29 September 2025

System Operator
Transpower
By email: system.operator@transpower.co.nz

**Connected Asset Commissioning, Testing and Information Standard**

Meridian appreciates the opportunity to provide feedback on Transpower's draft Connected Asset Commissioning, Testing and Information Standard (CACTIS). This consultation follows the Electricity Authority's consultation last month on a Code amendment proposal to establish the CACTIS as a document incorporated by reference under the Code. Meridian provided feedback on that consultation, including specific comments on the draft CACTIS, in our submission here.

We understand that Transpower will consider feedback provided via the Authority's consultation process once it receives submissions on its own consultation. For easy reference, we are attaching our specific feedback on the CACTIS provided to the Authority in Appendix B to this submission. Our responses to Transpower's specific consultation questions are attached as Appendix A.

We also provided more generalised feedback to the Authority on the approach adopted in the CACTIS. We trust this feedback will be considered by the Authority and/or Transpower, as is appropriate. A high-level summary of the generalised feedback we consider to be directly relevant to Transpower follows. For further details on these points, please refer to our submission to the Authority:

- We are concerned that the draft CACTIS includes changes which signal a shift from a more flexible, collaborative and needs-based approach to more prescriptive requirements; this will impose real costs on asset owners and ultimately consumers;
- Overall, the CACTIS seems to shift more responsibility on to asset owners, including for matters that are predominantly for the SO's benefit; again, this could impose significant additional cost and complexity on asset owners and consumers;
- Some of the CACTIS requirements are likely to introduce greater reliance on third-party consultants, which will introduce additional cost and contractual complexity;

Meridian Energy Limited

Level 2, 55 Lady Elizabeth Lane
PO Box 10-840
Wellington 6143
New Zealand

Phone +64-4 381 1200
Fax +64-4 381 1272
www.meridianenergy.co.nz

- The proposed requirement to use the Transient Security Assessment Tool (TSAT) for final validation will create a reliance on TSAT supplier Powertech; this risks leaving asset owners with an unavoidable and uncontrollable cost;

- It is unclear whether the draft CACTIS is intended to codify the requirements set out in GL-EA-010 Generator Testing Requirements. We recommend that detailed testing requirements are a starting point for negotiation with the SO rather than being compulsory in all situations; and

- It is not clear which obligations will apply to existing assets from the point the CACTIS comes into force and/or whether there will be any transition period for existing assets; this needs to be clarified.

Please contact me if you have any queries regarding this submission. This submission can be published in full.

Nāku noa, nā

Matt Hall
**Principal Advisor – Regulatory and Government Relations**

## Appendix A: Responses to consultation questions

| | Question | Response |
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| 1 | Do you agree that failing to provide key information will have an impact on the commissioning of an asset, power system security and the system operator's ability to meet the PPOs and dispatch objective? | While this is possible, whether it arises in any particular given scenario will depend on a range of factors. |
| 2 | Do you agree with the proposal to mandate minimum time frames for the activities in Chapter 1 of the proposed CACTIS? | Please refer to our comments on Chapter 1 of the CACTIS as attached in Appendix B. |
| 3 | Do you agree with the proposed time frames for asset owners to submit a commissioning plan and for the system operator to review them? | Please refer to our comments on Chapter 1 of the CACTIS as attached in Appendix B. |
| 4 | Do you agree that requiring asset owners to use a standard commissioning plan template would help streamline the preparation and review process? | Please refer to our comments on Chapter 2 of the CACTIS as attached in Appendix B. |
| 5 | Do you agree with the proposed time frames for asset owners to submit asset capability statements at the planning, pre-commissioning, and final stages of the commissioning process, and for the system operator to review them? | Please refer to our comments on Chapter 3 of the CACTIS as attached in Appendix B. |
| 6 | Do you agree that formalising the asset capability statement assessment requirements will provide clarity for asset owners? | No comment. |
| 7 | Do you agree with the proposal to formalise requirements for asset owners to provide urgent or temporary changes to asset capability statements? | Please refer to our comments on Chapter 3 of the CACTIS as attached in Appendix B. |
| 8 | Do you agree with the proposed time frames for asset owners to submit m1 and m2 models, and for the system operator to review them? | Please refer to our comments on Chapter 1 of the CACTIS as attached in Appendix B. |
| 9 | Do you agree that the updated modelling requirements are necessary to reflect the increasing complexity and changing generation | Meridian is not convinced that the updated modelling requirements are necessary. The consultation paper notes that "translating models can result in data loss". We consider such issues could be addressed through specifying appropriate benchmarking between models. |

