the individual network bi-directional interconnector legs is negative.

We recommend that the final process document includes the methodology AEMO will implement when more than one bidirectional interconnector is accumulating negative IRSR. We are supportive of the proposed step changes in interconnector flow limits for the new New South Wales to South Australia bidirectional interconnector (Project Energy Connect) as set out in Table 2. We also support maintaining the step changes for all other bidirectional interconnectors as set out in Table 1. However, the document does not detail the approach to flow limits when multiple bidirectional interconnectors are accumulating negative IRSR. It is not clear whether the indicated step amounts set out in Tables 1 and 2 apply based on the accumulation of negative IRSR around the loop in total or when the sum of the IRSR around the loop is negative.

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[1]By load, based on Shell Energy analysis of publicly available data.

[2] Utility Market Intelligence (UMI) survey of large commercial and industrial electricity customers of major electricity retailers, including ERM Power (now known as Shell Energy) by independent research company NTF Group in 2011-2021.

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Given that negative IRSR management will only be implemented for a loop when the sum of the IRSR around the loop is negative, an alternative solution may be appropriate. This alternative could involve calculating and adjusting interconnector flow limits based on the value of the negative IRSR accumulating on each individual bidirectional interconnector. For example, using the values in Tables 1 and 2, the NSW to Vic directional interconnector could be subject to a 100 MW flow limit reduction whilst the NSW to SA directional interconnector only be subject to a 40 MW instead of a 75 MW flow limit reduction. We recommend further clarity be provided regarding the proposed approach in the revised process document.

Shell Energy supports the proposed approach to management of negative IRSR when one of the loop links is out of service. It is appropriate that the current approach to managing negative IRSR will apply to the remaining in-service bidirectional interconnectors for the duration of the outage.

Issues with the Current Automated Negative Residue Management Process – cycling

Shell Energy has observed the problem of negative residue management (NRM) cycling on numerous occasions and notes that this results in values of negative IRSR significantly higher than the $100,000 threshold accumulating over a trading day. We consider that there are a number of causes for the cycling of NRM constraints including;

- The use of a zero MW flow limit on the interconnector, as suggested by AEMO in the consultation paper,
- The simple, full release of the NRM constraint once negative IRSR are determined to have ceased (in contrast with staged or graduated release of interconnector flow limits), and
- The current definition of a negative IRSR event which limits the focus to consecutive trading intervals.

The use of a zero interconnector flow limit

Following activation of a NRM event, the current process looks for and detects continuing trading intervals of negative IRSR and continues to apply the NRM interconnector flow limit constraint until such time a as non-negative (including zero) IRSR is detected. The current zero interconnector flow limit in the NRM equation results in a non-negative IRSR being determined for a trading interval. The proposed use of a 20 MW flow limit instead of the current zero MW flow limit should result in AEMO's systems determining an ongoing negative IRSR is occurring and therefore prevent the NRM constraint from deactivating.

Shell Energy supports the proposed change. However, given that the calculation of negative IRSR is inclusive of network losses, we request further consideration of the proposed 20 MW value and whether it will be sufficient for the majority of negative IRSR calculations. Given variations in losses, this may require the use of different values on different directional interconnects. We agree that the proposed change is relatively simple and can be implemented quickly and is unlikely to result in any unforeseen negative issues for the market.

The simple full release on the NRM constraint once negative IRSR are determined to have ceased

Shell notes AEMO's view that implementing the staged or graduated release of the NRM constraint could be more complex to implement. However, in our view this would deliver significant benefits for management of negative IRSR across individual directional interconnectors as well as bidirectional interconnectors forming part of a transmission network loop. The introduction of a graduated release prior to exit from NRM periods would allow negative IRSR to be assessed at progressively higher flow levels on the clamped interconnector. This would help avoid both a premature release of NRM constraints and would also allow the reapplication of reduced interconnector flow limits if negative IRSR is detected in these circumstances.

We recommend that AEMO undertake further consideration of this option. In considering the option of staged or graduated release step changes, we suggest a fixed value option based on a 2 times multiple of the stage interconnector flow limit reduction values set out in Tables 1 and 2. If a negative IRSR was detected during the staged release, the NRM constraint would then reactivate and return the interconnector flow limit to 50% of the increase allowed at the previous trading interval. We consider this to represent a balanced outcome between releasing the interconnector flow limits when it is efficient to do so, whilst continuing to act to minimise negative IRSR should they emerge during the NRM relaxation stage.

The current definition of a negative IRSR event

The current definition of a negative IRSR event involves the consecutive occurrence, on a trading interval basis, of negative IRSR outcomes. A single trading interval of non-negative IRSR following a period of negative IRSR resets the calculation of the $100,000 monitoring threshold. This definition allows the negative IRSR threshold of $100,00 to be breached multiple times in any trading day. In theory, an interconnector could accumulate approximately $14.4M in negative IRSR across a trading day. This could occur if negative to non-negative IRSR pattern was repeated across the 288 five-minute trading intervals in a trading day. Whilst such an occurrence is unlikely, the automated system would allow such an outcome to occur.

Shell Energy considers that it would be more appropriate for a negative IRSR event to be defined as the accumulation of the $100,000 threshold in any trading day. The operation of this would align with the current staged implementation of and proposed staged release of the NRM constraints. NRM would commence once the $100,000 threshold has been exceeded in a trading day and remain effective, but subject to the accumulation of both positive and negative IRSR across the balance of the trading day. Flow limits on the managed interconnector or network loop would be adjusted based on the accumulation of positive or negative IRSR. This proposed change would ensure that large amounts of negative IRSR are not able to accrue across any trading day.

Other issues identified

IRSR calculations for the NRM process

We support the proposal to implement a 5 minute trading interval based IRSR estimation calculation replacing the current 30 minute estimation calculation. This aligns with the NEM's 5 minute settlement process.

Use of 30 minute pre-dispatch estimates in NRM process

Following implementation of the proposed staged or graduated release of the NRM constraint, including Shell Energy's proposal that NRM remain active and staged clamping reactivate if negative IRSR are detected, we consider that the use of the 30 minute pre-dispatch estimates in the NRM process would no longer be required.

Other possible adjustments to NRM processes

We note the comments in the consultation paper regarding potential adjustments to the constraint violation penalty factor applied to the NRM constraint. Whilst acknowledging the issue raised by AEMO regarding co-optimisation of energy and FCAS across a bidirectional interconnector subject to NRM, it is unclear whether the statement of qualitative economic impact has been determined on a marginal or total settlement cost basis. Given the absence of this detail, we are unable to provide an informed opinion regarding this change. We consider significant additional work and consultation is required to demonstrate the benefits of such a change.

Prioritisation of potential changes

When considering the priority ranking of the proposed changes as nominated in Table 5, we consider that the Cycling change should be a higher priority, ie Moderate to High rather than the current priority ranking of

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Moderate. We consider this change will provide significant additional benefit in the management of negative IRSR compared to the proposed simple change from the zero interconnector flow limit.

We also recommend that Shell Energy's proposed change to the definition of a negative IRSR event be added to Table 5 and allocated a priority of Moderate. We consider this proposed change will deliver a large decrease in the accumulation of negative IRSR, the costs of which are ultimately borne by consumers. This change would also increase the value of positive IRSR associated with bidirectional interconnectors located within a transmission network loop by reducing the overall magnitude of negative IRSR.

Please contact Peter Wormald (peter.wormald@shellenergy.com.au) to discuss any questions regarding this submission.

Yours sincerely

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