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WUNI Stage 2: Major Capex Proposal Short-list Consultation

Transpower's System Operator business welcomes the opportunity to submit to Transpower's Transmission business consultation on its WUNI stage 2: Major Capex proposal short-list consultation, published 15 January 2026.

We support option 4b, which proposes duplexing the OTA-WKM circuits in 2030 and implementing series compensation for the BHL-WKM circuits in 2033.

The consultation paper focuses on the options and cost-benefit analysis to support the recommended option. Series compensation is new for our New Zealand power system. In other jurisdictions it has introduced sub-synchronous resonance (SSR) and sub-synchronous control interaction (SSCI) oscillations. Given this, we recommend the Grid Owner continue their consideration of these phenomena, along with any potential mitigations which should be included in the project. This should include ongoing engagement with the System Operator regarding prudent physical mitigations and operational considerations resulting from series compensation.

As the System Operator, we manage the power system using established processes, procedures, and real-time monitoring and analysis tools. To support ongoing progress on this project, we recommend that the Grid Owner collaborates with the System Operator to confirm that our processes and tools are appropriately designed to operate this new technology effectively. The System Operator cannot assess the impacts without knowing the specific type and characteristics of series compensation device(s) under consideration. However, it is likely some investment in System Operator tools and processes would be required to incorporate and operate this investment securely in the power system. The Grid Owner should allow for any such material costs in its application of the Investment Test in the CapexIM to this Major Capex proposal.

This submission outlines the key considerations from a System Operator perspective that the Grid Owner should consider when selecting the series compensation technology, including the adoption of Thyristor Controlled Series Compensation (TCSC). Some of the tool changes, monitoring system and process changes likely required may have long lead times and significant associated cost.

Real-time operation considerations

We anticipate that our SCADA has the capability to model TCSC as this type of technology is operational in other jurisdictions. Depending on the type of TCSC technology, particularly whether it is fixed or variable impedance, we may have to amend our tools and processes to operate the device. Some of the tool changes may have long lead times and significant cost.

As series compensation is known to sometimes cause SSR and SSCI instability, we anticipate that the real-time control room should have some form of wide area monitoring system to monitor oscillation. While this level of monitoring and managing oscillations in the real-time environment is becoming common in other jurisdictions, it would be new to the System Operator and require careful consideration and integration into our current operation processes and procedures. Additionally, sufficient training would need to be provided to coordinators and support teams to equip them with the skills needed to analyse and address real-time operational challenges that may arise from integrating TCSC into our power system.

Market operation considerations

The System Operator must evaluate the type of series compensation devices to determine necessary updates to the market system and potentially to Part 13 of the Code. Series compensated devices with fixed impedance are straightforward to model, but those with variable impedance require Scheduling Pricing Dispatch (SPD) tool modifications and Code amendments. If the transmission business needs to adjust fixed impedance values in future, their offers to the market system must also be modified.

Engineering modelling and support considerations

In line with other reactive assets, our software tools, such as PowerFactory and PSCAD, require detailed models to conduct stability analysis involving series compensation devices. Implementing online stability analysis within the real-time control room environment would be beneficial for managing system stability efficiently. Accordingly, it is necessary to develop models compatible with our online tools, including TSAT and SSAT, to support real-time operational requirements.

We respond to the consultation questions in the following appendix and raise additional points where relevant.

Yours sincerely

Katherine Moore

Head of Power Systems

Appendix – Responses to questions in short-list consultation

Question	Response
Q1. Are there any additional factors we should consider regarding our identified investment need in the Waikato and Upper North Island region?	As BESS uptake increases especially in the WUNI region, this technology will be a key contender as one of the non-transmission solutions (NTS). We suggest you consider the cost to operationalise NTS in real-time environment. If there are changes to the market system or SCADA, these can be costly and involve significant lead times.
Q.2 Do you agree with our approach that the prudent Environmental forecast is the appropriate forecast to inform the investment need?	Yes, it makes sense to use the environmental forecast.
Q3. Do you agree with our assumptions on availability and type of generation at Huntly during winter peak periods? Are there other relevant generation projects we should consider in our analysis?	We agree.
Q4. There is now a grid-connected battery energy storage system (BESS) in the WUNI region, with more projects committed. Based on very limited data available we are proposing an assumption that average BESS output is 15% of nominal capacity during peak load periods. Do you consider this to be appropriately conservative?	Yes, we agree.
Q5. Do you agree with the development plans we have shortlisted? Are there any additional considerations you believe should be included?	Of the four options shortlisted, three are based on series compensation. Given this, more consideration on the operational challenges series compensation can introduce and potential mitigations that may need allowed for.
Q6. Do you agree with the development plans we have short-listed?	As above.
Q7. Do you support the proposed NTS approach?	We agree.
Q8. Do you have any additional information that could materially affect	No comment.

Question	Response
our electricity demand forecast or generation assumptions?	
Q9. Do you consider our proposed weighting of the scenarios to be appropriate?	We agree.
Q10. Do you consider our use of a calculation period of 2034-55 and a standard discount rate of 5% to be appropriate?	No Comment.
Q11. Do you have any feedback on our cost-benefit analysis for this project?	We consider your assumption on AC losses should be tested.
Q12. Do you agree that our preferred option remains robust under sensitivity analysis?	No comment.
Q13. Is our selection of the preferred option (4b) reasonable? How do you view the benefits of the potential for staging in the context of the delivery challenges of duplexing by 2030? Do you support the consideration of an alternative preferred option (4a), as the feasibility of 4b is dependent on consultation feedback and further consideration of duplexing deliverability by 2030?	We agree with the selection of option (4b), noting our comments in our letter and on questions above.