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| | mix within the New Zealand power system? | The consultation paper also notes that the SO does not have the resources to translate IBR models. This is an issue that could be addressed through increasing the SO's resource. This would help ensure that clear and quantifiable costs are identified to provide this function, which would better allow costs and benefits to be assessed. This would be preferable to shifting this responsibility onto asset owners where costs will be disaggregated across parties and more difficult to quantify. Asset owners should not face the costs arising from the SO's decision to rely on a particular toolset.<br><br>Meridian's view is that it would be reasonable for asset owners to be required to provide encrypted and unencrypted PowerFactory models, an encrypted PSCAD model, and an unencrypted generic model. The SO should undertake any conversion to TSAT that it wishes to do. This would strike the right balance between not placing unreasonable expectations on asset owners and providing the SO with the required information to manage system security.<br><br>Please also refer to our comments on Chapter 4 of the CACTIS as attached in Appendix B. |
| 10 | Do you agree that the system operator needs TSAT and PSCAD software models to conduct the studies needed to maintain power system security and meet the PPOs? | Please refer to our comments on Chapter 4 of the CACTIS as attached in Appendix B. |
| 11 | Do you agree with the proposed time frames for asset owners to submit a final connection study report, and for the system operator to review it? | Please refer to our comments on Chapter 1 of the CACTIS as attached in Appendix B. |
| 12 | Do you agree with the proposed approach of using RMS studies for scenario screening and EMT studies for detailed fault ride through analysis of IBRs? | We consider the requirement to perform both RMS and EMT studies to be too onerous. We suggest that SCR/ESCR studies be used for initial screening with EMT studies used as necessary to provide further insight. Creating a generic requirement to perform both studies will create inefficiencies and place an additional burden on an already busy industry for no apparent gain.<br><br>Please also refer to our comments on Chapter 5 of the CACTIS as attached in Appendix B. |
| 13 | Do you agree with the proposal to require asset owners to repeat fault ride through studies when control system parameters are modified during or after commissioning? | Please refer to our comments on Chapter 5 of the CACTIS as attached in Appendix B. |
| 14 | Do you support the proposed process for accessing encrypted models from other asset owners when needed for fault ride through studies? | The sharing of encrypted models between asset owners is likely to involve multiple non-disclosure agreements (NDAs) between suppliers and consultants which will introduce further inefficiencies and costs to the process. Instead, screening should first be undertaken with generic |

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| | | models to determine the necessity of using more detailed models. An industry-wide NDA might also be considered where Transpower can be the trusted body to issue encrypted models for asset owners to study.<br><br>Please also refer to our comments on Chapter 5 of the CACTIS as attached in Appendix B. |
| 15 | Do you agree with the proposed time frames for asset owners to submit a commissioning plan and for the system operator to review it? | Please refer to our comments on Chapter 1 of the CACTIS as attached in Appendix B. |
| 16 | Do you agree with the proposed time frames for asset owners to submit a final engineering methodology, and for the system operator to review it? | Please refer to our comments on Chapter 1 of the CACTIS as attached in Appendix B. |
| 17 | Do you agree with the proposed testing requirements for wind, solar photovoltaic and BESS technologies? | Please refer to our comments on Chapter 7 of the CACTIS as attached in Appendix B. |
| 18 | Do you agree that the system operator needs the additional data identified in this section to maintain power system security and meet the PPOs? | Please refer to our comments on Chapter 8 of the CACTIS as attached in Appendix B. |
| 19 | Do you agree with the proposal to use high-speed monitoring data to verify asset performance and reduce the need for routine testing of generating stations between 10 MW and 30 MW? | No comment. |
| 20 | Do you agree with the data quality requirements as described in Chapter 9 of the proposed CACTIS for high-speed monitoring and operational reporting? | Please refer to our comments on Chapter 9 of the CACTIS as attached in Appendix B. |
| 21 | Do you currently have the ability to provide the additional information proposed in the draft CACTIS? If not, when do you expect to be able to meet these requirements? | No comment. |

## Appendix B: Feedback on the draft CACTIS

| Chapter | Feedback |
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| 1 | • 1.3 & 1.4 – these clauses provide the SO with too much discretion to unilaterally determine the information that asset owners need to provide and the timeframes for the provision of this information. This risks creating an unreasonable burden on asset owners. Requiring that these things are determined by mutual agreement would place better incentives on both parties to discuss, negotiate and agree information requirements and would be more likely to lead to fit-for-purpose requirements. Alternatively, a mechanism allowing asset owners to challenge information requirements specified by the SO should be introduced.<br>• 1.7 – the 3-month timeframe specified here is overly onerous. Based on our experience, a 1-month timeframe is realistic and sufficient.<br>• 1.16 & 1.17 – we recommend a separate check of final hold point test results be required immediately following commissioning. It is not reasonable for an asset owner to have to wait 4 months to find out if retesting is required. By this point, asset owners have likely disengaged with the OEM.<br>• General – the timeframes for building and connecting new generation projects is often dynamic. They can be impacted by numerous factors, many of which are uncontrollable. We recommend this chapter includes a mechanism to modify the specified information provision timeframes by mutual agreement between the asset owner and SO to retain sufficient flexibility to respond to changing project schedules.<br>• General – it would be helpful to include a definition of “asset” which differentiates between those assets that, when connected to the grid, will have a significant impact on the power system and should therefore be subject to the processes and timeframes set out in the CACTIS, and those that will not have a significant impact. For example, it is possible that an asset owner will connect a substation without generating units attached which would have little to no impact on the power system. |
| 2 | • 2.3 – reference here to a change to a control system setting is too broad and encompasses settings which would have no or little power system impact. Changes to a control system setting should be defined in relation to the limited specific parameters which would impact the power system. Alternatively, flexibility could be provided for the SO and the asset owner to:<br>  ○ agree that particular changes are not material enough to warrant a full commissioning plan; or<br>  ○ modify the commissioning plan template to ensure that it is fit-for-purpose for a particular piece of work.<br>• 2.5 – this clause requires that protection and control settings be specified in a commissioning plan. These settings are currently specified in the engineering methodology document, which is finalised after the commissioning plan. We consider the engineering methodology document will continue to be the appropriate place to detail these settings. We recommend the requirement to include these settings in a commissioning plan be removed. |
| 3 | • 3.5(a) – 2 business days to update the ACS is insufficient in cases where modelling or more complex analysis is required; it can often take weeks to collect the relevant information. We suggest this clause is changed to require that an asset owner notifies the SO immediately about a change to the capability of an asset but is provided 3 weeks to formally update the ACS.<br>• 3.5(b) – this requirement defines “temporary” changes to asset capability as being 4 weeks or less. However, the SO is allowed 20 business days to provide feedback on ACS updates. This could lead to a scenario where the ACS for a temporary change has only just been reviewed before the asset capability changes again. We recommended temporary changes are defined as up to 3 months to avoid such a situation. |

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| 4 | • 4.4 – Meridian's existing hydro and wind models do not include protection systems. This requirement, if applied retrospectively, could impose significant costs.<br>• 4.5 – TSAT models are uncommon and not provided by OEMs. As far as we are aware, there are no third-party resources available in the New Zealand market who could undertake this work as such models are only used by Transpower. A more reasonable approach would be for asset owners to provide a generic model to the SO and for the SO to translate this into TSAT for its own use.<br>• 4.6 – asset owners do not currently have access to unencrypted RMS models. These are directly submitted by the OEM to the SO. If the SO sets out clear and reasonable requirements for these models, we can seek to incorporate this in our contracts with OEMs.<br>• 4.10(d) – requires asset owners to ensure that the models we submit can be used in real time operations. It is unclear to us how we can do this; our understanding is such models do not readily integrate with real time operations. It is also unclear to us whether this clause requires non-dynamic controls to be modelled; we have historically agreed informally with the SO that any systems that act over a longer time period (minutes) are generally not useful to include in dynamic models.<br>• 4.10(f) – this requirement is too vague. Further, we query how this requirement would work if the control signal used is part of an encrypted block.<br>• 4.11(e) – we are unsure if BESS models include a state of charge parameter. We note also that droop and ramp rate settings are agreed between the asset owner and the SO; it is not clear why these would need to be changed by the SO.<br>• 4.12(b) – the reference to phase-locked loop (PLL) settings may become outdated with the increasing integration of grid-forming inverters.<br>• 4.13 – we can only validate encrypted PF, PSCAD and generic WECC models.<br>• 4.14 – as noted, we will not have access to a TSAT model. It will make the most sense to validate the PowerFactory model. We are not sure why validation of the PSCAD model is required here.<br>• 4.15(a) – we understand the need to provide a full model description, however we consider the more specific items listed here are already represented in the model. Providing details of these will create an additional burden for no benefit.<br>• 4.15(f) – it is unlikely that an OEM would provide information on the impact of configurable parameters on control system performance. We consider this requirement is too broad. The SO's focus should be on ensuring the as-left product is stable, not how parameters should be adjusted to make it stable.<br>• 4.15(g) – these models are not one-to-one comparisons so we are unlikely to be able to provide detailed cross-referencing. We will only be able to comment on model features at a high level.<br>• 4.15(i) – it is unclear to us whether we will be able to provide this.<br>• 4.16 – we note this requirement will impose costs on asset owners from providing updated models. As such, it would be helpful if the SO could give sufficient advance notice of upgrades to its software package version to allow asset owners to budget for this expense.<br>• 4.17 – 1 month is not a reasonable timeframe, particularly considering that we have some older assets with no OEM support and there are constraints in accessing the relevant consulting expertise.<br>• 4.19 – we query whether it is a good use of resource to require the submission of an updated validation report when the performance of the asset has not changed. |
| 5 | • 5.12 – undertaking studies of the suitability of an asset's voltage control system settings in conjunction with assets such as STATCOMs and SVCs will require Transpower to provide sufficiently detailed models.<br>• 5.22 & 5.33 – requirements to share encrypted models should be based on mutual discussion and agreement between the relevant asset owners. |

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| 6 | • 6.3(b) – as noted in relation to Chapter 2, reference here to a change to a control system setting is too broad and encompasses settings which would have no or little power system impact. Changes to a control system setting should be defined in relation to the limited specific parameters which would impact the power system.<br>• General – it would be preferable to provide asset owners with greater discretion around when testing is required. Given the obligation on asset owners to meet AOPOs, they are well-incentivised to undertake testing when a change is made that may impact performance.<br>• General – Meridian's view is that the SO should be responsible for undertaking grid-scale PSCAD studies. They hold the relevant information to undertake such studies and/or are best placed to work with other asset owners to obtain the required information. Meridian's recent experience with connecting and commissioning the Ruakākā BESS was that this required significant effort and we expect this will only get more difficult as more renewable generation is added to the system and PSCAD models need to be obtained from more asset owners. We understand in Australia, a grid-scale PSCAD study is conducted by AEMO while the asset owner is responsible for completing studies up to the point of connection (assuming an infinite grid). We recommend such an approach is also adopted in New Zealand. |
| 7 | • 7.3 – we query whether the requirement to undertake model validation every time routine testing is undertaken is an efficient use of resources.<br>• 7.7 – it is not clear what exactly is covered by "modify an existing asset". We presume this would only encompass modifications that affect the likes of PPOs, AOPOs or ACS. It may be helpful to clarify this.<br>• 7.13(a) – it may be helpful to further elaborate on transient response, steady state response and alternating current disturbance response.<br>• 7.13(d) – this requirement will impose a significant burden on the owners of older assets without providing much value.<br>• 7.19 – Typically frequency protection is part of inverter controls rather than protection relays making it difficult to define 'self-monitoring'. We would argue that 10 years would be a sufficient testing frequency if the settings are backed up or duplicated on feeder relays. |
| 8 | • 8.19 – we consider this clause provides too much discretion for the SO to determine what is reasonable. We recommend the information provided is based on negotiation and mutual agreement between the parties.<br>• 8.27 – the requirement for +/- 2% accuracy is likely to be difficult to achieve for assets that don't have metering class CT/VT. |
| 9 | • 9.3 – limiting the provision of data to the specified file types may unnecessarily create additional work. At present, the SO is happy to receive data in PQZIP files. This could instead require the SO and asset owners to work together to ensure the SO is able to read the provided files.<br>• 9.4 – Table K specifies requirements for station-level data. Meridian generally only has data available at a unit level for hydro stations. Is an aggregation of unit data sufficient for this purpose? |